IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-D2DMG-C-D
PRODUCT NAME:	DMC11 CROM AND JUMP TESTS
DATE:	MAY 1977
MAINTAINER:	DIAGNOSTICS
AUTHOR:	FAY BASHAW

1. ABSTRACT

The function of the DMC11 diagnostics is to verify that the option operates according to specifications. The diagnostics verfiy that there are no malfunctions and the all operations of the DMC11 are correct in its environment.

Parameters must be set up to alert the diagnostics to the DMC11 configuration. These parameters are contained in the STATUS TABLE and are generated in two ways: 1) Manual Input - the operator answers questions. 2) Autosizing - the program determines the parameters automatically.

DZDMG tests the DMC11-AR and DMC11-AL micro-processors (M8200-YA M8200-YB). It performs jump tests on the micro-processor and verifies the control ROM of the M8200. This diagnostic will not run on a KMC (M8204), however it is possible to load the KMC CRAM with the DMC micro-code. See test 2 for details.

Currently there are five 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 five 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] Jump and CROM tests
5. DZDMH [REV] Free-running tests (Heat test tape)

2. REQUIREMENTS

2.1 EQUIPMENT

Any PDP11 family CPU (except an LSI-11) with minimum 8K memory
ASR 33 (or equillivalent)
DMC11-AR (M8200-YA) or an DMC11-AL (M8200-YB)

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

&1
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: Innibit error print out
SW 12 Set: Innibit 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 RGMCLK 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 'SCOPI') 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=Ø and SW 12=Ø). 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.

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: 002000
```

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
BIT1=0 DMC11-AR (LOW SPEED)
BIT1=1 DMC11-AL (HIGH SPEED)

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 626 or 16520 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, a 626 indicates a DMC11-AL, and a 16520 indicates a DMC11-AL. 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
****
DZDMG LST
****

```
6       MAINDEC-11-DZDMG-C   DMC11 CROM AND JUMP TESTS
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        ------------------------------------------------------------

1675    ************************* TEST 1 ****************************
        THIS IS A SPECIAL TEST WHICH IS ONLY EXECUTED  ONE TIME,
        THE FIRST PASS AFTER THE DIAGNOSTIC IS LOADED. IT TYPES ON
        THE CONSOLE THE PART NUMBERS OF THE CROMS WHICH THIS
        REVISION SUPPORTS. TO FORCE A TYPE OUT PATCH LOCATION
        ROMNUM: TO A ZERO.

1696    ************************* TEST 2 ****************************
        THIS IS A SPECIAL TEST WHICH WILL RUN ON A KMC (DMC WITH
        WRITTABLE CONTROL STORE) TO LOAL THE CRAM WITH THE DDCMP
        MICRO-CODE. FIRST BE SURE BIT1 OF STAT3 IS SET UP AS FOLLOWS
        1=LOCAL HIGH SPEED CODE,  0=REMOTE LOW SPEED CODE  THE STATUS
        OF STAT3 BIT1 DETERMINES WHICH MICRO-CODE WILL
        BE LOADED IN THE KMC. LOOP ON THIS TEST FOR A FEW SECONDS
        TO LOAD THE KMC.

1727    ************************* TEST 3 ****************************
        TEST OF BR RIGHT SHIFT
        VERIFY THAT A DEST OF BR RSH (011) OF A MICRO-INSTRUCTION
        SHIFTS THE RESULTING BR DATA RIGHT ONCE.

1768    ************************* TEST 4 ****************************
        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.

1773    IF THIS TEST FAILS CHECK YOUR CROM PART NUMBERS.
        DZDMG-C SUPPORTS THE FOLLOWING PART NUMBERS:

        DMC11-AR  (M8200-YA)
                23-414A9
                23-415A9
                23-416A9
                23-417A9
                23-418A9
                23-419A9
                23-420A9
                23-421A9

        DMC11-AL  (M8200-YB)
                23-392A9
                23-393A9
                23-394A9
                23-395A9
                23-396A9
                23-397A9
                23-398A9
                23-399A9
```

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1840    ************************** TEST 5 ****************************
        CROM TEST OF JUMP(1) 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).

1898    ************************** TEST 6 ****************************
        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

1952    ************************** TEST 7 ****************************
        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

2009    ************************** TEST 10 ***************************
        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

2066    ************************** TEST 11 ***************************
        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

2123    ************************** TEST 12 ***************************
        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

2180    ************************** TEST 13 ***************************
        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

2237    ************************** TEST 14 ***************************
        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

2294    ************************** TEST 15 ***************************
        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).

2352    ************************** TEST 16 ***************************
        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).
```

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2410    ************************** TEST 17 ***************************
        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).

2468    ************************** TEST 20 ***************************
        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).

2526    ************************** TEST 21 ***************************
        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).

2584    ************************** TEST 22 ***************************
        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).
```

```
                                ;*MAINDEC-11-DZDMG-C   DMC11 CROM AND JUMP TESTS
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                                ;*-------------------------------------------------------------------

                                ;STARTING PROCEDURE
                                ;LOAD PROGRAM
                                ;LOAD ADDRESS 000200
                                ;SWR=0  AUTOSIZE DMC11
                                ;SW07=1  USE CURRENT DMC11 PARAMETERS
                                ;SW00=1  INPUT NEW DMC11 PARAMETERS
                                ;PRESS START
                                ;PROGRAM WILL TYPE "MAINDEC-11-DZDMG-C   DMC11 CROM AND JUMP TESTS"
                                ;PROGRAM WILL TYPE STATUS MAP
                                ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                                ;AT THE END OF A PASS, PROGRAM WILL TYPE PASS COMPLETE MESSAGE
                                ;AND THEN RESUME TESTING
                                ;SUBSEQUENT RESTARTS WILL NOT TYPE PROGRAM TITLE


                                ;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  005336                                 .PFAIL                  ;POWER FAIL HANDLER
000026  000340                                 340                     ;SERVICE AT LEVEL 7
000030  004750                                 .HLT                    ;ERROR HANDLER
000032  000340                                 340                     ;SERVICE AT LEVEL 7
000034  004716                                 .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  003522                                 $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-C/<377>
(2) 001025     104  041515  030461             .ASCIZ  /DMC11 CROM AND JUMP 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 ITERATIONS 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  003576                                .SCOPE
        104401                          SCOP1=TRAP+1        ;CALL TO LOOP ON CURRENT DATA HANDLER
001332  003736                                .SCOP1
        104402                          TYPE=TRAP+2         ;CALL TO TELETYPE OUTPUT ROUTINE
001334  003766                                .TYPE
        104403                          INSTR=TRAP+3        ;CALL TO ASCII STRING INPUT ROUTINE
001336  004050                                .INSTR
        104404                          INSTER=TRAP+4       ;CALL TO INPUT ERROR HANDLER
001340  004154                                .INSTER
        104405                          PARAM=TRAP+5        ;CALL TO NUMERICAL DATA INPUT ROUTINE
001342  004174                                .PARAM
        104406                          SAV05=TRAP+6        ;CALL TO REGISTER SAVE ROUTINE
001344  004374                                .SAV05
        104407                          RES05=TRAP+7        ;CALL TO REGISTER RESTORE ROUTINE
001346  004434                                .RES05
        104410                          CONVRT=TRAP+10      ;CALL TO DATA OUTPUT ROUTINE
001350  004466                                .CONVRT
        104411                          CNVRT=TRAP+11       ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
001352  004472                                .CNVRT
        104412                          MSTCLR=TRAP+12      ;CALL TO ISUE A MASTER CLEAR
001354  005466                                .MSTCLR
        104413                          DELAY=TRAP+13       ;CALL TO DELAY
001356  005436                                .DELAY
        104414                          ROMCLK=TRAP+14      ;CALL TO CLOCK ROM ONCE
001360  005504                                .ROMCLK
        104415                          DATACLK=TRAP+15     ;CALL TO CLK DATA
001362  005552                                .DATACLK
        104416                          TIMER=TRAP+16       ;CALL TO DELAY A CLOCK TICK
001364  005616                                .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                          DMPO4:  0           ;POINTER TO DMC11 PORT REGISTER(SEL 4)
001414  000000                          DMPO6:  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
```

```
001550  000001          DMCR05: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 05
001552  000001          DMS105: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 05
001554  000001          DMS205: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 05
001556  000001          DMS305: .BLKW   1               ;3RD STATUS WORD

001560  000001          DMCR06: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 06
001562  000001          DMS106: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 06
001564  000001          DMS206: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 06
001566  000001          DMS306: .BLKW   1               ;3RD STATUS WORD

001570  000001          DMCR07: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 07
001572  000001          DMS107: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 07
001574  000001          DMS207: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 07
001576  000001          DMS307: .BLKW   1               ;3RD STATUS WORD

001600  000001          DMCR10: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 10
001602  000001          DMS110: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 10
001604  000001          DMS210: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 10
001606  000001          DMS310: .BLKW   1               ;3RD STATUS WORD

001610  000001          DMCR11: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 11
001612  000001          DMS111: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 11
001614  000001          DMS211: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 11
001616  000001          DMS311: .BLKW   1               ;3RD STATUS WORD

001620  000001          DMCR12: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 12
001622  000001          DMS112: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 12
001624  000001          DMS212: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 12
001626  000001          DMS312: .BLKW   1               ;3RD STATUS WORD

001630  000001          DMCR13: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 13
001632  000001          DMS113: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 13
001634  000001          DMS213: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 13
001636  000001          DMS313: .BLKW   1               ;3RD STATUS WORD

001640  000001          DMCR14: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 14
001642  000001          DMS114: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 14
001644  000001          DMS214: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 14
001646  000001          DMS314: .BLKW   1               ;3RD STATUS WORD

001650  000001          DMCR15: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 15
001652  000001          DMS115: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 15
001654  000001          DMS215: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 15
001656  000001          DMS315: .BLKW   1               ;3RD STATUS WORD

001660  000001          DMCR16: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 16
001662  000001          DMS116: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 16
001664  000001          DMS216: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 16
001666  000001          DMS316: .BLKW   1               ;3RD STATUS WORD

001670  000001          DMCR17: .BLKW   1               ;CONTROL STATUS REGISTER FOR DMC11 NUMBER 17
001672  000001          DMS117: .BLKW   1               ;VECTOR FOR DMC11 NUMBER 17
001674  000001          DMS217: .BLKW   1               ;DDCMP LINE# FOR DMC11 NUMBER 17
001676  000001          DMS317: .BLKW   1               ;3RD STATUS WORD

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
```

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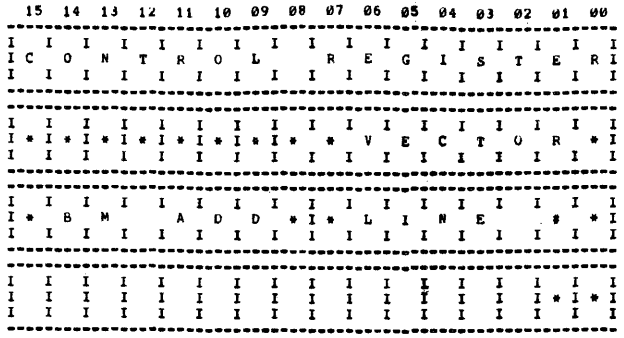
FORMAT OF STATUS TABLE



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 (PROGRAM DZDMI ONLY))
KMC MUST HAVE MICRO-CODE WRITTEN FROM RUNNING
DZDMG TEST 2 FIRST
BIT1=1 DMC11-AL LOCAL HIGH SPEED MICRO-CODE
BIT1=0 DMC11-AR REMOTE LOW SPEED MICRO-CODE


```
468
469                                             ;PROGRAM INITIALIZATION
470                                             ;LOCK OUT INTERRUPTS
471                                             ;SET UP PROCESSOR STACK
472                                             ;SET UP POWER FAIL VECTOR
473                                             ;CLEAR PROGRAM CONTROL FLAGS AND COUNTS
474                                             ;TYPE TITLE MESSAGE
475
476  002002  012737  000340  177776  .START: MOV     #340,PS         ;LOCK OUT INTERRUPTS
477  002010  012706  001200                  MOV     #STACK,SP       ;SET UP STACK
478  002014  012737  005336  000024          MOV     #.PFAIL,@#24    ;SET UP POWER FAIL VECTOR
479  002022  013737  001310  001314          MOV     DMNUM,SAVNUM    ;SAVE NUMBER OF DEVICES IN SYSTEM.
480  002030  005037  012010                  CLR     SWFLG           ;CLEAR SOFT TYPEOUT FLAG
481  002034  105037  001325                  CLRB    ERRFLG          ;CLEAR ERROR FLAG
482  002040  105037  001327                  CLRB    QV.FLG          ;ZERO QUICK VERIFY FLAG
483  002044  012737  001470  001320          MOV     #DM.MAP-10,CREAM;GET MAP POINTER.
484  002052  012737  001676  001322          MOV     #CNT.MAP-4,MILK ;GET PASS COUNT MAP POINTER
485  002060  012737  100000  001316          MOV     #BIT15,RUN      ;POINT POINTER TO FIRST DEVICE.
486  002066  012700  001702                  MOV     #CNT.MAP,R0     ;PASS COUNT POINTER TO R0
487  002072  005020                  23$:    CLR     (R0)+           ;CLEAR TABLE
488  002074  022700  002002                  CMP     #CNT.MAP+100,R0 ;DONE YET?
489  002100  001374                          BNE     23$             ;KEEP GOING
490  002102  005037  001234                  CLR     LSTERR          ;CLEAR LAST ERROR POINTER
491  002106  012737  000001  001226          MOV     #1,TSTNO        ;SET UP FOR TEST 1
492  002114  012737  002002  001214          MOV     #.START,RETURN  ;SET UP FOR POWER FAIL BEFORE
493                                                                  ;TESTING STARTS
494  002122  013746  000006                  MOV     @#6,-(SP)       ;SAVE CURRENT VECTORS
495  002126  013746  000004                  MOV     @#4,-(SP)       ;
496  002132  012737  002166  000004          MOV     #6$,@#4         ;SET UP FOR TIMEOUT
497  002140  012737  177570  001202          MOV     #177570,SWR     ;SET SWR TO HARD SWR ADDRESS
498  002146  012737  177570  001200          MOV     #177570,DISPLAY ;SET DISPLAY TO HARD SWR ADDRESS
499  002154  022777  177777  177420          CMP     #-1,@SWR        ;REFERENCE HARDWARE SWITCH REGISTER
500  002162  001402                          BEQ     6$+2            ;IF = -1 USE SOFT SWR ANYWAY
501  002164  000407                          BR      7$              ;IF IT EXISTS AND NOT = -1 USE HARD SWR
502  002166  022626                  6$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
503  002170  012737  000176  001202          MOV     #SWREG,SWR      ;POINTER TO SOFT SWR
504  002176  012737  000174  001200          MOV     #DISPREG,DISPLAY;POINTER TO SOFT DISPLAY REG
505  002204  012637  000004          7$:     MOV     (SP)+,@#4       ;RESTORE VECTORS
506  002210  012637  000006                  MOV     (SP)+,@#6       ;
507  002214  105737  001324                  TSTB    INIFLG          ;HAS INITIALIZATION BEEN PERFORMED
508  002220  001006                          BNE     20$             ;BR IF YES
509  002222  022737  003522  000042          CMP     #$ENDAD,@#42    ;IF ACT-11 AUTOMATIC MODE, DON'T TYPE ID
510  002230  001402                          BEQ     20$
511  002232  104402  001000                  TYPE    ,MTITLE         ;TYPE TITLE MESSAGE
512  002236  004737  007606          20$:    JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
513  002242  017737  176734  001236          MOV     @SWR,STRTSW     ;STORE STARTING SWITCHES
514  002250  005737  000042                  TST     @#42            ;IS IT RUNNING IN AUTO MODE?
515  002254  001402                          BEQ     .+6             ;BR IF NO
516  002256  005037  001236                  CLR     STRTSW          ;IF YES, CLEAR SWITCHES
517  002262  032737  000001  001236          BIT     #SW00,STRTSW    ;IF SW00=1, QUESTIONS ARE ASKED.
518  002270  001012                          BNE     17$             ;BR IF SW00=1
519  002272  105737  001236                  TSTB    STRTSW          ;BIT7=1??
520  002276  100007                          BPL     17$             ;BR IF SW07=0
521  002300  005737  001306                  TST     DMACTV          ;ARE ANY DEVICES SELECTED?
522  002304  001006                          BNE     16$             ;BR IF YES
523  002306  104402  007154                  TYPE,   NOACT           ;NO DEVICES SELECTED.
```

```
002312  000000                          HALT                    ;STOP THE SHOW
002314  000776                          BR      .-2             ;DISQUALIFY CONTINUE SWITCH
002316  004737  010512          17$:    JSR     PC,AUTO.SIZE    ;GO DO THE AUTO SIZE
002322  105737  001324          16$:    TSTB    INIFLG          ;FIRST TIME?
002326  001410                          BEQ     21$             ;BR IF YES
002330  105737  001236                  TSTB    STRTSW          ;IF USING SAME PARAMETERS DONT TYPE MAP
002334  100431                          BMI     1$
002336  032737  000406  001236          BIT     #BIT1!BIT2,STRTSW;IS TEST NO. OR LOCK SELECTED
002344  001403                          BEQ     24$             ;IF NO THEN TYPE STATUS
002346  000424                          BR      1$              ;IF YES DO NOT TYPE STATUS
002350  005137  001324          21$:    COM     INIFLG          ;SET FLAG
002354  104402  006224          24$:    TYPE    ,XHEAD          ;TYPE HEADER
002360  012704  001500                  MOV     #DM.MAP,R4      ;SET POINTER
002364  010437  001246          5$:     MOV     R4,TEMP1        ;SET ADDRESS
002370  012437  001250                  MOV     (R4)+,TEMP2     ;SET CSR
002374  001411                          BEQ     1$              ;ALL DONE IF ZERO
002376  012437  001252                  MOV     (R4)+,TEMP3     ;SET STAT1
002402  012437  001254                  MOV     (R4)+,TEMP4     ;SET STAT2
002406  012437  001256                  MOV     (R4)+,TEMP5     ;SET STAT3
002412  104410                          CONVRT                  ;TYPE OUT STATUS MAP
002414  007454                          XSTATQ                  ;
002416  000762                          BR      5$
002420  012700  001500          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. THIS TEST MAY REQUIRE 2 OR MORE ATTEMPTS TO GET THE
                                ;;*RIGHT ADDRESSES. AFTER YOU HAVE CHANGED THE ADDRESS TO WHAT IT TOLD
                                ;;*YOU THE FIRST TIME, IT MAY COME BACK AND TELL YOU A DIFFERENT ADDRESS
                                ;;*THE NEXT TIME YOU RUN IT. PLEASE HAVE PATIENCE, THE FINAL ADDRESS
                                ;;*WILL BE CORRECT (AS LONG AS ALL DEVICES IN FRONT OF THE DMC'S ARE
                                ;;*CORRECT).
                                ;;*****************************************************************

002424  013746  000004                  MOV     @#4,-(SP)       ;SAVE LOC 4
002430  013746  000006                  MOV     @#6,-(SP)       ;SAVE LOC 6
002434  005037  000006                  CLR     @#6             ;CLEAR VEC+2
002440  005037  001252                  CLR     TEMP3           ;CLEAR FLAG
002444  005005                          CLR     R5              ;R5=0=DMC, R5=-1=KMC
002446  011037  001404          AUSTRT: MOV     (R0),DMCSR      ;GET NEXT DMC CSR
002452  001564                          BEQ     AUDONE          ;BR IF DONE
002454  005705                          TST     R5              ;DMC OR KMC?
002456  001005                          BNE     1$              ;BR IF KMC
002460  032760  100000  000002          BIT     #BIT15,2(R0)    ;CHECK FOR DMC CSR
002466  001061                          BNE     SKIP            ;SKIP IF NOT DMC
002470  000404                          BR      2$              ;ITS A DMC SO CONTINUE
002472  032760  100000  000002  1$:     BIT     #BIT15,2(R0)    ;CHECK FOR KMC CSR
002500  001454                          BEQ     SKIP            ;SKIP IF NOT KMC
002502  012737  002674  000004  2$:     MOV     #NODEV,@#4      ;SET UP FOR TIMEOUT
002510  005705                          TST     R5              ;DMC OR KMC?
002512  001003                          BNE     3$              ;BR IF KMC
```



```
002514  012703  000006                  MOV     #6,R3           ;R3 IS COUNT OF DEVICES BEFORE DMC
002520  000402                          BR      4$              ;GO ON
002522  012703  000010          3$:     MOV     #10,R3          ;R3 IS COUNT OF DEVICES BEFORE KMC
002526  012702  003010          4$:     MOV     #DEVTAB,R2      ;R2 IS DEVICE TABLE POINTER
002532  012701  160010                  MOV     #160010,R1      ;START WITH ADDRESS 160010
002536  005711          FLOAT:  TST     (R1)            ;CHECK ADDRESS IN R1
002540  111204                          MOVB    (R2),R4         ;IF NO TIMEOUT, GET NEXT ADDRESS
002542  060401                          ADD     R4,R1           ;IN R1
002544  005201                          INC     R1              ;
002546  040401                          BIC     R4,R1           ;
002550  005703                          TST     R3              ;ANY MORE DEVICES TO CHECK FOR?
002552  001371                          BNE     FLOAT           ;BR IF YES
002554  012737  002700  000004          MOV     #ERR,@#4        ;OK ONLY DMC'S ARE LEFT, SET UP FOR TIMEOUT
002562  010137  003022                  MOV     R1,XLOC         ;SAVE FIRST DMC/KMC ADDRESS
002566  005705          FY:     TST     R5              ;DMC OR KMC?
002570  001005                          BNE     1$              ;BR IF KMC
002572  032760  100000  000002          BIT     #BIT15,2(R0)    ;CHECK FOR DMC CSR
002600  001014                          BNE     SKIP            ;SKIP IF NOT DMC
002602  000404                          BR      2$              ;ITS A DMC SO CONTINUE
002604  032760  100000  000002  1$:     BIT     #BIT15,2(R0)    ;CHECK FOR KMC CSR
002612  001407                          BEQ     SKIP            ;SKIP IF NOT KMC
002614  005711          2$:     TST     (R1)            ;CHECK DMC ADDRESS
002616  020137  001404                  CMP     R1,DMCSR        ;DOES IT MATCH
002622  001411                          BEQ     OK              ;BR IF YES
002624  062701  000010                  ADD     #10,R1          ;GET NEXT DMC ADDRESS
002630  000756                          BR      FY              ;DO IT AGAIN
002632  062700  000010          SKIP:   ADD     #10,R0          ;SKIP TO NEXT CSR IN TABLE
002636  011037  001404                  MOV     (R0),DMCSR      ;GET NEXT CSR
002642  001470                          BEQ     AUDONE          ;BR IF DONE
002644  000750                          BR      FY              ;ELSE CONTINUE
002646  062700  000010          OK:     ADD     #10,R0          ;SKIP TO NEXT DMC CSR
002652  062737  000010  003022          ADD     #10,XLOC        ;UPDATE EXPECTED DMC/KMC ADDRESS
002660  011037  001404                  MOV     (R0),DMCSR      ;GET NEXT DMC/KMC CSR
002664  001457                          BEQ     AUDONE          ;BR IF DONE
002666  013701  003022                  MOV     XLOC,R1         ;GET EXPECTED DMC/KMC ADDRESS
002672  000735                          BR      FY              ;CONTINUE
002674  122243          NODEV:  CMPB    (R2)+,-(R3)     ;ON TIMEOUT, INC R2, DEC R3
002676  000002                          RTI                     ;RETURN
002700  005737  001252          ERR:    TST     TEMP3           ;CHECK FLAG IF = 0 TYPE HEADER
002704  001014                          BNE     1$              ;SKIP HEADER
002706  104402                          TYPE                    ;TYPEOUT HEADER MESSAGE
002710  007223                          CONERR                  ;CONFIGURATION ERROR!!!!
002712  012737  002700  001276          MOV     #ERR,SAVPC      ;SAVE PC FOR TYPEOUT
002720  104411                          CNVRT                   ;TYPE OUT ERROR PC
002722  002770                          ERRPC                   ;
002724  104402                          TYPE                    ;TYPE REST OF HEADER
002726  007277                          CNERR                   ;
002730  012737  177777  001252          MOV     #-1,TEMP3       ;SET FLAG SO IT ONLY GETS TYPED ONCE
002736  010137  001262          1$:     MOV     R1,SAVR1        ;SAVE R1 FOR TYPEOUT
002742  104410                          CONVRT
002744  002776                          CONTAB                  ;TYPE CSR VALUES
002746  005705                          TST     R5              ;DMC OR KMC ?
002750  001003                          BNE     3$              ;BR IF KMC
002752  104402                          TYPE
002754  007320                          DMCM
002756  000732                          BR      4$              ;CONTINUE
```

```
                                3$:     TYPE
                                        KMCM
                                4$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
                                        BR      OK              ;BR TO GET OUT
                                ERRPC:  1
                                        .BYTE   6,2
                                        SAVPC
                                CONTAB: 2
                                        .BYTE   6,4
                                        XLOC
                                        .BYTE   6,2
                                        DMCSR
                                DEVTAB: .BYTE   7               ;DJ
                                        .BYTE   17              ;DH
                                        .BYTE   7               ;DQ
                                        .BYTE   7               ;DU
                                        .BYTE   7               ;DUP
                                        .BYTE   7               ;LK
                                        .BYTE   7               ;DMC
                                        .BYTE   7               ;DZ
                                        .BYTE   7               ;KMC
                                .EVEN
                                XLOC:   0
                                AUDONE: TST     R5              ;DMC?
                                        BNE     1$              ;BR IF KMC AND ALL DONE
                                        MOV     #-1,R5          ;SET R5 TO -1 (KMC)
                                        MOV     #DM.MAP,R0      ;RESET R0 TO START OF TABLE
                                        BR      AUSTRT          ;GO DO KMC'S
                                1$:     MOV     (SP)+,@#6       ;RESTORE LOC 6
                                        MOV     (SP)+,@#4       ;RESTORE LOC 4
                                        BIT     #SW03,STRTSW    ;SELECT SPECIFIC DEVICES??
                                        BEQ     3$              ;BR IF NO.
                                        TYPE    ,MNEW           ;TYPE THE MESSAGE.
                                        CLR     R0              ;ZERO DATA LIGHTS
                                        HALT                    ;WAIT FOR USER TO TELL WHAT DEVICES TO RUN
                                        CMP     @SWR,SAVACT     ;IS THE NUMBER VALID?
                                        BLOS    2$              ;BR IF NUMBER IS OK.
                                        TYPE    ,MERR3          ;TELL USER OF INVALID NUMBER.
                                        HALT                    ;STOP EVERY THING.
                                        BR      .-2             ;RESTART THE PROGRAM AGAIN.
                                2$:     MOV     @SWR,DMACTV     ;GET NEW DEVICE PATTERN
                                        MOV     DMACTV,R0       ;SHOW THE USER WHAT HE SELECTED.
                                        HALT                    ;CONTINUE DYNAMIC SWITCHES.
                                3$:     MOV     #300,R0         ;PREPARE TO CLEAR THE FLOATING
                                        MOV     #302,R1         ;VECTOR AREA, 300-776
                                4$:     MOV     R1,(R0)+        ;START PUTTING "PC+2 - HALT"
                                        CLR     (R1)+           ;IN VECTOR AREA.
                                        CMP     (R0)+,(R1)+     ;POP POINTERS
                                        CMP     #1000,R0        ;ALL DONE??
                                        BNE     4$              ;BR IF NO.

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

                                .BEGIN: MOV     #STACK,SP       ;SET UP STACK
                                        MOV     @#6,-(SP)       ;SAVE LOC 6
```



```
                                        MOV     @#4,-(SP)       ;SAVE LOC 4
                                        CLR     R0              ;START AT 0
                                        MOV     #2$,@#4         ;SET UP FOR TIME OUT
                                        CLR     @#6             ;TO AUTOSIZE MEMORY
                                6$:     TST     (R0)+           ;CHECK ADDRESS IN R0
                                        CMP     #157776,R0      ;IS IT AT LEAST 28K
                                        BNE     6$              ;BR IF NO
                                        SUB     #7776,R0        ;SAVE 2K FOR MONITORS
                                7$:     MOV     R0,MEMLIM       ;STORE MEMORY LIMIT
                                        MOV     (SP)+,@#4       ;RESTORE LOC 4
                                        MOV     (SP)+,@#6       ;RESTORE LOC 6
                                        BR      10$             ;CONTINUE
                                2$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
                                        SUB     #4,R0           ;GET LAST GOOD ADDRESS
                                        SUB     #7776,R0        ;SAVE 2K FOR MONITORS
                                        CMP     #30000,R0       ;IS IT 8K?
                                        BNE     7$              ;BR IF NO
                                        MOV     #37400,R0       ;IF 8K DON'T SAVE 2K
                                        BR      7$              ;
                                10$:    MOV     #340,PS         ;LOCK OUT INTERRUPTS
                                        BIT     #BIT2,STRTSW    ;CHECK FOR LOCK ON TEST
                                        BEQ     1$              ;BR IF NO LOCK DESIRED.
                                        TYPE    ,MLOCK          ;TYPE LOCK SELECTED.
                                        MOV     #NOP,TTST       ;ADJUST SCOPE ROUTINE.
                                        MOV     #NOP,TTST+2     ;SET UP TO LOCK
                                        BR      3$              ;CONTINUE ALONG.
                                1$:     MOV     BRW,TTST        ;PREPARE NORMAL SCOPE ROUTINE
                                        MOV     BRX,TTST+2      ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
                                3$:     MOV     #CYCLE,RETURN   ;START AT "CYCLE" FIND WHICH DEVICE TO TEST
                                4$:     BIT     #SW01,STRTSW    ;IS TEST NO. SELECTED?
                                        BNE     5$              ;BR IF YES
                                        TYPE    ,MR             ;TYPE R
                                5$:     JMP     @RETURN         ;START TESTING
```

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

003364  000005                  .EOP:   RESET                   ;MAKE THE  WORLD CLEAN AGAIN.
003365  005037  001234                  CLR     LSTERR          ;CLEAR LAST ERROR PC
003372  105037  001325                  CLRB    ERRFLG          ;CLEAR ERROR FLAG
003376  005237  001230                  INC     PASCNT          ;UPDATE PASS COUNT
003402  013777  001230  175570          MOV     PASCNT,@DISPLAY ;DISPLAY PASS COUNT
003410  104402  005733                  TYPE    ,MEPASS         ;TYPE END PASS
003414  104402  006072                  TYPE    ,MCSRX          ;TYPE CSR
003420  104411  003546                  CNVRT   ,XCSR           ;SHOW IT
003424  104402  006100                  TYPE    ,MVECX          ;TYPE VECTOR
003430  104411  003554                  CNVRT   ,XVEC           ;SHOW IT
003434  104402  006106                  TYPE    ,MPASSX         ;TYPE PASSES
003440  104411  003562                  CNVRT   ,XPASS          ;SHOW IT
003444  104402  006117                  TYPE    ,MERRX          ;TYPE ERRORS
003450  104411  003570                  CNVRT   ,XERR           ;SHOW IT
003454  013700  001322                  MOV     MILK,R0         ;GET POINTER TO PASS COUNT
003460  013720  001230                  MOV     PASCNT,(R0)+    ;STORE PASS COUNT FOR THIS DMC11
003464  013720  001232                  MOV     ERRCNT,(R0)+    ;STORE ERROR COUNT FOR THIS DMC11
003470  005337  001314                  DEC     SAVNUM          ;ARE ALL DEVICES TESTED?
003474  001017                          BNE     RESTRT          ;BR IF NO.
003476  112737  000377  001327          MOVB    #377,QV.FLG     ;SET THE QUICK VERIFY FLAG.
003504  013737  001310  001314          MOV     DMNUM,SAVNUM    ;RESTORE THE COUNT
003512  013701  000042                  MOV     @#42,R1         ;CHECK FOR ACT-11 OR DDP
003516  001406                          BEQ     RESTRT          ;IF NOT, CONTINUE TESTING
003520  000005                          RESET                   ;STOP THE SHOW--CLEAR THE WORLD
003522                          $ENDAD:
003522  004711                          JSR     PC,(R1)
003524  000240                          NOP
003526  000240                          NOP
003530  000240                          NOP
003532  000240                          NOP
003534  012737  010060  001214  RESTRT: MOV     #CYCLE,RETURN
003542  000137  010060                  JMP     CYCLE
003546  000001                  XCSR:   1
003550      006     002                 .BYTE   6,2
003552  001404                          DMCSR
003554  000001                  XVEC:   1
003556      004     002                 .BYTE   4,2
003560  001374                          DMRVEC
003562  000001                  XPASS:  1
003564      006     002                 .BYTE   6,2
003566  001230                          PASCNT
003570  000001                  XERR:   1
003572      006     002                 .BYTE   6,2
003574  001232                          ERRCNT

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

003576  004737  007606          .SCOPE: JSR     PC,CKSWR        ;CKECK FOR SOFT SWR
003602  010016                          MOV     R0,(SP)         ;SAVE R0 ON THE STACK
```



```
003604  032777  040000  175370          BIT     #BIT14,@SWR     ;"LOOP ON THIS TEST"?
003612  001327                  TTST:   BEQ     1$              ;BR IF NO.  (IF LOCK SW01=1; THIS LOC =240)
003614  000437                          BR      3$              ;GOTO 3$    (IF LOCK SW01=1; THIS LOC =240)
003616  005737  003734                  TST     DONE            ;WAS TKCSR DONE SET?
003622  001434                          BEQ     3$              ;BR IF NO (LOCKED ON TEST)
003624  005037  003734                  CLR     DONE            ;YES, CLEAR FLAG
003630  000415                          BR      2$              ;GO TO NEXT TEST
003632  032777  004000  175342  1$:     BIT     #SW11,@SWR      ;DELETE ITERATION?  (QUICK PASS)
003640  001011                          BNE     2$              ;BR IF YES
003642  105737  001327                  TSTB    QV.FLG          ;HAVE PASSES BEECOMPLETED?
003646  001406                          BEQ     2$              ;BR IF QUICK PASS.
003650  005237  001224                  INC     LPCNT           ;UPDATE ITERATION COUNTER
003654  023737  001224  001222          CMP     LPCNT,ICOUNT    ;ARE ALL ITERATIONS DONE??
003662  101414                          BLOS    3$              ;BR IF NOT YET
003664  105037  001325          2$:     CLRB    ERRFLG          ;PREPARE FOR NEW TEST
003670  005037  001224                  CLR     LPCNT           ;START ICOUNTER AT 0
003674  005037  001220                  CLR     LOCK
003700  012737  000020  001222          MOV     #20,ICOUNT      ;RESET ITERATIONS
003706  013737  001216  001214          MOV     NEXT,RETURN     ;GET NEXT TEST
003714  011600                  3$:     MOV     (SP),R0         ;POP R0 OFF OF THE STACK
003716  022626                          POP2SP                  ;FAKE AN "RTI"
003720  013701  001404                  MOV     DMCSR,R1        ;R1 CONTAINS BASE DMC ADDRESS
003724  000177  175264                  JMP     @RETURN         ;GO DO THE TEST
003730  001407                  BRW:    1407
003732  000437                  BRA:    437
003734  000000                  DONE:   0

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

003736  004737  007606          .SCOP1: JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
003742  032777  001000  175232          BIT     #SW09,@SWR      ;IS SW09=1(SET)?
003750  001405                          BEQ     1$              ;BR IF NOT SET.
003752  005737  001220                  TST     LOCK
003756  001402                          BEQ     1$
003760  013716  001220                  MOV     LOCK,(SP)       ;GOTO THE ADDRESS IN LOCK.
003764  000002                  1$:     RTI                     ;GO BACK.

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

003766  010546                  .TYPE:  MOV     R5,-(SP)        ;SAVE R5 ON THE STACK.
003770  017605  000002                  MOV     @2(SP),R5       ;GET ADDRESS OF MESSAGE.
003774  062766  000002  000002          ADD     #2,2(SP)        ;POP OVER ADDRESS.
004002  005737  010016          4$:     TST     SWFLG           ;SOFT SWR MESSAGE?
004006  001004                          BNE     1$              ;IF YES TYPE IT OUT REGARDLESS OF SW12
004010  032777  010000  175164          BIT     #SW12,@SWR      ;INHIBIT ALL PRINT OUT??
004016  001012                          BNE     3$              ;BR IF NO PRINT OUT WANTED (SW12=1)
004020  105715                  1$:     TSTB    (R5)            ;IS NUMBER MINUS? (MSB=1(BIT7))
004022  100002                          BPL     2$              ;BR IF NUMBER IS PLUS
004024  104402                          TYPE    ,MCRLF          ;TYPE A CR/LF!
004030  105777  175151          2$:     TSTB    @TPCSR          ;TTY READY?
004034  100375                          BPL     2$              ;BR IF NO.
004036  112577  175150                  MOVB    (R5)+,@TPDBF    ;PRINT CURRENT CHAR.
004042  001357                          BNE     4$              ;IF NOT ZERO KEEP PRINTING!
```

```
 837  004046  000002                          RTI                     ;GO HOME
 838                                          ;-----------------------
 839
 840  004050  010346                  .INSTR: MOV     R3,-(SP)        ;SAVE R3 ON STACK
 841  004052  010446                          MOV     R4,-(SP)        ;SAVE R4 ON STACK
 842  004054  317637  000004  004072          MOV     @4(SP),.MSG
 843  004062  062766  000002  000004          ADD     #2,4(SP)
 844  004070  104402                  .INST1: TYPE
 845  004072  000000                  .MSG:   0
 846  004074  012704  007502                  MOV     #INBUF,R4
 847  004100  012703  000007                  MOV     #7,R3
 848  004104  105777  175074          1$:     TSTB    @TKCSR
 849  004110  100375                          BPL     1$
 850  004112  117714  175070                  MOVB    @TKDBR,(R4)
 851  004116  142714  000200                  BICB    #200,(R4)
 852  004122  122427  000015                  CMPB    (R4)+,#15
 853  004126  001417                          BEQ     INSTR2
 854  004130  105777  175054          2$:     TSTB    @TPCSR
 855  004134  100375                          BPL     2$
 856  004136  017777  175044  175046          MOV     @TKDBR,@TPDBR
 857  004144  005303                          DEC     R3
 858  004146  001356                          BNE     1$
 859  004150  012604                          MOV     (SP)+,R4
 860  004152  012603                          MOV     (SP)+,R3
 861  004154  104402  005666          .INST2: TYPE    ,MQM
 862  004160  010346                          MOV     R3,-(SP)
 863  004162  010446                          MOV     R4,-(SP)
 864  004164  000741                          BR      .INST1
 865  004166  012604                  INSTR2: MOV     (SP)+,R4        ;RESTORE R4
 866  004170  012603                          MOV     (SP)+,R3        ;RESTORE R3
 867  004172  000002                          RTI
 868
 869                                          ;CONVERT ASCII STRING TO OCTAL
 870                                          ;----------------------------
 871
 872  004174  010546                  .PARAM: MOV     R5,-(SP)
 873  004176  010446                          MOV     R4,-(SP)
 874  004200  016605  000004                  MOV     4(SP),R5
 875  004204  012537  004364                  MOV     (R5)+,LOLIM
 876  004210  012537  004366                  MOV     (R5)+,HILIM
 877  004214  012537  004370                  MOV     (R5)+,DEVADR
 878  004220  112537  004372                  MOVB    (R5)+,LOBITS
 879  004224  112537  004373                  MOVB    (R5)+,ADRCNT
 880  004230  010566  000004                  MOV     R5,4(SP)
 881  004234  005005                  PARAM1: CLR     R5
 882  004236  012704  007502                  MOV     #INBUF,R4
 883  004242  122714  000015                  CMPB    #15,(R4)
 884  004246  001420                          BEQ     PARERR
 885  004250  121427  000060          1$:     CMPB    (R4),#60
 886  004254  002415                          BLT     PARERR
 887  004256  121427  000067                  CMPB    (R4),#67
 888  004262  003012                          BGT     PARERR
 889  004264  142714  000060                  BICB    #60,(R4)
 890  004270  152405                          BISB    (R4)+,R5
 891  004272  122714  000015                  CMPB    #15,(R4)
 892  004276  001406                          BEQ     LIMITS
```



```
 893  004300  006305                          ASL     R5
 894  004302  006305                          ASL     R5
 895  004304  006305                          ASL     R5
 896  004306  000763                          BR      1$
 897  004310  104404                  PARERR: INSTER
 898  004312  000750                          BR      PARAM1
 899
 900                                          ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
 901                                          ;--------------------------------------
 902
 903  004314  020537  004366          LIMITS: CMP     R5,HILIM
 904  004320  101373                          BHI     PARERR
 905  004322  020537  004364                  CMP     R5,LOLIM
 906  004326  103770                          BLO     PARERR
 907  004330  133705  004372                  BITB    LOBITS,R5
 908  004334  001365                          BNE     PARERR
 909
 910                                          ;STORE NUMBER AT SPECIFIED ADDRESS
 911
 912  004336  013704  004370                  MOV     DEVADR,R4
 913  004342  010524                  1$:     MOV     R5,(R4)+
 914  004344  062705  000002                  ADD     #2,R5
 915  004350  105337  004373                  DECB    ADRCNT
 916  004354  001372                          BNE     1$
 917  004356  012604                          MOV     (SP)+,R4
 918  004360  012605                          MOV     (SP)+,R5
 919  004362  000002                          RTI
 920  004364  000000                  LOLIM:  0
 921  004366  000000                  HILIM:  0
 922  004370  000000                  DEVADR: 0
 923  004372  000000                  LOBITS: 0
 924          004373                  ADRCNT=LOBITS+1
 925
 926                                          ;SAVE PC OF TEST THAT FAILED AND R0-R5
 927                                          ;-------------------------------------
 928
 929  004374  016637  000004  001276  .SAV05: MOV     4(SP),SAVPC     ;SAVE R7 (PC)
 930
 931                                          ;SAVE R0-R5
 932
 933  004402  010537  001272          SV05:   MOV     R5,SAVR5        ;SAVE R5
 934  004406  010437  001270                  MOV     R4,SAVR4        ;SAVE R4
 935  004412  010337  001266                  MOV     R3,SAVR3        ;SAVE R3
 936  004416  010237  001264                  MOV     R2,SAVR2        ;SAVE R2
 937  004422  010137  001262                  MOV     R1,SAVR1        ;SAVE R1
 938  004426  010037  001260                  MOV     R0,SAVR0        ;SAVE R0
 939  004432  000002                          RTI                     ;LEAVE.
 940
 941                                          ;RESTORE R0-R5
 942
 943  004434  013700  001260          .RES05: MOV     SAVR0,R0        ;RESTORE R0
 944  004440  013701  001262                  MOV     SAVR1,R1        ;RESTORE R1
 945  004444  013702  001264                  MOV     SAVR2,R2        ;RESTORE R2
 946  004450  013703  001266                  MOV     SAVR3,R3        ;RESTORE R3
 947  004454  013704  001270                  MOV     SAVR4,R4        ;RESTORE R4
 948  004460  013705  001272                  MOV     SAVR5,R5        ;RESTORE R5
```

```
 949  004464  000002                        RTI                     ;LEAVE
 950
 951                                          ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
 952                                          ;-----------------------------------------------------
 953
 954  004466  104402  005672          .CONVR: TYPE    ,MCRLF
 955  004472  010046                  .CNVRI: MOV     R0,-(SP)
 956  004474  010146                          MOV     R1,-(SP)
 957  004476  010346                          MOV     R3,-(SP)
 958  004500  010446                          MOV     R4,-(SP)
 959  004502  010546                          MOV     R5,-(SP)
 960  004504  017601  000012                  MOV     @12(SP),R1
 961  004510  062766  000002  000012          ADD     #2,12(SP)
 962  004516  012137  004710                  MOV     (R1)+,WRDCNT
 963  004522  112137  004712          1$:     MOVB    (R1)+,CHRCNT
 964  004526  112137  004713                  MOVB    (R1)+,SPACNT
 965  004532  013137  004714                  MOV     @(R1)+,BINWRD
 966  004536  122737  000003  004712          CMPB    #3,CHRCNT
 967  004544  001003                          BNE     2$
 968  004546  042737  177400  004714          BIC     #177400,BINWRD
 969  004554  013704  004714          2$:     MOV     BINWRD,R4
 970  004560  113705  004712                  MOVB    CHRCNT,R5
 971  004564  012700  001416                  MOV     #TEMP,R0
 972  004570  010403                  3$:     MOV     R4,R3
 973  004572  042703  177770                  BIC     #177770,R3
 974  004576  062703  000060                  ADD     #060,R3
 975  004602  110320                          MOVB    R3,(R0)+
 976  004604  000241                          CLC
 977  004606  006004                          ROR     R4
 978  004610  000241                          CLC
 979  004612  006004                          ROR     R4
 980  004614  000241                          CLC
 981  004616  006004                          ROR     R4
 982  004620  005305                          DEC     R5
 983  004622  001362                          BNE     3$
 984  004624  012703  007544                  MOV     #MDATA,R3
 985  004630  114023                  4$:     MOVB    -(R0),(R3)+
 986  004632  105337  004712                  DECB    CHRCNT
 987  004636  001374                          BNE     4$
 988  004640  105737  004713                  TSTB    SPACNT
 989  004644  001405                          BEQ     6$
 990  004646  112723  000040          5$:     MOVB    #040,(R3)+
 991  004652  105337  004713                  DECB    SPACNT
 992  004656  001373                          BNE     5$
 993  004660  105013                  6$:     CLRB    (R3)
 994  004662  104402  007544                  TYPE    ,MDATA
 995  004666  005337  004710                  DEC     WRDCNT
 996  004672  001313                          BNE     1$
 997  004674  012605                          MOV     (SP)+,R5
 998  004676  012604                          MOV     (SP)+,R4
 999  004700  012603                          MOV     (SP)+,R3
1000  004702  012601                          MOV     (SP)+,R1
1001  004704  012600                          MOV     (SP)+,R0
1002  004706  000002                          RTI
1003  004710  000000                  WRDCNT: 0
1004  004712  000000                  CHRCNT: 0
```



```
1005          004713                    SPACNT=CHRCNT+1
1006  004714  000000                    BINWRD: 0
1007
1008
1009                                          ;TRAP DISPATCH SERVICE
1010                                          ;ARGUMENT OF TRAP IS EXTRACTED
1011                                          ;AND USED AS OFFSET TO OBTAIN POINTER
1012                                          ;TO SELECTED SUBROUTINE
1013
1014  004716  011646                  .TRPSR: MOV     (SP),-(SP)      ;GET PC OF RETURN
1015  004720  162716  000002                  SUB     #2,(SP)         ;=PC OF TRAP
1016  004724  017616  000000                  MOV     @(SP),(SP)      ;GET TRP
1017  004730  006316                  TRPOK:  ASL     (SP)            ;MULTIPLY TRAP ARG BY 2
1018  004732  042716  177001                  BIC     #177001,(SP)    ;CLEAR UNWANTED BITS
1019  004736  062716  001330                  ADD     #.TRPTAB,(SP)   ;POINTER TO SUBROUTINE ADDRESS
1020  004742  017616  000000                  MOV     @(SP),(SP)      ;SUBROUTINE ADDRESS
1021  004746  000136                          JMP     @(SP)+          ;GO TO SUBROUTINE
1022
1023                                          ;ERROR HANDLER
1024                                          ;-------------
1025
1026  004750  004737  007606          .HLT:   JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
1027  004754  032777  010000  174220          BIT     #SW12,@SWR      ;BELL ON ERROR?
1028  004762  001406                          BEQ     XBX             ;BR IF NO BELL
1029  004764  105777  174220                  TSTB    @TPCSR          ;TTY READY.
1030  004770  100003                          BPL     XBX             ;DON'T WAIT IF TTY NOT READY.
1031  004772  112777  000207  174212          MOVB    #207,@TPDBR     ;PUSH A BELL AT THE TTY.
1032  005000  032777  020000  174174  XBX:    BIT     #SW13,@SWR      ;DELETE ERROR PRINT OUT?
1033  005006  001105                          BNE     HALTS           ;BR IF NO PRINT OUT WANTED.
1034  005010  321637  001234                  CMP     (SP),LSTERR     ;WAS THIS ERROR FOUND LAST TIME?
1035  005014  001404                          BEQ     1$              ;BR IF YES
1036  005016  011637  001234                  MOV     (SP),LSTERR     ;RECORD BEING HERE
1037  005022  105037  001325                  CLRB    ERRFLG          ;PREPARE HEADER
1038  005026  104406                  1$:     SAV05                   ;SAVE ALL PROC REGISTERS
1039  005030  011605                          MOV     (SP),R5         ;GET THE PC OF ERROR
1040  005032  162705  000002                  SUB     #2,R5           ;GET ADDRESS OF TRAP CALL
1041  005036  011504                          MOV     (R5),R4         ;GET HLT INSTRUCTION
1042  005040  006304                          ASL     R4              ;MULT BY TWO
1043  005042  061504                          ADD     (R5),R4         ;DOUBLE IT
1044  005044  006304                          ASL     R4              ;MULT AGAIN
1045  005046  042704  177001                  BIC     #177001,R4      ;CLEAR JUNK
1046  005052  062704  027602                  ADD     #.ERRTAB,R4     ;GET POINTER
1047  005056  012437  005172                  MOV     (R4)+,ERRMSG    ;GET ERROR MESSAGE
1048  005062  012437  005204                  MOV     (R4)+,DATAHD    ;GET DATA HEADRER
1049  005066  011437  005216                  MOV     (R4),DATABP     ;GET DATA TABLE
1050  005072  105737  001325                  TSTB    ERRFLG          ;TYPE HEADREER
1051  005076  001403                          BEQ     TYPMSG          ;BR IF YES
1052  005100  005737  005216                  TST     DATABP          ;DOES DATA TABLE EXIST?
1053  005104  001010                          BNE     TYPDAT          ;BR IF YES.
1054  005106  104402  005672          TYPMSG: TYPE    ,MCRLF
1055  005112  104402  005672                  TYPE    ,MCRLF
1056  005116  005737  001220                  IST     LOCK
1057  005122  001402                          BEQ     1$
1058  005124  104402  006142                  TYPE    ,MASTER
1059  005130  104402  006130          1$:     TYPE    ,MTSTN
1060  005134  104411  005330                  CNVRI   ,XTSTN          ;SHOW IT
```

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1061  005140  104402  006217                  TYPE    ,MERRPC         ;TYPE PC.
1062  005144  104411  005322                  CNVRT   ,ERTAB0         ;SHOW IT
1063  005150  104402  005672                  TYPE    ,MCRLF          ;GIVE A CR/LF
1064  005154  112737  177777  001325          MOVB    #-1,ERRFLG      ;NO MORE HEADER UNLESS NO DATA TABLE.
1065  005162  005737  005172                  TST     ERRMSG          ;IS THERE AN ERROR MESSAGE?
1066  005166  001402                          BEQ     WRKO.FM         ;BR IF NO.
1067  005170  104402                          TYPE                    ;TYPE
1068  005172  000000                  ERRMSG: 0                       ;    ERROR MESSAGE
1069  005174                           WRKO.FM:                        ;
1070  005174  005737  005204                  TST     DATAHD          ;DATA HEADER?
1071  005200  001402                          BEQ     TYPDAT          ;BR IF NO
1072  005202  104402                          TYPE                    ;TYPE
1073  005204  000000                  DATAHD: 0                       ;    DATA HEADER
1074  005206  005737  005216          TYPDAT: TST     DATABP          ;DATA TABLE?
1075  005212  001402                          BEQ     RESREG          ;BR IF NO.
1076  005214  104410                          CONVRT                  ;SHOW
1077  005216  000000                  DATABP: 0                       ;    DATA TABLE
1078  005220  104407                  RESREG: RES05                   ;RESTORE PROC REGISTERS
1079  005222  022737  003522  000042  HALTS:  CMP     #$ENDAD,@#42    ;IF ACT-11 AUTOMATIC MODE, HALT!!
1080  005230  001403                          BEQ     1$
1081  005232  005777  173744                  TST     @SWR            ;HALT ON ERROR?
1082  005236  100005                          BPL     EXITER          ;BR IF NO HALT ON ERROR
1083  005240  010046                  1$:     PUSHR0                  ;SAVE R0
1084  005242  016600  000002                  MOV     2(SP),R0        ;SHOW ERROR PC IN DATA LIGHTS
1085  005246  000000                          HALT                    ;HALT
1086  005250  012600                          POPR0                   ;GET R0
1087  005252  005237  001232          EXITER: INC     ERRCNT          ;UPDATE ERROR COUNT
1088  005256  032777  000400  173716          BIT     #SW08,@SWR      ;GOTO TOP OF TEST?
1089  005264  001007                          BNE     1$              ;BR IF YES
1090  005266  032777  002000  173706          BIT     #SW10,@SWR      ;GOTO NEXT TEST?
1091  005274  001411                          BEQ     2$              ;BR IF NO
1092  005276  013737  001216  001214          MOV     NEXT,RETURN     ;SET FOR NEXT TEST
1093  005304  012706  001200          1$:     MOV     #STACK,SP       ;RESET SP
1094  005310  013701  001404                  MOV     DMCSR,R1        ;SET UP R1
1095  005314  000177  173674                  JMP     @RETURN         ;GOTO SPECIFIED TEST
1096  005320  000002                  2$:     RTI                     ;RETURN
1097  005322  000001                  ERTAB0: 1
1098  005324     006     002                  .BYTE   6,2
1099  005326  001276                          SAVPC
1100  005330  000001                  XTSTN:  1
1101  005332     003     002                  .BYTE   3,2
1102  005334  001226                          TSTNO
1103                                           ;ENTER HERE ON POWER FAILURE
1104                                           ;-------------------------
1105
1106
1107  005336                           .PFAIL:
1108  005336  012737  005350  000024          MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
1109  005344  000000                          HALT                            ;HALT ON POWER DOWN NORMAL
1110  005346  000777                          BR      .
1111
1112                                           ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
1113
1114  005350                           RESTAR:
1115  005350  012737  005336  000024          MOV     #.PFAIL,24      ;SET UP FOR POWER FAILURE
1116  005356  012706  001200                  MOV     #STACK,SP       ;RESET THE STACK POINTER
```



```
1117  005362  013701  001404                  MOV     DMCSR,R1        ;RESTORE R1
1118  005366  005037  001416                  CLR     TEMP            ;READY FOR TIMMER
1119  005372  005237  001416                  INC     TEMP            ;PLUS ONE TO THE TIMER!
1120  005376  001375                          BNE     .-4             ;BR IF MORE TO GO
1121  005400  104402  005675                  TYPE    ,MPFAIL         ;TYPE THE MESSAGE
1122  005404  104411  005430                  CNVRT   ,PFTAB          ;TELL WHAT TEST TO RETURN TO.
1123  005410  105037  001325                  CLRB    ERRFLG          ;START CLEAN
1124  005414  005037  001234                  CLR     LSTERR          ;**********
1125  005420  005011                          CLR     (R1)            ;CLEAR MAINT BITS
1126  005422  104412                          MSTCLR                  ;START CLEAN UP OF DEVICE
1127  005424  000177  173564                  JMP     @RETURN         ;START DOING THAT TEST AGAIN.
1128  005430  000001                  PFTAB:  1
1129  005432     003     002          .BYTE   3,2
1130  005434  001226                          TSTNO
1131
1132  005436                           .DELAY:
1133  005436  012777  000020  173746          MOV     #20,@DMPO4
1134  005444  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1135  005446  121111                          121111                  ;POKE CLOCK DELAY BIT
1136  005450                           1$:
1137  005450  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1138  005452  121224                          121224                  ;PORT4_1BUS*11
1139  005454  032777  000020  173730          BIT     #BIT4,@DMPO4    ;IS CLOCK BIT SET?
1140  005462  001772                          BEQ     1$              ;BR IF NO
1141  005464  000002                          RTI
1142
1143  005466                           .MSTCLR:
1144  005466  152777  000100  173712          BISB    #BIT6,@DMCSRH   ;SET MASTER CLEAR
1145  005474  142777  000300  173704          BICB    #BIT6!BIT7,@DMCSRH  ;CLEAR MASTER CLEAR AND RUN
1146  005502  000002                          RTI                     ;RETURN
1147
1148  005504                           .ROMCLK:
1149  005504  152777  000002  173674          BISB    #BIT1,@DMCSRH   ;SET ROMI
1150  005512  013677  173676                  MOV     @(SP)+,@DMPO6   ;LOAD INSTRUCTION IN SEL6
1151  005516  062746  000002                  ADD     #2,-(SP)        ;ADJUST STACK
1152  005522  032777  000100  173452          BIT     #SW06,@SWR      ;BR IF SW06 =1
1153  005530  001401                          BEQ     1$              ;BR IF SW06 =0
1154  005532  000000                          HALT                    ;HALT BEFORE CLOCKING INSTRUCTION
1155  005534  152777  000003  173644  1$:     BISB    #BIT1!BIT0,@DMCSRH ;CLOCK INSTRUCTION
1156  005542  142777  000007  173636          BICB    #BIT2!BIT1!BIT0,@DMCSRH  ;CLEAR ROM0, ROM1, STEP
1157  005550  000002                          RTI
1158
1159  005552                           .DATACLK:
1160  005552  013637  001416                  MOV     @(SP)+,TEMP     ;PUT TICK COUNT IN TEMP
1161  005556  062746  000002                  ADD     #2,-(SP)        ;ADJUST STACK
1162  005562  152777  000020  173616  1$:     BISB    #BIT4,@DMCSRH   ;SET STEP LO
1163  005570  027777  173610  173600          CMP     @DMCSR,@DMCSR   ;WASTE TIME
1164  005576  142777  000020  173602          BICB    #BIT4,@DMCSRH   ;CLEAR STEP LO
1165  005604  005337  001416                  DEC     TEMP            ;DEC TICK COUNT
1166  005610  001364                          BNE     1$              ;BR IF NOT DONE
1167  005612  000002                          RTI                     ;RETURN
1168  005614  000001                  3$:     .BLKW 1
1169
1170  005616                           .TIMER:
1171  005616  013637  001416                  MOV     @(SP)+,TEMP     ;MOVE COUNT TO TEMP
1172  005622  062746  000002                  ADD     #2,-(SP)        ;ADJUST STACK
```

```
1173  005626                                  1$:
1174  005626  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1175  005630  021364                                  021364                  ;PORT4_IBUS* REG11
1176  005632  032777  000002  173552                  BIT     #2,@DMPU4       ;IS PGM CLOCK BIT CLEAR?
1177  005640  001772                                  BEQ     1$              ;BR IF YES
1178  005642                                  2$:
1179  005642  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1180  005644  021364                                  021364                  ;PORT4_IBUS* REG11
1181  005646  032777  000002  173536                  BIT     #2,@DMPU4       ;IS PGM CLOCK BIT SET?
1182  005654  001372                                  BNE     2$              ;BR IF YES
1183  005656  005337  001416                          DEC     TEMP            ;DEC COUNT
1184  005662  001361                                  BNE     1$              ;BR IF NOT DONE
1185  005664  000002                                  RTI                     ;RETURN
1186
1187  005666  020040  000077                  MQM:    .ASCIZ  / ?/
 (2)  005672  005015      000                 MCRLF:  .ASCIZ   <15><12>
 (2)  005675     377  053520  020122          MPFAIL: .ASCIZ <377>/PWR FAILED, RESTART AT TEST /
 (2)  005733     377  047105  020104          MEPASS: .ASCIZ <377>/END PASS DZDMG  /
 (2)  005755     377  000122                  MR:     .ASCIZ <377>/R/
 (2)  005760  047377  020117  042504          MERR2:  .ASCIZ <377>/NO DEVICES PRESENT./
 (2)  006005     377  047111  052523          MERR3:  .ASCIZ <377>/INSUFFICIENT DATA!/
 (2)  006031     377  042524  052123          MTSTPC: .ASCIZ <377>/TEST PC=/
 (2)  006043     377  047514  045503          MLOCK:  .ASCIZ <377>/LOCK ON SELECTED TEST/
 (2)  006072  051503  035122  000040          MCSRX:  .ASCIZ  /CSR: /
 (2)  006100  042526  035103  000040          MVECX:  .ASCIZ /VEC: /
 (2)  006106  040520  051523  051505          MPASSX: .ASCIZ /PASSES: /
 (2)  006117     105  051122  051117          MERRX:  .ASCIZ /ERRORS: /
 (2)  006130  042524  052123  047040          MTSTN:  .ASCIZ /TEST NO: /
 (2)  006142  000052                          MASTER: .ASCIZ /*/
 (2)  006144  051777  052105  051440          MNEW:   .ASCIZ <377>/SET SWITCH REG TO DMC11'S DESIRED ACTIVE./
 (2)  006217     120  035103  000040          MERRPC: .ASCIZ /PC: /
 (2)  006224  020212  020040  020040          XHEAD1: .ASCII <212>/           MAP OF DMC11 STATUS/
 (2)  006263     377  020040  020040                  .ASCII <377>/           ----------------/
 (2)  006322  020212  050040  020103                  .ASCII <212>/  PC      CSR     STAT1    STAT2    STAT3/
 (2)  006374  026777  026455  026455                  .ASCIZ <377>/------   ------  ------   ------   ------/
 (2)  006450  044377  053517  046440          NUM:    .ASCIZ <377>/HOW MANY DMC11'S TO BE TESTED?/
 (2)  006510  041777  051123  040440          CSR:    .ASCIZ <377>/CSR ADDRESS?/
 (2)  006526  053377  041505  047524          VEC:    .ASCIZ <377>/VECTOR ADDRESS?/
 (2)  006547     377  051102  050040          PRIO:   .ASCIZ <377>/BR PRIORITY LEVEL? (4,5,6,7)?/
 (2)  006606  044777  020106  046504          CRAM:   .ASCIZ <377>/IF DMC HAS CRAM (M8204) TYPE "Y", IF CROM (M8200) TYPE "N"
 (2)  006704  053777  044510  044103          MODU:   .ASCIZ <377>/WHICH LINE UNIT? IF NONE TYPE "R", IF M8201 TYPE "1", IF M
 (2)  007016  051777  044527  041524          LINE:   .ASCIZ <377>/SWITCH PAC#1 (DDCMP LINE #)?/
 (2)  007054  051777  044527  041524          BM:     .ASCIZ <377>/SWITCH PAC#2 (BM873 BOOT ADD)?/
 (2)  007114  044777  020123  044124          CONN:   .ASCIZ <377>/IS THE LOOP BACK CONNECTOR ON?/
 (2)  007154  047377  020117  042504          NOACT:  .ASCIZ <377>/NO DEVICES ARE SELECTED/
 (2)  007205     377  051412  051127          SWMES:  .ASCIZ <377><12>/SWR= /
 (2)  007215     116  053505  020077          SWMES1: .ASCIZ /NEW? /
 (2)  007223     377  042377  041515          CONERR: .ASCIZ <377><377>/DMC11 FOUND AT NON-STANDARD ADDRESS  PC: /
 (2)  007277     377  054105  042520          CNERR:  .ASCIZ <377>/EXPECTED  FOUND/
 (2)  007320  024040  046504  024503          DMCM:   .ASCIZ / (DMC) /
 (2)  007330  024040  046513  024503          KMCM:   .ASCIZ / (KMC) /
 (2)  007340  042377  041515  030461          SPEED:  .ASCIZ <377>/DMC11-AR(REMOTE,LOW SPEED) OR DMC11-AL(LOCAL,HIGH SPEED) T
 (2)                                          .EVEN
 (2)  007454  000005                          XSTATQ: 5
1188  007456     006     003                          .BYTE   6,3
1189  007460  001246                                  TEMP1
```



```
1190  007462     006     003                          .BYTE   6,3
1191  007464  001250                                  TEMP2
1192  007466     006     003                          .BYTE   6,3
1193  007470  001252                                  TEMP3
1194  007472     006     003                          .BYTE   6,3
1195  007474  001254                                  TEMP4
1196  007476     006     002                          .BYTE   6,2
1197  007500  001256                                  TEMP5
1198                                          .EVEN
1199
1200                                                  ;BUFFERS FOR INPUT-OUTPUT
1201
1202  007502  000000                          INBUF:  0
1203          007544                                  .=.+40
1204  007544  000000                          MDATA:  0
1205          007606                                  .=.+40
1206
1207
1208                                                  ;ROUTINE USED TO CHANGE SOFTWARE SWITCH
1209                                                  ;REGISTER USING THE CONSOLE TERMINAL
1210                                                  ;-------------------------------------
1211
1212  007606  022737  000176  001202          CKSWR:  CMP     #SWREG,SWR      ;IS THE SOFT SWR BEING USED?
1213  007614  001077                                  BNE     CKSWR5          ;BR IF NO
1214  007616  105777  171362                          TSTB    @TKCSR          ;IS DONE SET?
1215  007622  100003                                  BPL     2$              ;GO ON IF NOT SET
1216  007624  012737  177777  003734                  MOV     #-1,DONE        ;IF DONE SET, SET FLAG
1217  007632  022777  000007  171346          2$:     CMP     #7,@TKDBR       ;WAS CTRL G TYPED? (7 BIT ASCII)
1218  007640  001404                                  BEQ     1$              ;BR IF YES
1219  007642  022777  000207  171336                  CMP     #207,@TKDBR     ;WAS CTRL G TYPED? (8 BIT ASCII)
1220  007650  001061                                  BNE     CKSWR5          ;BR IF NO
1221  007652  010246                          1$:     MOV     R2,-(SP)        ;STORE R2
1222  007654  010346                                  MOV     R3,-(SP)        ;STORE R3
1223  007656  010446                                  MOV     R4,-(SP)        ;STORE R4
1224  007660  012737  177777  010016                  MOV     #-1,$WFLG       ;SET SOFT TYPE OUT FLAG
1225  007666  005002                          CKSWR1: CLR     R2              ;CLEAR NEW SWR CONTENTS
1226  007670  012704  177777                          MOV     #-1,R4          ;SET FLAG TO ALL ONES
1227  007674  104402  007205                          TYPE    ,SWMES          ;TYPE "SWR= "
1228  007700  104411                          CKSWR2: CNVRT                   ;TYPE OUT PRESENT CONTENTS
1229  007702  610052                                  SOFTSW                  ;OF SOFT SWITCH REGISTER
1230  007704  104402  007215                  CKSWR3: TYPE    ,SWMES1         ;TYPE "NEW? "
1231  007710  004737  010020                  CKSWR4: JSR     PC,1NCHAR       ;GET RESPONSE
1232  007714  022703  000015                          CMP     #15,R3          ;WAS IT A CR?
1233  007720  001424                                  BEQ     5$              ;BR IF YES
1234  007722  022703  000012                          CMP     #12,R3          ;WAS IT A LF?
1235  007726  001416                                  BEQ     4$              ;BR IF YES
1236  007730  022703  000025                          CMP     #25,R3          ;WAS IT CTRL U?
1237  007734  001754                                  BEQ     CKSWR1          ;BR IF YES(START OVER)
1238  007736  022703  000007                          CMP     #7,R3           ;IF CNTL G GET NEXT CHAR
1239  007742  001762                                  BEQ     CKSWR4
1240  007744  005004                                  CLR     R4              ;IT MUST BE A DIGIT SO CLR FLAG
1241  007746  042703  177770                          BIC     #177770,R3      ;ONLY 0-7 ARE LEGAL SO MASK OFF BITS
1242  007752  006302                                  ASL     R2              ;SHIFT R2 3 TIMES
1243  007754  006302                                  ASL     R2
1244  007756  006302                                  ASL     R2
1245  007760  050302                                  BIS     R3,R2           ;ADD LAST DIGIT
```

```
1246  007762  000752                        BR      CKSWR4          ;GET NEXT CHARACTER
1247  007764  012766  002002  000006  4$:   MOV     #.START,6(SP)   ;IF WAS TIPED SO GO TO START
1248  007772  005704                  5$:   TST     R4              ;IS FLAG CLEAR?
1249  007774  001002                        BNE     6$              ;IF NOT DON'T CHANGE SOFT SWR
1250  007776  010277  171200                MOV     R2,@SWR         ;IF YES THEN WRITE NEW CONTENTS TO SOFT SWR
1251  010002  005037  010016          6$:   CLR     SWFLG           ;CLEAR TYPEOUT FLAG
1252  010006  012604                        MOV     (SP)+,R4        ;RESTORE R4
1253  010010  012603                        MOV     (SP)+,R3        ;RESTORE R3
1254  010012  012602                        MOV     (SP)+,R2        ;RESTORE R2
1255  010014  000207                  CKSWR5: RTS     PC              ;RETURN
1256
1257  010016  000000                  SWFLG:  0
1258
1259  010020  105777  171160          INCHAR: TSTB    @TKCSR
1260  010024  100375                        BPL     .-4
1261  010026  017703  171154                MOV     @TKDBR,R3
1262  010032  105777  171152                TSTB    @TPCSR
1263  010036  100375                        BPL     .-4
1264  010040  010377  171146                MOV     R3,@TPDBR
1265  010044  042703  000200                BIC     #BIT7,R3
1266  010050  000207                        RTS     PC
1267
1268  010052  000001                  SOFTSW: 1
1269  010054     006     002                .BYTE   6,2
1270  010056  000176                        SWREG
```



```
1271
1272                                            ;
1273                                            ;ROUTINE USED TO "CYCLE" THROUGH UP TO 16 DMC11'S
1274                                            ;THIS ROUTINE SETS UP THE CONTROL ADDRESS FOR THE DIAGNOSTIC
1275                                            ;AND RUNS THE SPECIFIED DMC11'S.  THIS ROUTINE *MUST*
1276                                            ;BE RUN FIRST BEFORE ENTERING THE DIAGNOSTIC FOR THE
1277                                            ;SETUP NECESSARY.
1278                                            ;
1279
1280  010060  005737  001306          CYCLE:  TST     DMACTV          ;ARE ANY DMC11'S TO BE TESTED?
1281  010064  001004                          BNE     1$              ;BR IF OK.
1282  010066  104402  007154                  TYPE    ,NOACT          ;NO DMC11'S SELECTED!!
1283  010072  000000                          HALT                    ;STOP THE SHOW.
1284  010074  000776                          BR      .-2             ;DISQUALIFY CONT. SW.
1285  010076  000241                  1$:     CLC                     ;CLEAR PROC. CARRY BIT.
1286  010100  006137  001316                  ROL     RUN             ;UPDATE POINTER
1287  010104  005537  001316                  ADC     RUN             ;CATCH CARRY FROM RUN
1288  010110  062737  000004  001322          ADD     #4,MILK         ;UPDATE POINTER
1289  010116  062737  000010  001320          ADD     #10,CREAM       ;UPDATE ADDRESS POINTER.
1290  010124  022737  001700  001320          CMP     #DM.MAP+200,CREAM
1291  010132  001006                          BNE     2$              ;KEEP GOING; NOT ALL TESTED FOR.
1292  010134  012737  001500  001320          MOV     #DM.MAP,CREAM   ;RESET ADDRESS POINTER.
1293  010142  012737  001702  001322          MOV     #CNT,MAP,MILK   ;RESET PASS COUNT POINTER
1294  010150  033737  001316  001306  2$:     BIT     RUN,DMACTV      ;IS THIS ONE ACTIVE?
1295  010156  001747                          BEQ     1$              ;BR IF NO
1296  010160  013700  001320                  MOV     CREAM,R0        ;GET ADDRESS POINTER
1297  010164  013702  001322                  MOV     MILK,R2         ;GET PASS COUNT POINTER
1298  010170  012037  001404                  MOV     (R0)+,DMCSR     ;LOAD SYSTEM CTRL. REG
1299  010174  011037  001374                  MOV     (R0),DMRVEC     ;LOAD VECTOR
1300  010200  042737  177000  001374          BIC     #177000,DMRVEC  ;CLEAR UNWANTED BITS
1301  010206  012037  001366                  MOV     (R0)+,STAT1     ;LOAD STAT1
1302  010212  012037  001370                  MOV     (R0)+,STAT2     ;LOAD STAT2
1303  010216  012037  001372                  MOV     (R0)+,STAT3     ;LOAD STAT3
1304  010222  012237  001230                  MOV     (R2)+,PASCNT    ;LOAD PASS COUNT
1305  010226  012237  001232                  MOV     (R2)+,ERRCNT    ;LOAD ERROR COUNT
1306  010232  012700  000002                  MOV     #2,R0           ;SAVE CORE THIS WAY!
1307  010236  013737  001404  001406          MOV     DMCSR,DMCSRH
1308  010244  005237  001406                  INC     DMCSRH
1309  010250  013737  001406  001410          MOV     DMCSRH,DMCTL
1310  010256  005237  001410                  INC     DMCTL
1311  010262  013737  001410  001412          MOV     DMCTL,DMP04
1312  010270  060037  001412                  ADD     R0,DMP04
1313  010274  013737  001412  001414          MOV     DMP04,DMP06
1314  010302  060037  001414                  ADD     R0,DMP06
1315
1316  010306  013737  001374  001376          MOV     DMRVEC,DMRLVL   ;PTY LVL
1317  010314  060037  001376                  ADD     R0,DMRLVL       ;
1318  010320  013737  001376  001400          MOV     DMRLVL,DMTVEC   ;TX VEC
1319  010326  060037  001400                  ADD     R0,DMTVEC       ;
1320  010332  013737  001400  001402          MOV     DMTVEC,DMTLVL   ;TX LVL
1321  010340  060037  001402                  ADD     R0,DMTLVL
1322
1323  010344  032737  000002  001236          BIT     #SW01,STRTSW    ;IS TEST NO. SELECTED
1324  010352  001450                          BEQ     7$              ;BR IF NO
1325  010354                          4$:
1326  010354  005737  000042                  TST     @#42            ;RUNNING IN AUTO MODE?
```

```
1327  010360  001045                          BNE     7$              ;BR IF YES
1328  010362  104402  005672                  TYPE    ,MCRLF
1329  010366  104403                          INSTR                   ;GET TEST NO.
1330  010370  006130                          MTSTN
1331  010372  104405                          PARAM
1332  010374  000001                          1
1333  010376  001000                          1000
1334  010400  001226                          TSTNO
1335  010402     000                  .BYTE   0
1336  010403     001                  .BYTE   1
1337  010404  012700  022322                  MOV     #TST1,R0
1338  010410  022710                  5$:     CMP     (PC)+,(R0)      ;CMP FIRST WORD TO 12737
1339  010412  012737                          MOV     (PC)+,@(PC)+
1340  010414  001020                          BNE     6$              ;BR IF NOT SAME
1341  010416  023760  001226  000002          CMP     TSTNO,2(R0)     ;DOES TSTNO MATCH?
1342  010424  001014                          BNE     6$              ;BR IF NO
1343  010426  022760  001226  000004          CMP     #TSTNO,4(R0)    ;IS LAST WORD OK?
1344  010434  001010                          BNE     6$              ;BR IF NO
1345  010436  010037  001214                  MOV     R0,RETURN       ;IT IS A LEGAL TEST SO DO IT
1346  010442  104402  005755                  TYPE    ,MR
1347  010446  042737  000002  001236          BIC     #SW01,STRTSW
1348  010454  000412                          BR      8$
1349  010456  005720                  6$:     TST     (R0)+           ;POP R0
1350  010460  020027  026472                  CMP     R0,#TLAST+10    ;AT END YET?
1351  010464  001351                          BNE     5$              ;BR IF NO
1352  010466  104402  005666                  TYPE    ,MQM            ;YES ILLEGAL TEST NO.
1353  010472  000730                          BR      4$              ;TRY AGAIN
1354
1355  010474  012737  022322  001214  7$:     MOV     #TST1,RETURN    ;PREPARE RETURN ADDRESS
1356  010502  013701  001404          8$:     MOV     DMCSR,R1        ;R1 = BASE DMC11 ADDRESS
1357  010506  000177  170502                  JMP     @RETURN         ;GO START TESTING.
1358
1359
1360                                          ;ROUTINE USED TO "AUTO SIZE" THE DMC11
1361                                          ;CSR AND VECTOR.
1362                                          ;NOTE:  THE CSR MAY BE ANY WHERE IN THE FLOATING
1363                                          ;       ADDRESS RANGE (160000:164000)
1364                                          ;       AND THE VECTOR MAY BE ANY WHERE IN THE
1365                                          ;       FLOATING VECTOR RANGE (300:770)
1366                                          ;
1367
1368  010512                          AUTO.SIZE:
1369  010512  000005                          RESET                   ;INSURE A BUS INIT.
1370  010514  012702  001500          CSRMAP: MOV     #DM.MAP,R2      ;LOAD MAP POINTER.
1371  010520  005022                  1$:     CLR     (R2)+           ;ZERO ENTIRE MAP
1372  010522  022702  001700                  CMP     #DM.END,R2      ;ALL DONE?
1373  010526  001374                          BNE     1$              ;BR IF NO
1374  010530  005037  001310                  CLR     DMNUM           ;SET OCTAL NUMBER OF DMC11'S TO 0
1375  010534  012702  001500                  MOV     #DM.MAP,R2      ;R2 POINTS TO DMC MAP
1376  010540  005037  001306                  CLR     DMACTF          ;CLEAR ACTIVE
1377  010544  032737  000001  001236          BIT     #SW00,STRTSW    ;QUESTIONS?
1378  010552  001002                          BNE     .+6             ;BR IF YES
1379  010554  000137  011252                  JMP     7$              ;IF NO SKIP QUESTIONS
1380  010560  012737  000001  001256          MOV     #1,TEMP5        ;START WITH 1
1381  010566  104403                          INSTR
1382  010570  006450                          NUM
```



```
1383  010572  104405                          PARAM
1384  010574  000001                          1
1385  010576  000020                          16.
1386  010600  001252                          TEMP3
1387  010602     000                  .BYTE   0
1388  010603     001                  .BYTE   1
1389  010604  013737  001252  001310          MOV     TEMP3,DMNUM     ;DMNUM = HOW MANY
1390  010612  104402  005672          12$:    TYPE    ,MCRLF
1391  010616  104410                          CONVRT                  ;TYPE WHICH DMC IS BEING DONE
1392  010620  012002                          WHICH                   ;TEMP5 IS WHICH DMC
1393  010622  005237  001256                  INC     TEMP5
1394  010626  104403                          INSTR
1395  010630  006510                          CSR
1396  010632  104405                          PARAM
1397  010634  160000                          160000
1398  010636  164000                          164000
1399  010640  001254                          TEMP4
1400  010642     000                  .BYTE   0
1401  010643     001                  .BYTE   1
1402  010644  013722  001254                  MOV     TEMP4,(R2)+     ;STORE CSR IN MAP
1403  010650  104403                          INSTR
1404  010652  006526                          VEC
1405  010654  104405                          PARAM
1406  010656  000000                          0
1407  010660  000776                          776
1408  010662  001254                          TEMP4
1409  010664     000                  .BYTE   0
1410  010665     001                  .BYTE   1
1411  010666  013712  001254                  MOV     TEMP4,(R2)      ;STORE VECTOR IN MAP
1412  010672  104402                  10$:    TYPE
1413  010674  006547                          PRIO                    ;ASK WHAT BR LEVEL
1414  010676  004737  012266                  JSR     PC,INTTY        ;GET RESPONSE
1415  010702  022703  000024                  CMP     #24,R3          ;
1416  010706  101014                          BHI     50$             ;BR IF LESS THAN 4
1417  010710  022703  000027                  CMP     #27,R3          ;
1418  010714  103411                          BLO     50$             ;BR IF GREATER THAN 7
1419  010716  012704  000011                  MOV     #11,R4          ;R4 = NUMBER OF SHIFTS
1420  010722  006303                          ASL     R3              ;SHIFT R3 LEFT
1421  010724  005304                          DEC     R4              ;DEC SHIFT COUNT
1422  010726  001375                          BNE     .-4             ;BR IF NOT DONE
1423  010730  042703  170777                  BIC     #170777,R3      ;BIC UNWANTED BITS
1424  010734  050312                          BIS     R3,(R2)         ;PUT BR LEVEL IN STATUS MAP
1425  010736  000403                          BR      8$              ;CONTINUE
1426  010740  104402                  50$:    TYPE
1427  010742  006666                          MQM                     ;RESPONSE IS OUT OF LIMITS
1428  010744  000752                          BR      10$             ;TRY AGAIN
1429  010746  104402                  8$:     TYPE
1430  010750  006606                          CRAM                    ;DOES DMC HAVE CRAM?
1431  010752  004737  012266                  JSR     PC,INTTY        ;GET REPLY
1432  010756  022703  000131                  CMP     #131,R3
1433  010762  001427                          BEQ     9$              ;YES
1434  010764  022703  000116                  CMP     #116,R3         ;NO
1435  010770  001403                          BEQ     40$             ;NOT A Y OR N
1436  010772  104402                          TYPE
1437  010774  006666                          MQM                     ;TYPE "?"
1438  010776  000763                          BR      8$              ;ASK AGAIN
```

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011000  104402                          40$:    TYPE
011002  007340                                  SPEED                   ;DMC11-AR OR DMC11-AL?
011004  004737  012266                          JSR     PC,INTTY        ;GET RESPONSE
011010  022703  000122                          CMP     #122,R3         ;IS IT R
011014  001414                                  BEQ     16$             ;BR IF REMOTE
011016  022703  000114                          CMP     #114,R3         ;IS IT L
011022  001403                                  BEQ     41$             ;BR IF LOCAL
011024  104402                                  TYPE
011026  005666                                  MQM
011030  000763                                  BR      40$             ;TRY AGAIN
011032  052762  000002  000004          41$:    BIS     #BIT1,4(R2)     ;SET BIT1 IN STAT3
011040  000402                                  BR      16$             ;CONTINUE
011042  052712  100000                  9$:     BIS     #BIT15,(R2)     ;SET BIT 15 IF CRAM
011046  104402                          16$:    TYPE
011050  006704                                  MODU                    ;ASK WHICH LINE UNIT
011052  004737  012266                          JSR     PC,INTTY        ;GET REPLY
011056  022703  000021                          CMP     #21,R3          ;"1"
011062  001417                                  BEQ     30$
011064  022703  000022                          CMP     #22,R3          ;"2"
011070  001412                                  BEQ     31$
011072  022703  000116                          CMP     #116,R3         ;"N"
011076  001403                                  BEQ     32$
011100  104402                                  TYPE
011102  005666                                  MQM                     ;IF NOT A 1,2 OR N TYPE "?"
011104  000760                                  BR      16$             ;TRY AGIAN
011106  052722  010000                  32$:    BIS     #BIT12,(R2)+    ;SET BIT 12 IN STAT2 IF NO LU
011112  022222                                  CMP     (R2)+,(R2)+     ;POP OVER STAT2 AND STAT3
011114  000447                                  BR      33$
011116  052712  020000                  31$:    BIS     #BIT13,(R2)     ;SET BIT 13 IN STAT2 IF M8202
011122  104402                          30$:    TYPE
011124  007114                                  CONN                    ;ASK IF LOOP-BACK IS ON
011126  004737  012266                          JSR     PC,INTTY        ;GET REPLY
011132  022703  000131                          CMP     #131,R3         ;Y
011136  001406                                  BEQ     17$
011140  022703  000116                          CMP     #116,R3         ;N
011144  001406                                  BEQ     18$
011146  104402                                  TYPE
011150  005666                                  MQM                     ;IF NOT Y OR N TYPE "?"
011152  000763                                  BR      30$             ;TRY AGAIN
011154  052722  040000                  17$:    BIS     #BIT14,(R2)+    ;TURNAROUND IS CONNECTED
011160  000402                                  BR      19$
011162  042722  040000                  18$:    BIC     #BIT14,(R2)+    ;NO TURNAROUND
011166                                  19$:
011166  104403                                  INSTR
011170  007016                                  LINE
011172  104405                                  PARAM
011174  000000                                  0
011176  000377                                  377
011200  001254                                  TEMP4
011202     000                                  .BYTE   0
011203     001                                  .BYTE   1
011204  113722  001254                          MOVB    TEMP4,(R2)+     ;STORE SWITCH PAC IN MAP
011210  104403                                  INSTR
011212  007054                                  BM
011214  104405                                  PARAM
011216  000000                                  0
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011220  000377                                  377
011222  001254                                  TEMP4
011224     000                                  .BYTE   0
011225     001                                  .BYTE   1
011226  113722  001254                          MOVB    TEMP4,(R2)+     ;STORE SWITCH PAC IN MAP
011232  005722                                  TST     (R2)+           ;POP OVER STAT3
011234  005337  001252                  33$:    DEC     TEMP3           ;DEC DMC COUNT
011240  001402                                  BEQ     34$             ;BR IF DONE
011242  000137  010612                          JMP     12$             ;JUMP IF NOT
011246  000137  011702                  34$:    JMP     13$             ;CONTINUE
011252  012701  160000                  7$:     MOV     #160000,R1      ;SET FOR FIRST ADDRESS TO BE TESTED
011256  012737  011774  000004                  MOV     #6$,@#4         ;SET FOR NON-EXISTANT DEVICE TIME OUT
011264  005011                          2$:     CLR     (R1)            ;CLEAR SEL0
011266  005711                                  TST     (R1)            ;IF DMC11 DMCSR S/B 0
011270  001172                                  BNE     3$              ;IF NO DEV ; TRAP TO 4. IF NO BIT 8 THEN NO DMC1
011272  005061  000006                          CLR     6(R1)           ;CLEAR SEL6
011276  005761  000006                          TST     6(R1)           ;IF DMC11 THEN DMRIC S/B =01
011302  001165                                  BNE     3$              ;BR IF NOT DMC11
011304  012711  002000                          MOV     #BIT10,(R1)     ;SET ROMO
011310  005061  000004                          CLR     4(R1)           ;CLEAR SEL4
011314  012761  125252  000006                  MOV     #125252,6(R1)   ;WRITE THIS TO SEL6
011322  052711  020000                          BIS     #BIT13,(R1)     ;WRITE IT!
011326  022761  125252  000004                  CMP     #125252,4(R1)   ;WAS IT WRITTEN?
011334  001004                                  BNE     21$             ;IF NO IT IS NOT CRAM
011336  052762  100000  000002                  BIS     #BIT15,2(R2)    ;SET BIT15 IF CRAM
011344  000431                                  BR      22$
011346  012711  001000                  21$:    MOV     #BIT9,(R1)      ;SET ROM1
011352  012761  100417  000006                  MOV     #100417,6(R1)   ;PUT INSTRUCTION IN SEL6
011360  012711  001400                          MOV     #BIT9!BIT8,(R1) ;CLOCK INSTRUCTION (MICRO PROC PC TO 0)
011364  012711  002000                          MOV     #BIT10,(R1)     ;SET ROMO
011370  022761  000626  000006                  CMP     #626,6(R1)      ;IS IT LOCAL CROM
011376  001411                                  BEQ     23$             ;BR IF YES
011400  022761  016520  000006                  CMP     #16520,6(R1)    ;IS IT REMOTE CROM?
011406  001410                                  BEQ     22$             ;BR IF YES
011410  022761  177777  000006                  CMP     #-1,6(R1)       ;NO CROM?
011416  001404                                  BEQ     22$             ;BR IF YES
011420  000516                                  BR      3$              ;NOT A DMC
011422  052762  000002  000006          23$:    BIS     #BIT1,6(R2)     ;SET BIT 1 IN STAT3
                                        ;AT THIS POINT IT IS ASSUMED THAT R1 HOLDS A DMC11 CSR ADDRESS.
011430  010122                          22$:    MOV     R1,(R2)+        ;STORE CSR IN CORE TABLE.
011432  012711  001000                  15$:    MOV     #BIT9,(R1)      ;CLEAR LINE UNIT LOOP
011436  005061  000004                          CLR     4(R1)           ;CLEAR PORT4
011442  012761  122113  000006                  MOV     #122113,6(R1)   ;LOAD INSTRUCTION (CLR DTR)
011450  052711  000400                          BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION
011454  012761  021264  000006                  MOV     #021264,6(R1)   ;LOAD INSTRUCTION
011462  052711  000400                          BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION
011466  122761  000377  000004                  CMPB    #377,4(R1)      ;IS IT ALL ONES?
011474  001003                                  BNE     .+10            ;BR IF NO
011476  052712  010000                          BIS     #BIT12,(R2)     ;IF YES, NO LINE UNIT, SET STATUS BIT
011502  000436                                  BR      20$
011504  032761  000002  000004                  BIT     #BIT1,4(R1)     ;IS SWITCH A ONE?
011512  001403                                  BEQ     .+10            ;BR IF M8201
011514  052712  060000                          BIS     #BIT13!BIT14,(R2) ;M8202 ASSUME CONNECTOR
011520  000427                                  BR      20$             ;CONNECTOR ON)
011522  032761  000010  000004                  BIT     #BIT3,4(R1)     ;IS MPDY SET
011530  001423                                  BNE     20$             ;BR IF M8201 NO CONNECTOR (ON LINE)
```

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1551  011532  012761  000100  000004          MOV     #BIT6,4(R1)     ;LOAD PORT4
1552  011540  012761  122113  000006          MOV     #122113,6(R1)   ;LOAD INSTRUCTION
1553  011546  052711  000400                  BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION(SET DTR)
1554  011552  012761  021264  000006          MOV     #021264,6(R1)   ;LOAD INSTRUCTION
1555  011560  052711  000400                  BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION(READ MODEM REG)
1556  011564  032761  000010  000004          BIT     #BIT3,4(R1)     ;IS MRDY SET NOW?
1557  011572  001402                          BEQ     20$             ;BR IF NO CONNECTOR
1558  011574  052712  040000                  BIS     #BIT14,(R2)     ;SET STATUS BIT FOR CONNECTOR
1559  011600  005722                  20$:    TST     (R2)+           ;POP POINTER
1560  011602  012761  021324  000006          MOV     #021324,6(R1)   ;PUT INSTRUCTION IN PORT6
1561  011610  012711  001400                  MOV     #BIT9!BIT8,(R1) ;PORT4=LU 15
1562  011614  156122  000004                  BISB    4(R1),(R2)+     ;STORE DDCMP LINE # IN TABLE
1563  011620  012761  021344  000006          MOV     #021344,6(R1)   ;PORT6=INSTRUCTION
1564  011626  012711  001400                  MOV     #BIT8!BIT9,(R1) ;CLOCK INSTR.
1565  011632  156122  000004                  BISB    4(R1),(R2)+     ;STORE BM873 ADD IN TABLE
1566  011636  005722                          TST     (R2)+           ;POP OVER STAT3
1567  011640  005011                          CLR     (R1)            ;CLEAR ROMI
1568  011642  005237  001310                  INC     DMNUM           ;UPDATE DEVICE COUNTER
1569  011646  022737  000020  001310          CMP     #20,DMNUM       ;ARE MAX. NO. OF DEV FOUND?
1570  011654  001412                          BEQ     13$             ;YES DON'T LOOK FOR ANY MORE.
1571  011656  005011                  3$:     CLR     (R1)            ;CLEAR BIT 10
1572  011660  005061  000006                  CLR     6(R1)           ;CLEAR SEL 6
1573  011664  062701  000010                  ADD     #10,R1          ;UPDATE CSR POINTER ADDRESS
1574  011670  022701  164000                  CMP     #164000,R1
1575  011674  001402                          BEQ     13$             ;BR IF DONE
1576  011676  000137  011264                  JMP     2$              ;JUMP IF NOT
1577  011702  005037  001306          13$:    CLR     DMACTV
1578  011706  005737  001310                  TST     DMNUM           ;WERE ANY DMC11'S FOUND AT ALL?
1579  011712  001423                          BEQ     5$              ;ERROR AUTO SIZER FOUND NO DMC11'S IN THIS SYS.
1580  011714  013701  001310                  MOV     DMNUM,R1
1581  011720  010137  001314                  MOV     R1,SAVNUM       ;SAVE NUMBER OF DEVICES
1582  011724  000241                  4$:     CLC
1583  011726  006137  001306                  ROL     DMACTV          ;GENERATE ACTIVE REGISTER OF DEVICES.
1584  011732  005237  001306                  INC     DMACTV          ;SET THE BIT
1585  011736  005301                          DEC     R1
1586  011740  001371                          BNE     4$              ;BR IF MORE TO GENERATE
1587  011742  012737  000006  000004          MOV     #6,@#4          ;RESTORE TRAP VECTOR
1588  011750  013737  001306  001312          MOV     DMACTV,SAVACT   ;SAVE ACTIVE REGISTER
1589  011756  000137  012010                  JMP     VECMAP          ;GO FIND THE VECTOR NOW.
1590  011762  104402  005760          5$:     TYPE    ,MERR2          ;NOTIFY OPR THAT NO DMC11'S FOUND.
1591  011766  005000                          CLR     R0              ;MAKE DATA LIGHTS ZERO
1592  011770  000000                          HALT                    ;STOP THE SHOW
1593  011772  000776                          BR      .-2             ;DISABLE CONT. SW.
1594  011774  012716  011664          6$:     MOV     #14$,(SP)       ;ENTERED BY NON-EXISTANT TIME-OUT.
1595  012000  000002                          RTI                     ;RETURN TO MAINSTREAM
1596
1597  012002  000001                  WHICH:  1
1598  012004     002     002                  .BYTE   2,2
1599  012006  001256                          TEMP5
1600
1601  012010  032737  000001  001236  VECMAP: BIT     #SW00,STRTSW
1602  012016  001114                          BNE     5$
1603  012020  012737  000340  000022          MOV     #340,@#22       ;SET IOT TRAP PRIO TO 7
1604  012026  012737  012202  000020          MOV     #4$,@#20        ;SET IOT TRAP VECTOR
1605  012034  012702  001500                  MOV     #DM.MAP,R2      ;SET SOFTWARE POINTER
1606  012040  012700  000300                  MOV     #300,R0         ;FLOATING VECTORS START HERE.
```



```
1607  012044  012701  000302                  MOV     #302,R1         ;PC OF IOT INSTR.
1608  012050  010120                  1$:     MOV     R1,(R0)+        ;START FILLING VECTOR AREA
1609  012052  012721  000004                  MOV     #4,(R1)+        ;WITH .+2; IOT
1610  012056  022021                          CMP     (R0)+,(R1)+     ;ADD 2 TO R0 +R1
1611  012060  026127  001000                  CMP     R1,#1000
1612  012064  101771                          BLOS    1$              ;BR IF MORE TO FILL
1613  012066  013737  001306  001246          MOV     DMACTV,TEMP1    ;STORE TEMPORALLY
1614  012074  006037  001246          2$:     ROR     TEMP1           ;BRING OUT A BIT
1615  012100  103003                          BCC     5$              ;BR IF ALL DONE
1616  012102  012704  000012                  MOV     #12,R4          ;R4 IS INDEX REGISTER
1617  012106  016437  012252  177776          MOV     BRLVL(R4),PS    ;SET PS TO 7
1618  012114  011201                          MOV     (R2),R1
1619  012116  012761  000200  000004          MOV     #200,4(R1)
1620  012124  012711  001000                  MOV     #BIT9,(R1)      ;SET ROMI
1621  012130  012761  121111  000006          MOV     #121111,6(R1)   ;PUT INSTRUCTION IN PORT6
1622  012136  012711  001400                  MOV     #BIT9!BIT8,(R1) ;FORCE AN INTERRUPT
1623  012142  105200                  7$:     INCB    R0              ;STALL
1624  012144  001376                          BNE     .-2             ;FOR TIME TO INTERUPT
1625  012146  162704  000002                  SUB     #2,R4           ;GET NEXT LOWEST PS LEVEL
1626  012152  001404                          BEQ     6$              ;BR IF R4 = 0
1627  012154  016437  012252  177776          MOV     BRLVL(R4),PS    ;MOVE NEXT LOWER LEVEL IN PS
1628  012162  000767                          BR      7$              ;BR TO DELAY
1629  012164  052762  005300  000002  6$:     BIS     #5300,2(R2)     ;NO INTERUPT ASSUME 300 AT LEVEL 5 AND FIX DMC11
1630  012172  005011                  3$:     CLR     (R1)            ;CLEAR ROMI
1631  012174  062702  000010                  ADD     #10,R2          ;POP SOFTWARE POINTER
1632  012200  000735                          BR      2$              ;KEEP GOING
1633  012202  051662  000002          4$:     BIS     (SP),2(R2)      ;GET VECTOR ADDRESS
1634  012206  042762  000007  000002          BIC     #7,2(R2)        ;CLEAR JUNK
1635  012214  016405  012254                  MOV     BRLVL+2(R4),R5  ;GET BR LEVEL OF DMC11
1636  012220  006305                          ASL     R5              ;SHIFT LEVEL 4 PLACES
1637  012222  006305                          ASL     R5              ;TO THE LEFT FOR THE
1638  012224  006305                          ASL     R5              ;STATUS TABLE
1639  012226  006305                          ASL     R5
1640  012230  042705  170777                  BIC     #170777,R5      ;CLEAR UNWANTED BITS
1641  012234  050562  000002                  BIS     R5,2(R2)        ;PUT BR LEVEL IN STATUS TABLE
1642  012240  022626                          CMP     (SP)+,(SP)+     ;POP IOT JUNK OFF STACK
1643  012242  012716  012172                  MOV     #3$,(SP)        ;SET FOR RETURN
1644  012246  000002                          RTI
1645  012250  000207                  5$:     RTS     PC              ;ALL DONE WITH "AUTO SIZING"
1646
1647  012252  000000                  BRLVL:  0       ;LEVEL 0
1648  012254  000000                          0       ;LEVEL 0
1649  012256  000200                          200     ;LEVEL 4
1650  012260  000240                          240     ;LEVEL 5
1651  012262  000300                          300     ;LEVEL 6
1652  012264  000340                          340     ;LEVEL 7
1653
1654
1655  012266  105777  166712                  TSTB    @TKCSR          ;WAIT FOR DONE
1656  012272  100375                          BPL     .-4
1657  012274  017703  166706                  MOV     @TKDBR,R3       ;PUT CHAR IN R3
1658  012300  105777  166704                  TSTB    @TPCSR          ;WAIT UNTIL PRINTER IS READY
1659  012304  100375                          BPL     .-4
1660  012306  010377  166700                  MOV     R3,@TPDBR       ;ECHO CHAR
1661  012312  042703  000240                  BIC     #BIT7!BIT5,R3   ;MASK OFF LOWER CASE
1662  012316  000207                          RTS     PC              ;RETURN
```

```
1663
1664                                    001000
1665  012320  000000                    001100  ROMMAP: 0                       ;POINTER TO HI OR LO SPEED MICRO-CODE
1666                                    001200
1667  012322                            001300  LOMAP:                          ;LOW SPEED (REMOTE) MICRO-CODE
```

```
                                .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
                                ;
```

```
                        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
000360            SUBTC=360             ;FUNCTION= TWOS COMPLEMENT SUBTRACT
000000          ADD=0                   ;ADD A+B
000020          ADDC=20                 ;A+B+CARRY
000040          SUBC=40                 ;A-B-C
000060          INCA=60                 ;INCREMENT A
000100          AC=100                  ;A PLUS CARRY
000120          AA=120                  ;A PLUS A
000140          AAC=140                 ;A PLUS A PLUS C
000160          DECA=160                ;DECREMENT A
                        ;END FUNCTIONS
004000          PAGE1=4000
010000          PAGE2=10000
014000          PAGE3=14000
001000          CCOND=1000              ;CONDITION C
001400          ZCOND=1400              ;CONDITION Z
000400          ALCOND=400              ;ALWAYS
002000          BR0CON=2000             ;CONDITION BR0
002400          BR1CON=2400             ;CONDITION BR1
003000          BR4CON=3000             ;CONDITION BR4
003400          BR7CON=3400             ;CONDITION BR7
```



```
                        .SBTTL  MICRO INSTRUCTION DEFINITIONS
                        .SBTTL          BRANCH INSTRUCTIONS
                        ;
100000          JUMP=100000             ;JUMP OP CODE
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        .SBTTL          INDEXED BRANCH INSTRUCTIONS
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        .SBTTL          MOVE INSTRUCTIONS
                        ;
000000          MOVE=0          ;MOVE OPCODE
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
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                        ;
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                        ;
                        ;
                        ;
```

```
                                .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
                                ;
                                ;
                                ;
                                ;
                                ;
                                ;

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
```



```
000174                          RTHRS=INCONS+1  ;RECV THRESHOLD LINK
000240                          NXTINT=240      ;NEXT INTERRUPT POSITION
000241                          NXTSP=NXTINT+1  ;END OF INTERUPT CHAIN
000242                          INTSTK=NXTSP+1  ;STACK OF INTERUPTS
000400                          MMEND=400       ;MAIN MEMORY END
```

```
                                .SBTTL  SCRATCH PAD ASSIGNMENTS
000000                          SP0=0   ;SP0---SCRATCH REGISTER
000001                          SP1=1   ;SP1---PORT STATUS WORD
                                        ;BIT ASSIGNMENTS
                                        ;BIT0--INIT MODE
                                        ;BIT1--SEC STATION SELECT(UNUSED)
                                        ;BIT2--NO BUFFER ASSIGNED IN BOOT MODE
                                        ;BIT3--DLE RECEIVED WHILE NOT IN MAINT MODE
                                        ;BIT4--INTERRUPT PENDING
                                        ;BIT5--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
012322                          .=12322
012322  INIT:   SP      BR,SELB,SP0             ;CLEAR   SP0
(1)     000000                  MICPC=MICPC+1
(1)     012322  063220          <MOVE!SPX!BR!SELB!SP0>
012324                          SP      BR,SELB,SP3             ;PAGE ONE TRANSFER ADDRESS
(1)     000001                  MICPC=MICPC+1
(1)     012324  063223          <MOVE!SPX!BR!SELB!SP3>
012326                          SP      BR,SELB,SP17            ;CLEAR SP17
(1)     000002                  MICPC=MICPC+1
(1)     012326  063237          <MOVE!SPX!BR!SELB!SP17>
012330                          OUT     BR,<SELA!OINCON>        ;ZERO THE IN CONTROL CSR
(1)     000003                  MICPC=MICPC+1
(1)     012330  061200          <MOVE!WROUTX!BR!<SELA!OINCON>>
012332                          OUT     BR,<SELA!OOCON>         ;ZERO THE OUT CONTROL CSR
(1)     000004                  MICPC=MICPC+1
(1)     012332  061202          <MOVE!WROUTX!BR!<SELA!OOCON>>
012334                          SP      IMM,370,SP10            ;WRITE 5 ONE BITS TO THE HIGH ORDER
(1)     000005                  MICPC=MICPC+1
(1)     012334  003370          <MOVE!SPX!IMM!370!SP10>
                                                                ;BITS OF SP10
012336                  55:     SP      BR,AA,SP10              ;SHIFT SP10 LEFT SETTING CARRY THE
(1)     000006                  MICPC=MICPC+1
(1)     012336  063130          <MOVE!SPX!BR!AA!SP10>
                                                                ;FIRST 5 TIMES THRU THE LOOP
012340                          MEMINC  BR,ADDC!SP3             ;WRITE A ONE TO THE FIRST 5 MEMORY
(1)     000007                  MICPC=MICPC+1
(1)     012340  076423          <MOVE!WRMEM!INCMAR!BR!<ADDC!SP3>>
                                                                ;LOCATIONS AND ZERO THE REST
012342                          SP      BR,INCA,SP0             ;INCREMENT COUNTER
(1)     000010                  MICPC=MICPC+1
(1)     012342  063060          <MOVE!SPX!BR!INCA!SP0>
012344                          Z       10$                     ;ALL DONE
(1)     000011                  MICPC=MICPC+1
(1)     012344  101413          <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
012346                          ALWAYS  5$                      ;KEEP GOING
(1)     000012                  MICPC=MICPC+1
(1)     012346  100406          <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
012350  10$:    SPBR    IMM,1,SP1               ;WRITE A 1 TO THE BR AND SP1
(1)     000013                  MICPC=MICPC+1
(1)     012350  063401          <MOVE!SPBRX!IMM!1!SP1>
012352                          SP      BR,SELB,SP11            ;WRITE A 1 TO SP11
(1)     000014                  MICPC=MICPC+1
(1)     012352  063231          <MOVE!SPX!BR!SELB!SP11>
012354                          SP      BR,SELB,SP12            ;WRITE A 1 TO SP12
(1)     000015                  MICPC=MICPC+1
(1)     012354  063232          <MOVE!SPX!BR!SELB!SP12>
012356                          LDMA    IMM,PRTST               ;POINT MAR TO UNNUM MSG SKELETON
(1)     000016                  MICPC=MICPC+1
(1)     012356  010162          <MOVE!LDMAR!IMM!<PRTST&377>>
```

```
504  012360                          PSTATI  NIDLE2                  ;WRITE PORT IDLE STATE
(1)  012360                          MEMINC  IMM,<<NIDLE2-INIT&777/2>>
(2)          000017                  MICPC=MICPC+1
(2)  012360  016520                  <MOVE!WRMEM!INCMAR!IMM!<<NIDLE2-INIT&777/2>>>
505  012362                          BRWRTB  IMM,226                  ;WRITE SYNC TO MEMORY
(1)          000020                  MICPC=MICPC+1
(1)  012362  000626                  <MOVE!WRTEBR!IMM!<226>>
506  012364                          OUTPUT  BR,SELB!SYNC     ;LOAD THE SYNC REGISTER
(1)          000021                  MICPC=MICPC+1
(1)  012364  062234                  <MOVE!WROUT!BR!<SELB!SYNC>>
507  012366                          MEMINC  IMM,3                    ;REP
(1)          000022                  MICPC=MICPC+1
(1)  012366  016403                  <MOVE!WRMEM!INCMAR!IMM!<3>>
508  012370                          MEM     IMM,2                    ;NAK
(1)          000023                  MICPC=MICPC+1
(1)  012370  002402                  <MOVE!WRMEM!IMM!<2>>
509  012372                          SP      MEMX!INCMAR,SELB,SP15            ;SET STARTING COUNT
(1)          000024                  MICPC=MICPC+1
(1)  012372  057235                  <MOVE!SPX!MEMX!INCMAR!SELB!SP15>
510  012374                          MEMINC  IMM,6                    ;START
(1)          000025                  MICPC=MICPC+1
(1)  012374  016406                  <MOVE!WRMEM!INCMAR!IMM!<6>>
511  012376                          MEMINC  IMM,7                    ;STACK
(1)          000026                  MICPC=MICPC+1
(1)  012376  016407                  <MOVE!WRMEM!INCMAR!IMM!<7>>
512  012400                          MEMINC  IMM,1                    ;ACK
(1)          000027                  MICPC=MICPC+1
(1)  012400  016401                  <MOVE!WRMEM!INCMAR!IMM!<1>>
513  012402                          LDMA    IMM,STC                  ;LOAD ADDRESS OF LAST TMT CHAIN
(1)          000030                  MICPC=MICPC+1
(1)  012402  210070                  <MOVE!LDMAR!IMM!<STC&377>>
514  012404                          MEMINC  IMM,TML1                 ;STORE ADDRESS OF FIRST TMT LINK
(1)          000031                  MICPC=MICPC+1
(1)  012404  016473                  <MOVE!WRMEM!INCMAR!IMM!<TML1>>
515  012406                          MEMINC  IMM,TML1
(1)          000032                  MICPC=MICPC+1
(1)  012406  016473                  <MOVE!WRMEM!INCMAR!IMM!<TML1>>
516  012410                          MEMINC  IMM,TML1
(1)          000033                  MICPC=MICPC+1
(1)  012410  016473                  <MOVE!WRMEM!INCMAR!IMM!<TML1>>
517  012412                          LDMA    IMM,SRC                  ;LOAD ADDRESS OF LAST RECV CHAIN
(1)          000034                  MICPC=MICPC+1
(1)  012412  010022                  <MOVE!LDMAR!IMM!<SRC&377>>
518  012414                          MEMINC  IMM,RCL1                 ;SET UP ADDRESS OF FIRST RECV LINK
(1)          000035                  MICPC=MICPC+1
(1)  012414  016425                  <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
519  012416                          MEMINC  IMM,RCL1
(1)          000036                  MICPC=MICPC+1
(1)  012416  016425                  <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
520  012420                          MEMINC  IMM,RCL1
(1)          000037                  MICPC=MICPC+1
(1)  012420  016425                  <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
521  012422                          LDMA    IMM,NXTINT               ;ADDRESS OF NEXT INTERRUPT POINTER TO MAR
(1)          000040                  MICPC=MICPC+1
(1)  012422  010240                  <MOVE!LDMAR!IMM!<NXTINT&377>>
522  012424                          MEMINC  IMM,INTSTK                       ;INITIALIZE NEXT INTERRUPT POINTER
```



```
(1)          000041                  MICPC=MICPC+1
(1)  012424  016042                  <MOVE!WRMEM!INCMAR!IMM!<INTSTK>>
523  012426                          MEM     IMM,INTSTK                       ;INITIALIZE INSERTION POINTER
(1)          000042                  MICPC=MICPC+1
(1)  012426  002642                  <MOVE!WRMEM!IMM!<INTSTK>>
524  012430                          BRWRTB  IMM,200                  ;WRITE THE RUN BIT TO THE BR
(1)          000043                  MICPC=MICPC+1
(1)  012430  000600                  <MOVE!WRTEBR!IMM!<200>>
525  012432                          OUT     BR,<SELB!OMAIN>          ;WRITE  THE RUN BIT TO MAINT CSR
(1)          000044                  MICPC=MICPC+1
(1)  012432  061221                  <MOVE!WROUTX!BR!<SELB!OMAIN>>
526                                                                   ;FALL INTO IDLE LOOP
```

```
                                        .SBTTL  IDLE--PROGRAM IDLE LOOP
                                        ;PROGRAM IDLE LOOP
                                        ;DISPATCHES TO APPROPRIATE SERVICE ROUTINES
                                        ;USES STATE POINTERS FOR TMT,RCV,CSR ACTIVITY
                                        ;
012434                          IDLE:   BRWRTE  BR,<SELA!SP10>          ;READ TRANSMIT STATUS WORD FROM SP10 TO BR
(1)             000045                  MICPC=MICPC+1
(1)  012434  060610                     <MOVE!WRTEBR!BR!<SELA!SP10>>
012436                                  BR1     TMTDA                   ;IF DATA TO SEND-- BRANCH
(1)             000046                  MICPC=MICPC+1
(1)  012436  112400                     <JUMP!BR1CON!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
012440                                  BR0     TMTDA                   ;IF DATA TO SEND-- BRANCH
(1)             000047                  MICPC=MICPC+1
(1)  012440  112000                     <JUMP!BR0CON!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
012442                                  ALWAYS  I1
(1)             000050                  MICPC=MICPC+1
(1)  012442  100452                     <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
                                        ;
012444                          XEXIT:  SP      BR,SELB,SP2
(1)             000051                  MICPC=MICPC+1
(1)  012444  063222                     <MOVE!SPX!BR!SELB!SP2>
012446                          I1:     BRWRTE  IBUS,RCVCON             ;READ LINE UNIT RECEIVE CONTROL WORD
(1)             000052                  MICPC=MICPC+1
(1)  012446  020640                     <MOVE!WRTEBR!IBUS!<RCVCON>>
012450                                  ,BR4    BR,SELA,SP3!PAGE1       ;BRANCH BASED UPON RECV STATE
(1)             000053                  MICPC=MICPC+1
(1)  012450  167203                     <JUMP! BR4CON!BR!SELA!SP3!PAGE1>
012452                          I2:     LDMA    IMM,PRTST               ;ADDRESS PORT STATE
(1)             000054                  MICPC=MICPC+1
(1)  012452  010162                     <MOVE!LDMAR!IMM!<PRTST&377>>
012454                                  .ALWAY  MEMX,SELB,0             ;INDEX
(1)             000055                  MICPC=MICPC+1
(1)  012454  140620                     <JUMP!ALCOND!MEMX!SELB!0>
```



```
                                        .SBTTL  BASSRV---- BASE SERVICE ROUTINE
012456                          BASSRV: PSTATE  NIDLE2
(1)  012456                             MEM     IMM,<<NIDLE2-INIT&777/2>>
(2)             000056                  MICPC=MICPC+1
(2)  012456  002520                     <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>
012460                                  LDMA    IMM,BASE                        ;CLEAR TO MAR SO IT POINTS TO BASE POINT
(1)             000057                  MICPC=MICPC+1
(1)  012460  010017                     <MOVE!LDMAR!IMM!<BASE&377>>
012462                                  MEMINC  IBUS,PORT1              ;READ CSR4
(1)             000060                  MICPC=MICPC+1
(1)  012462  136504                     <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
012464                                  MEMINC  IBUS,PORT2              ;READ CSR5
(1)             000061                  MICPC=MICPC+1
(1)  012464  136520                     <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
012466                                  MEM     IBUS,PORT4
(1)             000062                  MICPC=MICPC+1
(1)  012466  122560                     <MOVE!WRMEM!IBUS!<PORT4>>
012470                                  SP      IBUS,INCON,SP0          ;READ INPUT CONTROL CSR
(1)             000063                  MICPC=MICPC+1
(1)  012470  123000                     <MOVE!SPX!IBUS!INCON!SP0>
012472                                  BRWRTE  IMM,100                 ;CLEAR THE BR
(1)             000064                  MICPC=MICPC+1
(1)  012472  000500                     <MOVE!WRTEBR!IMM!<100>>
012474                                  OUT     BR,<AANDB!OINCON>       ;CLEAR THE INCONTROL CSR
(1)             000065                  MICPC=MICPC+1
(1)  012474  061260                     <MOVE!WROUTX!BR!<AANDB!OINCON>>
012476                                  BRWRTE  IMM,120                 ; MASK FOR HDX AND DTR
(1)             000066                  MICPC=MICPC+1
(1)  012476  000520                     <MOVE!WRTEBR!IMM!<120>>
012500                                  OUTPUT  BR,<SELB!OMODEM>
(1)             000067                  MICPC=MICPC+1
(1)  012500  062233                     <MOVE!WROUT!BR!<SELB!OMODEM>>
012502                                  BRWRTE  MEMX,SELB               ;READ SEL6
(1)             000070                  MICPC=MICPC+1
(1)  012502  040620                     <MOVE!WRTEBR!MEMX!<SELB>>
012504                                  BR4     RESUME                  ;IF SET RESUME
(1)             000071                  MICPC=MICPC+1
(1)  012504  103100                     <JUMP!BR4CON!<RESUME-INIT&3000*4>!<RESUME-INIT&777/2>>
012506                                  LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
(1)             000072                  MICPC=MICPC+1
(1)  012506  010153                     <MOVE!LDMAR!IMM!<T&377>>
012510                                  MEMINC  IMM,6                   ;WRITE START TYPE TO MEMORY
(1)             000073                  MICPC=MICPC+1
(1)  012510  016406                     <MOVE!WRMEM!INCMAR!IMM!<6>>
012512                                  MEM     IMM,300                 ;WRITE SELECT AND FINAL TO MEMORY
(1)             000074                  MICPC=MICPC+1
(1)  012512  002700                     <MOVE!WRMEM!IMM!<300>>
012514                                  SP      BR,DECA,SP1     ;TURN OFF INIT MODE
(1)             000075                  MICPC=MICPC+1
(1)  012514  063161                     <MOVE!SPX!BR!DECA!SP1>
012516                          BS1:    BRWRTE  IMM,241         ;SET OK TO SEND,STARTMODE AND UNNUM PENDING
(1)             000076                  MICPC=MICPC+1
(1)  012516  000641                     <MOVE!WRTEBR!IMM!<241>>
012520                                  ALWAYS  SA3
(1)             000077                  MICPC=MICPC+1
(1)  012520  110733                     <JUMP!ALCOND!<SA3-INIT&3000*4>!<SA3-INIT&777/2>>
```

```
  568  012522                          RESUME: SP      IMM,SP4,4               ;SET UP SP4 FOR COUNTING NPRS
  (1)          000100                          MICPC=MICPC+1
  (1)  012522  003024                          <MOVE!SPX!IMM!SP4!4>
  569  012524                                  SP      BR,INCA,SP10            ;SET UNNUMB MESSAGE PENDING TO
  (1)          000101                          MICPC=MICPC+1
  (1)  012524  003070                          <MOVE!SPX!BR!INCA!SP10>
  570                                                                          ;TRICK TRANSMITTER CODE
  571  012526                                  LDMA    IMM,BASE                ;ADDRESS BASE TABLE ADDRESS
  (1)          000102                          MICPC=MICPC+1
  (1)  012526  010017                          <MOVE!LDMAR!IMM!<BASE&377>>
  572  012530                                  STATE   FUDGE                   ;SET TMTR STATE TO ENTER TABLE UPDATE
  (1)          000103                          MICPC=MICPC+1
  (1)  012530  000736                          <MOVE!WRTEBR!IMM!<FUDGE-INIT&777/2>>
  573  012532                                  ALWAYS  TB0                     ;GO SET UP NXT BITS AND ADRESS OF BASE FOR NPRS
  (1)          000104                          MICPC=MICPC+1
  (1)  012532  110462                          <JUMP!ALCOND!<TB0-INIT&3000*4>!<TB0-INIT&777/2>>
  574  012534                          BS2:    LDMA    IMM,IMG10
  (1)          000105                          MICPC=MICPC+1
  (1)  012534  010156                          <MOVE!LDMAR!IMM!<IMG10&377>>
  575  012536                                  SP      MEMX,AORB,SP10          ;RESTORE BIT 1 OF SP10
  (1)          000106                          MICPC=MICPC+1
  (1)  012536  043310                          <MOVE!SPX!MEMX!AORB!SP10>
  576  012540                                  SP      MEMX!INCMAR,SELB,SP11           ;RESTORE SP11
  (1)          000107                          MICPC=MICPC+1
  (1)  012540  057231                          <MOVE!SPX!MEMX!INCMAR!SELB!SP11>
  577  012542                                  SP      MEMX!INCMAR,SELB,SP12           ;RESTORE SP12
  (1)          000110                          MICPC=MICPC+1
  (1)  012542  057232                          <MOVE!SPX!MEMX!INCMAR!SELB!SP12>
  578  012544                                  SP      MEMX,SELB,SP17          ;RESTORE        SP17
  (1)          000111                          MICPC=MICPC+1
  (1)  012544  043237                          <MOVE!SPX!MEMX!SELB!SP17>
  579  012546                                  SP      BR,DECA,SP10            ;TURN OFF UNNUM MESSAGE PENDING AND
  (1)          000112                          MICPC=MICPC+1
  (1)  012546  003170                          <MOVE!SPX!BR!DECA!SP10>
  580                                                                          ;ZERO THE BRG
  581  012550                                  STATE   NIDLE2                  ;PORT STATUS
  (1)          000113                          MICPC=MICPC+1
  (1)  012550  000520                          <MOVE!WRTEBR!IMM!<NIDLE2-INIT&777/2>>
  582  012552                                  SP      BR,SELB,SP13            ;SAVE IN SP13 - NOTE THAT STATUS READ INTO
  (1)          000114                          MICPC=MICPC+1
  (1)  012552  003233                          <MOVE!SPX!BR!SELB!SP13>
  583                                                                          ;RAM WAS TABLE UPDATE WHICH SAVED STATUS IN SP13
  584  012554                                  SP      BR,DECA,SP1             ;CLEAR INIT MODE
  (1)          000115                          MICPC=MICPC+1
  (1)  012554  003161                          <MOVE!SPX!BR!DECA!SP1>
  585  012556                                  BRWRTE  IMM,200                 ;SET OK TO SEND
  (1)          000116                          MICPC=MICPC+1
  (1)  012556  000600                          <MOVE!WRTEBR!IMM!<200>>
  586  012560                                  ALWAYS  SA3
  (1)          000117                          MICPC=MICPC+1
  (1)  012560  110733                          <JUMP!ALCOND!<SA3-INIT&3000*4>!<SA3-INIT&777/2>>
```



```
  588                                     .SBTTL  NIDLE2---NO CSR ACTIVITY STATE
  589  012562                          NIDLE2: BRWRTE  BR,SELA!SP1             ;READ PORT STATUS WORD
  (1)          000120                          MICPC=MICPC+1
  (1)  012562  000001                          <MOVE!WRTEBR!BR!<SELA!SP1>>
  594  012564                                  BR4     OUTINT
  (1)          000121                          MICPC=MICPC+1
  (1)  012564  103220                          <JUMP!BR4CON!<OUTINT-INIT&3000*4>!<OUTINT-INIT&777/2>>
  596  012566                                  SPBR    IBUS,INCON,SP0          ;READ INPUT CONTROL CSR
  (1)          000122                          MICPC=MICPC+1
  (1)  012566  123400                          <MOVE!SPBRX!IBUS!INCON!SP0>
  597  012570                                  BRSHFT                          ;SHIFT IT RIGHT
  (1)          000123                          MICPC=MICPC+1
  (1)  012570  001620                          <MOVE!SHFTBR!WRTEBR!SELB>
  598  012572                                  BR4     INWAT1                  ;IF RQI SET -- BRANCH
  (1)          000124                          MICPC=MICPC+1
  (1)  012572  103155                          <JUMP!BR4CON!<INWAT1-INIT&3000*4>!<INWAT1-INIT&777/2>>
  599                                                                          ;TO RE-READ THE IN CNTRL REGISTER TO AVOID
  600                                                                          ;A RACE IN MICRO-P READ/UNIBUS WRITE
  601  012574                          NIDLE6: BRWRTE  BR,SELA!SP1             ;READ PORT STATUS
  (1)          000125                          MICPC=MICPC+1
  (1)  012574  003001                          <MOVE!WRTEBR!BR!<SELA!SP1>>
  606  012576                                  BR0     10$
  (1)          000126                          MICPC=MICPC+1
  (1)  012576  102131                          <JUMP!BR0CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
  608  012600                                  SPBR    IBUS,UBBR,SP0           ;TIMER EXPIRES?
  (1)          000127                          MICPC=MICPC+1
  (1)  012600  123620                          <MOVE!SPBRX!IBUS!UBBR!SP0>
  609  012602                                  BR4     TIMSRV
  (1)          000130                          MICPC=MICPC+1
  (1)  012602  113245                          <JUMP!BR4CON!<TIMSRV-INIT&3000*4>!<TIMSRV-INIT&777/2>>
  614  012604                          10$:    SPBR    IBUS,MODEM,SP0          ;READ MODEM CONTROL CSR
  (1)          000131                          MICPC=MICPC+1
  (1)  012604  023660                          <MOVE!SPBRX!IBUS!MODEM!SP0>
  615  012606                                  BRWRTE  BR,AA!SP0               ;SHIFT IT LEFT
  (1)          000132                          MICPC=MICPC+1
  (1)  012606  000520                          <MOVE!WRTEBR!BR!<AA!SP0>>
  616  012610                                  BR4     SETDSR                  ;IF DSR SET, CLEAR FLAG
  (1)          000133                          MICPC=MICPC+1
  (1)  012610  103150                          <JUMP!BR4CON!<SETDSR-INIT&3000*4>!<SETDSR-INIT&777/2>>
  617  012612                                  BRWRTE  BR,SELA!SP10            ;READ LINE STATUS WORD
  (1)          000134                          MICPC=MICPC+1
  (1)  012612  003010                          <MOVE!WRTEBR!BR!<SELA!SP10>>
  618  012614                                  BRSHFT
  (1)          000135                          MICPC=MICPC+1
  (1)  012614  001620                          <MOVE!SHFTBR!WRTEBR!SELB>
  619  012616                                  BR4     IDLE                    ;START MODE
  (1)          000136                          MICPC=MICPC+1
  (1)  012616  103645                          <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  620  012620                                  BRWRTE  BR,AA!SP1               ;READ PORT STATUS WORD
  (1)          000137                          MICPC=MICPC+1
  (1)  012620  000521                          <MOVE!WRTEBR!BR!<AA!SP1>>
  621  012622                                  BR1     IDLE                    ;INIT MODE
  (1)          000140                          MICPC=MICPC+1
  (1)  012622  102345                          <JUMP!BR1CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  622  012624                                  BR7     IDLE                    ;DISCONNECT ERROR ALREADY SENT
  (1)          000141                          MICPC=MICPC+1
```

```
(1)  012624  103445                <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
623  012626                         SPBR    IBUS,MAIN,SP0   ;READ THE MAINT REGISTER
(1)          000142                MICPC=MICPC+1
(1)  012626  123420                <MOVE!SPBRX!IBUS!MAIN!SP0>
624  012630                         BRWRTE  BR,ADD!SP0              ;SHIFT LEFT
(1)          000143                MICPC=MICPC+1
(1)  012630  000400                <MOVE!WRTEBR!BR!<ADD!SP0>>
625  012632                         BR4     IDLE                    ;LU LOOP -- EXIT
(1)          000144                MICPC=MICPC+1
(1)  012632  103045                <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
626  012634                         BRWRTE  IMM,100                 ;WRITE DISCONNECT ERROR
(1)          000145                MICPC=MICPC+1
(1)  012634  000500                <MOVE!WRTEBR!IMM!<100>>
627  012636                         SP      BR,AORB,SP1             ;FLAG ERROR RECORDED
(1)          000146                MICPC=MICPC+1
(1)  012636  063301                <MOVE!SPX!BR!AORB!SP1>
628  012640                         ALWAYS  ERRXX                   ;MAKE A CONTROL OUT
(1)          000147                MICPC=MICPC+1
(1)  012640  114671                <JUMP!ALCOND!<ERRXX-INIT&3000*4>!<ERRXX-INIT&777/2>>
629  012642                 SETDSR: BRWRTE  IMM,277                 ;CLEAR DISCONNECT ERROR FLAG
(1)          000150                MICPC=MICPC+1
(1)  012642  000277                <MOVE!WRTEBR!IMM!<277>>
630  012644                         ALWAYS  CLRIDL
(1)          000151                MICPC=MICPC+1
(1)  012644  100652                <JUMP!ALCOND!<CLRIDL-INIT&3000*4>!<CLRIDL-INIT&777/2>>
```



```
637                             .SBTTL INWAIT---WAIT FOR RQI TO CLEAR
638  012646                 INWAIT: SPBR    IBUS,INCON,SP0          ;READ INPUT CONTROL CSR
(1)          000152                MICPC=MICPC+1
(1)  012646  123400                <MOVE!SPBRX!IBUS!INCON!SP0>
639  012650                         BRWRTE  BR,<AA!SP0>             ;SHIFT IT LEFT
(1)          000153                MICPC=MICPC+1
(1)  012650  060520                <MOVE!WRTEBR!BR!<AA!SP0>>
640  012652                         BR7     NIDLE3                  ;INTERRUPT ENABLE HAS BEEN SET
(1)          000154                MICPC=MICPC+1
(1)  012652  103557                <JUMP!BR7CON!<NIDLE3-INIT&3000*4>!<NIDLE3-INIT&777/2>>
641
642  012654                 INWAT1: SPBR    IBUS,INCON,SP0          ;READ THE INPUT CONTROL CSR
(1)          000155                MICPC=MICPC+1
(1)  012654  123400                <MOVE!SPBRX!IBUS!INCON!SP0>
643  012656                         BR7     INWAT2                  ;READY IN STILL SET
(1)          000156                MICPC=MICPC+1
(1)  012656  103566                <JUMP!BR7CON!<INWAT2-INIT&3000*4>!<INWAT2-INIT&777/2>>
644  012660                 NIDLE3: PSTATE  INWAT1                  ;UPDATE STATE TO INPUT
(1)  012660                         MEM     IMM,<<INWAT1-INIT&777/2>>
(2)          000157                MICPC=MICPC+1
(2)  012660  002555                <MOVE!WRMEM!IMM!<<INWAT1-INIT&777/2>>>
645  012662                         BRWRTE  BR,AA!SP0               ;SHIFT CSR LEFT
(1)          000160                MICPC=MICPC+1
(1)  012662  060520                <MOVE!WRTEBR!BR,@AA!SP0>>
646  012664                         BR7     ININT
(1)          000161                MICPC=MICPC+1
(1)  012664  117454                <JUMP!BR7CON!<ININT-INIT&3000*4>!<ININT-INIT&777/2>>
647  012666                         PSTATE  INWAIT                  ;UPDATE STATE POINTER TO NO INTERRUPT GENERATED
(1)  012666                         MEM     IMM,<<INWAIT-INIT&777/2>>
(2)          000162                MICPC=MICPC+1
(2)  012666  002552                <MOVE!WRMEM!IMM!<<INWAIT-INIT&777/2>>>
648  012670                 NIDLE4: BRWRTE  IMM,200
(1)          000163                MICPC=MICPC+1
(1)  012670  000200                <MOVE!WRTEBR!IMM!<200>>
649  012672                         OUT     BR,AORB!OINCON          ;SET THE RDYI
(1)          000164                MICPC=MICPC+1
(1)  012672  061300                <MOVE!WROUTX!BR!<AORB!OINCON>>
650  012674                         ALWAYS  IDLE
(1)          000165                MICPC=MICPC+1
(1)  012674  100445                <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
651                             ;
652  012676                 INWAT2: BRSHFT                          ;SHIFT THE BR RIGHT
(1)          000166                MICPC=MICPC+1
(1)  012676  001620                <MOVE!SHFTBR!WRTEBR!SELB>
653  012700                         BR4     NIDLE6                  ;RQI SET--- GO AWAY
(1)          000167                MICPC=MICPC+1
(1)  012700  103125                <JUMP!BR4CON!<NIDLE6-INIT&3000*4>!<NIDLE6-INIT&777/2>>
658  012702                 INSRV:  SPBR    IBUS,INCON,SP0          ;READ THE INPUT CONTROL CSR
(1)          000170                MICPC=MICPC+1
(1)  012702  123400                <MOVE!SPBRX!IBUS!INCON!SP0>
659  012704                         BR1     30$                     ;--SENSE OR BASE
(1)          000171                MICPC=MICPC+1
(1)  012704  102005                <JUMP!BR1CON!<30$-INIT&3000*4>!<30$-INIT&777/2>>
660  012706                         BR0     10$                     ;CNTL I
(1)          000172                MICPC=MICPC+1
(1)  012706  102177                <JUMP!BR0CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
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661  012710                          BRSHFT                          ;MUST BE BA/CC-SHIFT FOR IN OR OUT
(1)       000173                     MICPC=MICPC+1
(1)  012710 001620                   <MOVE!SHFTBR!WRTEBR!SELB>
662  012712                          BR1     15$
(1)       000174                     MICPC=MICPC+1
(1)  012712 102601                   <JUMP!BR1CON!<15$-INIT&3000*4>!<15$-INIT&777/2>>
663  012714                          PSTATE  TBASRV                  ;TRANSMITTER
(1)  012714                          MEM     IMM,<<TBASRV-INIT&777/2>>
(2)       000175                     MICPC=MICPC+1
(2)  012714 002703                   <MOVE!WRMEM!IMM!<<TBASRV-INIT&777/2>>>
664  012716                          ALWAYS  20$
(1)       000176                     MICPC=MICPC+1
(1)  012716 100502                   <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
665  012720                     10$: PSTATE  CTLSRV
(1)  012720                          MEM     IMM,<<CTLSRV-INIT&777/2>>
(2)       000177                     MICPC=MICPC+1
(2)  012720 002661                   <MOVE!WRMEM!IMM!<<CTLSRV-INIT&777/2>>>
666  012722                          ALWAYS  20$
(1)       000200                     MICPC=MICPC+1
(1)  012722 100502                   <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
667  012724                     15$: PSTATE  RBASRV
(1)  012724                          MEM     IMM,<<RBASRV-INIT&777/2>>
(2)       000201                     MICPC=MICPC+1
(2)  012724 002726                   <MOVE!WRMEM!IMM!<<RBASRV-INIT&777/2>>>
668  012726                     20$: BRWRTE  BR,SELA!SP1             ;INIT MODE
(1)       000202                     MICPC=MICPC+1
(1)  012726 060601                   <MOVE!WRTEBR!BR!<SELA!SP1>>
669  012730                          BR0     PROCER                  ;IF INIT MODE--ERROR
(1)       000203                     MICPC=MICPC+1
(1)  012730 102211                   <JUMP!BR0CON!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
670  012732                          ALWAYS  IDLE
(1)       000204                     MICPC=MICPC+1
(1)  012732 100445                   <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
679  012734                     30$: BR0     35$                     ;IF BASE---PROCESS
(1)       000205                     MICPC=MICPC+1
(1)  012734 102207                   <JUMP!BR0CON!<35$-INIT&3000*4>!<35$-INIT&777/2>>
680  012736                          ALWAYS  PROCER
(1)       000206                     MICPC=MICPC+1
(1)  012736 100611                   <JUMP!ALCOND!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
681  012740                     35$: BRWRTE  BR,SELA!SP1             ;INIT MODE?
(1)       000207                     MICPC=MICPC+1
(1)  012740 060601                   <MOVE!WRTEBR!BR!<SELA!SP1>>
682  012742                          BR0     BASSRV
(1)       000210                     MICPC=MICPC+1
(1)  012742 102056                   <JUMP!BR0CON!<BASSRV-INIT&3000*4>!<BASSRV-INIT&777/2>>
684  012744                PROCER: BRWRTE  IMM,100                  ;CLEAR INPUT CONTROL CSR
(1)       000211                     MICPC=MICPC+1
(1)  012744 000500                   <MOVE!WRTEBR!IMM!<100>>
685  012746                          OUT     BR,AANDB!OINCON         ;;
(1)       000212                     MICPC=MICPC+1
(1)  012746 061260                   <MOVE!WROUTX!BR!<AANDB!OINCON>>
686  012750                          LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
(1)       000213                     MICPC=MICPC+1
(1)  012750 010177                   <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
687  012752                          MEMINC  IMM,2
(1)       000214                     MICPC=MICPC+1
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(1)  012752 016402                   <MOVE!WRMEM!INCMAR!IMM!<2>>
688  012754                          MEM     IMM,0
(1)       000215                     MICPC=MICPC+1
(1)  012754 002400                   <MOVE!WRMEM!IMM!<0>>
689  012756                          OUTPUT  MEMX,SELB!OMODEM        ;CLEAR DATA TERMINAL READY
(1)       000216                     MICPC=MICPC+1
(1)  012756 342233                   <MOVE!WROUT!MEMX!<SELB!OMODEM>>
690  012760                          ALWAYS  RCEXX                   ;POST THE ERROR - FATAL
(1)       000217                     MICPC=MICPC+1
(1)  012760 114527                   <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
```

```
                                .SBTTL  OUTINT---SET UP OUTPUT INTERRUPT (RDYO)
012762                  OUTINT:
012762                          PSTATE  OUTWAIT         ;PORT STATUS TO WAITING FOR OUT
012762                          MEM     IMM,<<OUTWAIT-INIT&777/2>>
                        000220  MICPC=MICPC+1
012762  002654          <MOVE!WRMEM!IMM!<<OUTWAIT-INIT&777/2>>>
                                                        ;COMPLETION
012764                          LDMA    IMM,NXTINT              ;ADDRESS OF NEXT INTERRUPT POINTER
                        000221  MICPC=MICPC+1
012764  010240          <MOVE!LDMAR!IMM!<NXTINT&377>>
012766                          LDMA    MEMX,SELB               ;NEXT INTERRUPT
                        000222  MICPC=MICPC+1
012766  050220          <MOVE!LDMAR!MEMX!<SELB>>
012770                          SP      IBUS,OCON,SP0           ;READ THE OUTPUT CONTROL CSR
                        000223  MICPC=MICPC+1
012770  123040          <MOVE!SPX!IBUS!OCON!SP0>
012772                          OUT     <MEMX!INCMAR>,<AORB!OOCON>      ;WRITE THE OUT CONTROL CSR
                        000224  MICPC=MICPC+1
012772  055302          <MOVE!WROUTX!MEMX!INCMAR!<AORB!OOCON>>
012774                          LDMA    MEMX,SELB                       ;ADDRESS LINK
                        000225  MICPC=MICPC+1
012774  050220          <MOVE!LDMAR!MEMX!<SELB>>
012776                          BRWRTE  <BR!INCMAR>,<AA!SP0>            ;KICK PAST LINK STATUS BYTE
                        000226  MICPC=MICPC+1
012776  074520          <MOVE!WRTEBR!BR!INCMAR!<AA!SP0>>
                                                        ;SHIFT CSR0 IMAGE LEFT
                                                        ;***DO NOT CHANGE BR UNTIL BR7***
013000                          OUT     <MEMX!INCMAR>,<SELB!OPORT1>     ;WRITE LOW BYTE OF BA TO CSR
                        000227  MICPC=MICPC+1
013000  055224          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT1>>
013002                          OUT     <MEMX!INCMAR>,<SELB!OPORT2>     ;WRITE HIGH BYTE OF BA TO CSR
                        000230  MICPC=MICPC+1
013002  055225          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT2>>
013004                          OUT     <MEMX!INCMAR>,<SELB!OPORT4>     ;WRITE HIGH BYTE OF COUNT TO CSR
                        000231  MICPC=MICPC+1
013004  055227          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT4>>
013006                          OUT     <MEMX!INCMAR>,<SELB!OPORT3>     ;WRITE THE LOW BYTE OF COUNT
                        000232  MICPC=MICPC+1
013006  055226          <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT3>>
                                                        ;***HERE IS BR7***
013010                          BR7     PE1                     ;INTERRUPT ENABLE IS SET
                        000233  MICPC=MICPC+1
013010  103760          <JUMP!BR7CON!<PE1-INIT&3000*4>!<PE1-INIT&777/2>>
                                                        ;GENERATE AN INTERRUPT
013012                  PINT2:
013012                          LDMA    IMM,NXTINT              ;ADDRESS NEXT INTERRUPT QUEUE
                        000234  MICPC=MICPC+1
013012  010240          <MOVE!LDMAR!IMM!<NXTINT&377>>
013014                          SP      MEMX,SELB,SP0           ;COPY ADDRESS FOR NEXT INT TO SP0
                        000235  MICPC=MICPC+1
013014  043220          <MOVE!SPX!MEMX!SELB!SP0>
013016                          MEM     IMM,INTSTK              ;ASSUME WRAP AROUND CASE
                        000236  MICPC=MICPC+1
013016  002642          <MOVE!WRMEM!IMM!<INTSTK>>
013020                          BRWRTE  IMM,<<MMEND-2>>         ;ADDRESS OF LAST INT IN STACK
                        000237  MICPC=MICPC+1
```



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013020  000776          <MOVE!WRTEBR!IMM!<<MMEND-2>>>
013022                          CMP     BR,SP0                  ;SHOULD WE WRAP
                        000240  MICPC=MICPC+1
013022  060360          <SUBTC!BR!SP0>
013024                          Z       5$                      ;YES--BRANCH
                        000241  MICPC=MICPC+1
013024  101644          <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
013026                          BRWRTE  IMM,2                   ;OFFSET FOR NEXT POINTER
                        000242  MICPC=MICPC+1
013026  000402          <MOVE!WRTEBR!IMM!<2>>
013030                          MEM     BR,ADD!SP0              ;UPDATE POINTER
                        000243  MICPC=MICPC+1
013030  062400          <MOVE!WRMEM!BR!<ADD!SP0>>
013032                  5$:     SP      MEMX,SELB,SP0           ;COPY POINTER TO SP0
                        000244  MICPC=MICPC+1
013032  043220          <MOVE!SPX!MEMX!SELB!SP0>
013034                          LDMA    IMM,NXTSP               ;PICK UP START OF IN QUEUE
                        000245  MICPC=MICPC+1
013034  010241          <MOVE!LDMAR!IMM!<NXTSP&377>>
013036                          CMP     MEMX,SP0                ;COMPARE TO END
                        000246  MICPC=MICPC+1
013036  060360          <SUBTC!MEMX!SP0>
013040                          Z       10$                     ;IF EQUAL--CLEAR INT PENDING
                        000247  MICPC=MICPC+1
013040  101651          <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
013042                          ALWAYS  IDLE
                        000250  MICPC=MICPC+1
013042  100445          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
013044                  10$:    BRWRTE  IMM,357                 ;MASK TO CLEAR INT PENDING
                        000251  MICPC=MICPC+1
013044  000757          <MOVE!WRTEBR!IMM!<357>>
013046                  CLRIDL: SP      BR,AANDB,SP1
                        000252  MICPC=MICPC+1
013046  063261          <MOVE!SPX!BR!AANDB!SP1>
013050                          ALWAYS  IDLE
                        000253  MICPC=MICPC+1
013050  100445          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```

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                                        .SBTTL  OUTWAI--WAIT FOR RDYO TO GO AWAY
013052                          OUTWAI: SPBR    IBUS,OCON,SP0           ;READ OUTPUT CONTROL CSR
(1)     000254                          MICPC=MICPC+1
(1)  013052  123440                     <MOVE!SPBRX!IBUS!OCON!SP0>
013054                                  BR7     NIDLE6                  ;RDY0 SET --GET OUT
(1)     000255                          MICPC=MICPC+1
(1)  013054  103525                     <JUMP!BR7CON!<NIDLE6-INIT&3000*4>!<NIDLE6-INIT&777/2>>
013056                                  BRWRTE  IMM,100         ;CLEAR CONTROL BITS
(1)     000256                          MICPC=MICPC+1
(1)  013056  300500                     <MOVE!WRTEBR!IMM!<100>>
013060                                  OUT     BR,OOCON!AANDB
(1)     000257                          MICPC=MICPC+1
(1)  013060  061262                     <MOVE!WROUTX!BR!<OOCON!AANDB>>
013062                                  ALWAYS  INS13
(1)     000260                          MICPC=MICPC+1
(1)  013062  100674                     <JUMP!ALCOND!<INS13-INIT&3000*4>!<INS13-INIT&777/2>>
```



```
                                        .SBTTL  CTLSRV--CNTL I SERVICE
013064                          CTLSRV: SPBR    IBUS,PORT4,SP0                  ;TO SP0
(1)     000261                          MICPC=MICPC+1
(1)  013064  123560                     <MOVE!SPBRX!IBUS!PORT4!SP0>
013066                                  BRSHFT
(1)     000262                          MICPC=MICPC+1
(1)  013065  001620                     <MOVE!SHFTBR!WRTEBR!SELB>
013070                                  BR1     HDSEL                           ;IF SET IS HALF DUPLEX
(1)     000263                          MICPC=MICPC+1
(1)  013070  102755                     <JUMP!BR1CON!<HDSEL-INIT&3000*4>!<HDSEL-INIT&777/2>>
013072                                  BRWRTE  IMM,100                         ;MASK FOR DTR
(1)     000264                          MICPC=MICPC+1
(1)  013072  300500                     <MOVE!WRTEBR!IMM!<100>>
013074                                  OUTPUT  BR,SELB!OMODEM                  ;TURN OFF HALF-DUPLEX
(1)     000265                          MICPC=MICPC+1
(1)  013074  062233                     <MOVE!WROUT!BR!<SELB!OMODEM>>
013076                          INS11:  BRWRTE  DP,<SELA!SP0>                   ;RESTORE THE CNTL WORD
(1)     000266                          MICPC=MICPC+1
(1)  013076  360600                     <MOVE!WRTEBR!DP!<SELA!SP0>>
013100                                  BR0     CBOOT                           ;IF SET IS BOOT
(1)     000267                          MICPC=MICPC+1
(1)  013100  102276                     <JUMP!BR0CON!<CBOOT-INIT&3000*4>!<CBOOT-INIT&777/2>>
013102                          INS12:  SP      IBUS,INCON,SP0          ;READ THE INPUT CONTROL CSR
(1)     000270                          MICPC=MICPC+1
(1)  013102  123000                     <MOVE!SPX!IBUS!INCON!SP0>
013104                                  BRWRTE  IMM,100                 ;ZERO THE BR REGISTER EXCEPT INT ENABLE
(1)     000271                          MICPC=MICPC+1
(1)  013104  300500                     <MOVE!WRTEBR!IMM!<100>>
013106                                  OUT     BR,<AANDB!OINCON>               ;CLEAR IN CONTROL CSR
(1)     000272                          MICPC=MICPC+1
(1)  013106  061260                     <MOVE!WROUTX!BR!<AANDB!OINCON>>
013110                                  LDMA    IMM,PRTST                       ;ADDRESS PORT STATE
(1)     000273                          MICPC=MICPC+1
(1)  013110  010162                     <MOVE!LDMAR!IMM!<PRTST&377>>
013112                          INS13:  PSTATE  NIDLE2
(1)     013112                          MEM     IMM,<<NIDLE2-INIT&777/2>>
(2)     000274                          MICPC=MICPC+1
(2)  013112  302520                     <MOVE!WPMEM!IMM!<<NIDLE2-INIT&777/2>>>
013114                                  ALWAYS  IDLE
(1)     000275                          MICPC=MICPC+1
(1)  013114  100445                     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
                                        ;
013116                          CBOOT:  BRWRTE  IMM,200                 ;MASK FOR BOOT MODE
(1)     000276                          MICPC=MICPC+1
(1)  013115  300600                     <MOVE!WRTEBR!IMM!<200>>
013120                                  SP      BR,AORB,SP1             ;IN PORT STATUS WORD
(1)     000277                          MICPC=MICPC+1
(1)  013120  063301                     <MOVE!SPX!BR!AORB!SP1>
013122                                  BRWRTE  IMM,204                 ;MASK FOR OK TO SEND AND LINE IDLE
(1)     000300                          MICPC=MICPC+1
(1)  013122  300604                     <MOVE!WRTEBR!IMM!<204>>
013124                                  SP      BR,SELB,SP10            ;IN LINE STATUS
(1)     000301                          MICPC=MICPC+1
(1)  013124  063230                     <MOVE!SPX!BR!SELB!SP10>
013126                                  ALWAYS  INS12
(1)     000302                          MICPC=MICPC+1
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(1)  013126  100670                    <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
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                                       .SBTTL  TBASRV--TRANSMITTER BUFFER ADDRESS SERVICE
013130                         TBASRV: LDMA    IMM,ETC                 ;GET POINTER TO END OF TMT CHAIN
(1)             000303                 MICPC=MICPC+1
(1)  013130  010072                    <MOVE!LDMAR!IMM!<ETC&377>>
013132                                 LDMA    MEMX,<SELB!SPX!SP0>     ;FIND THE LINK
(1)             000304                 MICPC=MICPC+1
(1)  013132  053220                    <MOVE!LDMAR!MEMX!<SELB!SPX!SP0>>
013134                                 MEMINC  IMM,1                   ;BUFFER ASSIGNED IN IN LINK FLAGS
(1)             000305                 MICPC=MICPC+1
(1)  013134  016401                    <MOVE!WRMEM!INCMAR!IMM!<1>>
013136                                 BRWRTE  <IMM!INCMAR>,6          ;POINT PAST NUMBER FIELD
(1)             000306                 MICPC=MICPC+1
(1)  013136  014506                    <MOVE!WRTEBR!IMM!INCMAR!<6>>
                                                                       ;SET BR FOR ADDITION TO SP0
013140                                 MEMINC  IBUS,PORT1
(1)             000307                 MICPC=MICPC+1
(1)  013140  136500                    <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
013142                                 MEMINC  IBUS,PORT2
(1)             000310                 MICPC=MICPC+1
(1)  013142  136520                    <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
013144                                 MEMINC  IBUS,PORT4
(1)             000311                 MICPC=MICPC+1
(1)  013144  136560                    <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
013146                                 MEMINC  IBUS,PORT3
(1)             000312                 MICPC=MICPC+1
(1)  013146  136540                    <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
013150                                 SP      BR,ADD,SP0              ;OFFSET TO NEXT TRANSMIT LINK
(1)             000313                 MICPC=MICPC+1
(1)  013150  063000                    <MOVE!SPX!BR!ADD!SP0>
013152                                 BRWRTE  IMM,T                   ;LOAD BR WITH ADDRESS OF CHAIN END
(1)             000314                 MICPC=MICPC+1
(1)  013152  000553                    <MOVE!WRTEBR!IMM!<T>>
013154                                 LDMA    IMM,ETC
(1)             000315                 MICPC=MICPC+1
(1)  013154  010072                    <MOVE!LDMAR!IMM!<ETC&377>>
013156                                 CMP     BR,SP0                  ;END OF CHAIN?
(1)             000316                 MICPC=MICPC+1
(1)  013156  060360                    <SUBTC!BR!SP0>
013160                                 Z       20$                     ;IF YES--BRANCH
(1)             000317                 MICPC=MICPC+1
(1)  013160  101724                    <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
013162                                 MEM     BR,SELA!SP0             ;UPDATE THE END POINTER IN MEMORY
(1)             000320                 MICPC=MICPC+1
(1)  013162  062600                    <MOVE!WRMEM!BR!<SELA!SP0>>
013164                         10$:    BRWRTE  IMM,2                   ;NUMBERED MSG PENDING MASK
(1)             000321                 MICPC=MICPC+1
(1)  013164  000402                    <MOVE!WRTEBR!IMM!<2>>
013166                                 SP      BR,AORB,SP10            ;UPDATE LINE STATUS
(1)             000322                 MICPC=MICPC+1
(1)  013166  063310                    <MOVE!SPX!BR!AORB!SP10>
013170                                 ALWAYS  INS12
(1)             000323                 MICPC=MICPC+1
(1)  013170  100670                    <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
013172                         20$:    MEM     IMM,IML1                ;WRAP IT AROUND
(1)             000324                 MICPC=MICPC+1
(1)  013172  002471                    <MOVE!WRMEM!IMM!<IML1>>
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788  013174                          ALWAYS  10$                            ;CONTINUE PROCESSING
(1)          000325                  MICPC=MICPC+1
(1)  013174  100721                  <JUMP!ALCOND!1<10$-INIT&3000*4>!1<10$-INIT&777//2>>
```



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790                                   .SBTTL  RBASRV--RECEIVE BUFFER ADDRESS SERVICE
791  013176                          RBASRV: LDMA    IMM,ERC                  ;ADDRES END OF RECEIVE CHAIN
(1)          000326                  MICPC=MICPC+1
(1)  013176  010023                  <MOVE!LDMAR!IMM!<ERC&377>>
792  013200                          LDMA    MEMX,<SELB!$PX!$P0>              ;GET THE POINTER TO LINK
(1)          000327                  MICPC=MICPC+1
(1)  013200  053220                  <MOVE!LDMAR!MEMX!<SELB!$PX!SP0>>
793  013202                          MEMINC  IMM,1
(1)          000330                  MICPC=MICPC+1
(1)  013202  016401                  <MOVE!WRMEM!INCMAR!IMM!<1>>
794  013204                          MEMINC  IBUS,PORT1
(1)          000331                  MICPC=MICPC+1
(1)  013204  136500                  <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
795  013206                          MEMINC  IBUS,PORT2
(1)          000332                  MICPC=MICPC+1
(1)  013206  136520                  <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
796  013210                          MEMINC  IBUS,PORT4
(1)          000333                  MICPC=MICPC+1
(1)  013210  136560                  <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
797  013212                          MEMINC  IBUS,PORT3
(1)          000334                  MICPC=MICPC+1
(1)  013212  136540                  <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
798                                   ;;;;NOTE INVERTED ORDER OF PORT 3 AND PORT4
799  013214                          LDMA    IMM,ERC
(1)          000335                  MICPC=MICPC+1
(1)  013214  010023                  <MOVE!LDMAR!IMM!<ERC&377>>
800  013216                          MEM     IMM,RCL1                 ;ASSUME WRAP AROUND CASE
(1)          000336                  MICPC=MICPC+1
(1)  013216  002425                  <MOVE!WRMEM!IMM!<RCL1>>
801  013220                          BRWRTE  IMM,RCL7                 ;GET ADDRESS OF END OF CAHIN AREA
(1)          000337                  MICPC=MICPC+1
(1)  013220  000463                  <MOVE!WRTEBR!IMM!<RCL7>>
802  013222                          CMP     BR,SP0                           ;CHECK FOR END
(1)          000340                  MICPC=MICPC+1
(1)  013222  060360                  <SUBTC!BR!SP0>
803  013224                          Z       INS12                            ;IF EQUAL BRANCH
(1)          000341                  MICPC=MICPC+1
(1)  013224  101670                  <JUMP!ZCOND!1<INS12-INIT&3000*4>!1<INS12-INIT&777/2>>
804  013226                          BRWRTE  IMM,5                    ;CALCULATE ADDRESS OF NEXT LINK
(1)          000342                  MICPC=MICPC+1
(1)  013226  000405                  <MOVE!WRTEBR!IMM!<5>>
805  013230                          MEM     BR,ADD!$P0               ;..
(1)          000343                  MICPC=MICPC+1
(1)  013230  062400                  <MOVE!WRMEM!BR!<ADD!SP0>>
806  013232                          ALWAYS  INS12                            ;EXIT
(1)          000344                  MICPC=MICPC+1
(1)  013232  100670                  <JUMP!ALCOND!1<INS12-INIT&3000*4>!1<INS12-INIT&777/2>>
807  013234                          BRWRTE  IMM,317                  ;MASK TO CLEAR START MODE AND CLR ACTIVE
(1)          000345                  MICPC=MICPC+1
(1)  013234  000717                  <MOVE!WRTEBR!IMM!<317>>
808  013236                          SPBR    BR,AANDB,SP10            ;CLEAR BIT IN LINE STATUS WORD
(1)          000346                  MICPC=MICPC+1
(1)  013236  063670                  <MOVE!SPBRX!BR!AANDB!SP10>
809  013240                          BRWRTE  IMM,0                    ;CLEAR BR
(1)          000347                  MICPC=MICPC+1
(1)  013240  000400                  <MOVE!WRTEBR!IMM!<0>>
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 810  013242                          SP      BR,SELB,SP13            ;SET NUMB MESSAGE TYPE IN SP13
 (1)          000350                  MICPC=MICPC+1
 (1)  013242  063233                  <MOVE!SPX!BR!SELB!SP13>
 811  013244                          STATE   RCVB                    ;CHANGE RECEIVE STATE POINTER TO STATE B
 (1)          000351                  MICPC=MICPC+1
 (1)  013244  000424                  <MOVE!WRTEBR!IMM!<RCVB-INIT&777/2>>
 812  013246                          ALWAYS  REXIT
 (1)          000352                  MICPC=MICPC+1
 (1)  013246  104422                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
 813                                  ;
 814  013250                  RTHRES: BRWRTE  IMM,2
 (1)          000353                  MICPC=MICPC+1
 (1)  013250  000402                  <MOVE!WRTEBR!IMM!<2>>
 815  013252                          ALWAYS  ERRXX
 (1)          000354                  MICPC=MICPC+1
 (1)  013252  114671                  <JUMP!ALCOND!<ERRXX-INIT&3000*4>!<ERRXX-INIT&777/2>>
 816                                  ;
```



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 830  013254                  HDSEL:  BRWRTE  IMM,100                 ;HD MASK TO BR
 (1)          000355                  MICPC=MICPC+1
 (1)  013254  000500                  <MOVE!WRTEBR!IMM!<100>>
 831  013256                          SP      BR,AORB,SP10            ;UPDATE PORT STATUS WORD
 (1)          000356                  MICPC=MICPC+1
 (1)  013256  063310                  <MOVE!SPX!BR!AORB!SP10>
 832  013260                          ALWAYS  INS11
 (1)          000357                  MICPC=MICPC+1
 (1)  013260  100666                  <JUMP!ALCOND!<INS11-INIT&3000*4>!<INS11-INIT&777/2>>
 833                                  ;
 834  013262                  PE1:    BRWRTE  IMM,300                 ;MASK FOR INTERUPT AND VECTOR THROUGH X04
 (1)          000360                  MICPC=MICPC+1
 (1)  013262  000700                  <MOVE!WRTEBR!IMM!<300>>
 835  013264                          SP      IBUS,UBBR,SP0           ;READ BR CONTROL REG
 (1)          000361                  MICPC=MICPC+1
 (1)  013264  123220                  <MOVE!SPX!IBUS!UBBR!SP0>
 836  013266                          OUT     BR,<AORB!OBR>           ;INTERRUPT
 (1)          000362                  MICPC=MICPC+1
 (1)  013266  061311                  <MOVE!WROUTX!BR!<AORB!OBR>>
 841  013270                          ALWAYS  PINT2
 (1)          000363                  MICPC=MICPC+1
 (1)  013270  100634                  <JUMP!ALCOND!<PINT2-INIT&3000*4>!<PINT2-INIT&777/2>>
 843                                  ;
 844  013272                  HALTED: MEMADR  EM6
 (1)          000364                  MICPC=MICPC+1
 (1)  013272  002730                  <MOVE!WRMEM!<EM6-INIT&777/2>>
 845
 846  013274                  ACLOW:  BRWRTE  IMM,2                   ;CAUSE AN AC LOW
 (1)          000365                  MICPC=MICPC+1
 (1)  013274  000402                  <MOVE!WRTEBR!IMM!<2>>
 847  013276                          OUT     BR,<SELB!OBR>
 (1)          000366                  MICPC=MICPC+1
 (1)  013276  061231                  <MOVE!WROUTX!BR!<SELB!OBR>>
 848  013300                  5$:     BRWRTE  IBUS,UBBR               ;WAIT FOR IT TO COMPLETE
 (1)          000367                  MICPC=MICPC+1
 (1)  013300  120620                  <MOVE!WRTEBR!IBUS!<UBBR>>
 849  013302                          BR1     5$
 (1)          000370                  MICPC=MICPC+1
 (1)  013302  102767                  <JUMP!BR1CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
 850  013304                          ,ALWAY  MEMX,SELB,PAGE3
 (1)          000371                  MICPC=MICPC+1
 (1)  013304  154620                  <JUMP!ALCOND!MEMX!SELB!PAGE3>
 851  013306                  CKTIME: BRWRTE  IBUS,UBBR               ;READ BR CONTROL REG
 (1)          000372                  MICPC=MICPC+1
 (1)  013306  120620                  <MOVE!WRTEBR!IBUS!<UBBR>>
 852  013310                          BR4     HALTED
 (1)          000373                  MICPC=MICPC+1
 (1)  013310  103364                  <JUMP!BR4CON!<HALTED-INIT&3000*4>!<HALTED-INIT&777/2>>
 853  013312                          ALWAYS  EM1
 (1)          000374                  MICPC=MICPC+1
 (1)  013312  114733                  <JUMP!ALCOND!<EM1-INIT&3000*4>!<EM1-INIT&777/2>>
 854                                  ;
 855  013314                  TBU1:   BRWRTE  IBUS,NPR
 (1)          000375                  MICPC=MICPC+1
 (1)  013314  120600                  <MOVE!WRTEBR!IBUS!<NPR>>
 856  013316                          BR0     IDLE
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(1)          000376                     MICPC=MICPC+1
(1)  013316  102045                     <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
857  013320                             ALWAYS  EC2
(1)          000377                     MICPC=MICPC+1
(1)  013320  114760                     <JUMP!ALCOND!<EC2-INIT&3000*4>!<EC2-INIT&777/2>>
858
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860          013322                     .=INIT+1000
861          000377                     MICPC=377
862                                     .SBTTL  RCVA--ROUTINE TO HANDLE FIRST DDCMP CHARACTER
863                                     ;ENTERED FROM IDLE LOOP
864                                     ;DETERMINES IF MESSAGE TYPE IS NUMBERED,UNNUMBERED OR BOOT
865                                     ;SETS UP APROPRIATE STATES FOR REST OF MESSAGE.
866  013322                     RCVA:   SP      IBUS,RCVDAT,SP0         ;READ RECEIVE CHARACTE  R TO SP0
(1)          000400                     MICPC=MICPC+1
(1)  013322  023200                     <MOVE!SPX!IBUS!RCVDAT!SP0>
867  013324                             BRWRTE  BR,SELA!SP1             ;READ PORT STATUS WORD
(1)          000401                     MICPC=MICPC+1
(1)  013324  060601                     <MOVE!WRTEBR!BR!<SELA!SP1>>
868  013326                             BR0     5$                      ;IF INIT MODE---ONLY BOOT OK
(1)          000402                     MICPC=MICPC+1
(1)  013326  100012                     <JUMP!BR0CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
869  013330                             BR7     5$                      ;IF BOOT MODE---ONLY BOOT OK
(1)          000403                     MICPC=MICPC+1
(1)  013330  107412                     <JUMP!BR7CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
870  013332                             BRWRTE  IMM,201                 ;SOH TO BR
(1)          000404                     MICPC=MICPC+1
(1)  013332  000601                     <MOVE!WRTEBR!IMM!<201>>
871  013334                             CMP     BR,SP0                  ;COMPARE BR TO SP0
(1)          000405                     MICPC=MICPC+1
(1)  013334  060360                     <SUBTC!BR!SP0>
872  013336                             Z       RA1                     ;IF EQUAL-IS NUMBERED MESSAGE
(1)          000406                     MICPC=MICPC+1
(1)  013336  101745                     <JUMP!ZCOND!<RA1-INIT&3000*4>!<RA1-INIT&777/2>>
873  013340                             BRWRTE  IMM,5                   ;ENQ TO BR
(1)          000407                     MICPC=MICPC+1
(1)  013340  000605                     <MOVE!WRTEBR!IMM!<5>>
874  013342                             CMP     BR,SP0                  ;COMPARE ENQ TO SP0
(1)          000410                     MICPC=MICPC+1
(1)  013342  060360                     <SUBTC!BR!SP0>
875  013344                             Z       RA2                     ;IF EQUAL-IS UNNUMBERED MESSAGE
(1)          000411                     MICPC=MICPC+1
(1)  013344  105421                     <JUMP!ZCOND!<RA2-INIT&3000*4>!<RA2-INIT&777/2>>
876  013346                     5$:     BRWRTE  IMM,220                 ;DLE TO BR
(1)          000412                     MICPC=MICPC+1
(1)  013346  000620                     <MOVE!WRTEBR!IMM!<220>>
877  013350                             CMP     BR,SP0                  ;COMPARE DLE TO SP0
(1)          000413                     MICPC=MICPC+1
(1)  013350  060360                     <SUBTC!BR!SP0>
878  013352                             Z       BOOT                    ;IF EQUAL IS BOOT
(1)          000414                     MICPC=MICPC+1
(1)  013352  105762                     <JUMP!ZCOND!<BOOT-INIT&3000*4>!<BOOT-INIT&777/2>>
879  013354                     FLUSH:  OUTPUT  IMM,<200!ORCVCO>        ;FLUSH THE INPUT SILO
(1)          000415                     MICPC=MICPC+1
(1)  013354  002212                     <MOVE!WROUT!IMM!<200!ORCVCO>>
880  013356                             BRWRTE  IMM,357                 ;MASK TO CLEAR--CLEAR ACTIVE
(1)          000416                     MICPC=MICPC+1
(1)  013356  000757                     <MOVE!WRTEBR!IMM!<357>>
881  013360                             SP      BR,AANDB,SP10           ;IN LINE STATUS WORD
(1)          000417                     MICPC=MICPC+1
(1)  013360  063270                     <MOVE!SPX!BR!AANDB!SP10>
882  013362                             ALWAYS  RM1                     ;SET STATE TO RCVA AND RETURN TO IDLE
(1)          000420                     MICPC=MICPC+1
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(1)  013362  114662                  <JUMP!ALCOND!<RM1-INIT&3000*4>!<RM1-INIT&777/2>>
883  013364                  RA2:    STATE   RCVI                    ;CHANGE RECEIVE STATE TO 1
(1)          000421                  MICPC=MICPC+1
(1)  013364  000700                  <MOVE!WRTEBR!IMM!<RCVI-INIT&777/2>>
888  013366                  REXIT:  SP      BR,SELB,SP3
(1)          000422                  MICPC=MICPC+1
(1)  013366  063223                  <MOVE!SPX!BR!SELB!SP3>
889  013370                          ALWAYS  IDLE
(1)          000423                  MICPC=MICPC+1
(1)  013370  100445                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
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892                                   .SBTTL  RCVB--ROUTINE TO HANDLE FIRST CHARACTER OF COUNT FIELD
893                                   ;ENTERED FROM IDLE LOOP
894                                   ;STORES COUNT FIELD AND SETS UP RCVC AS NEXT STATE
895                                   ;
896  013372                  RCVB:
897  013372                          SP      IBUS,RCVDAT,SP4         ;READ CHARACTER TO SP4
(1)          000424                  MICPC=MICPC+1
(1)  013372  023204                  <MOVE!SPX!IBUS!RCVDAT!SP4>
898  013374                          LDMA    IMM,LRC                 ;LOAD ADDRESS OF START OF RECV  CHAIN
(1)          000425                  MICPC=MICPC+1
(1)  013374  010024                  <MOVE!LDMAR!IMM!<LRC&377>>
899  013376                          SP      MEMX!LDMAR,SELB,SP14    ;COPY POINTER TO SP14
(1)          000426                  MICPC=MICPC+1
(1)  013376  053234                  <MOVE!SPX!MEMX!LDMAR!SELB!SP14>
900                                                                   ;AND LOAD MAR WITH ADDRESS OF CURRENT BA
901  013400                          BRWRTE  MEMX,INCMAR!SELB        ;READ FLAGS BYTE
(1)          000427                  MICPC=MICPC+1
(1)  013400  054620                  <MOVE!WRTEBR!MEMX!<INCMAR!SELB>>
902  013402                          BR0     RB1                     ;RECV BUFFER ASSIGNED---CONTINUE
(1)          000430                  MICPC=MICPC+1
(1)  013402  106042                  <JUMP!BR0CON!<RB1-INIT&3000*4>!<RB1-INIT&777/2>>
903  013404                          BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
(1)          000431                  MICPC=MICPC+1
(1)  013404  060601                  <MOVE!WRTEBR!BR!<SELA!SP1>>
904  013406                          BR7     RB3                     ;MAINT MODE
(1)          000432                  MICPC=MICPC+1
(1)  013406  107440                  <JUMP!BR7CON!<RB3-INIT&3000*4>!<RB3-INIT&777/2>>
905  013410                          LDMA    IMM,T                   ;ERROR--LOAD TYPE FIELD ADDRESS IN MAR
(1)          000433                  MICPC=MICPC+1
(1)  013410  010153                  <MOVE!LDMAR!IMM!<T&377>>
906  013412                          MEMINC  IMM,2                   ;LOAD NAK TYPE
(1)          000434                  MICPC=MICPC+1
(1)  013412  016402                  <MOVE!WRMEM!INCMAR!IMM!<2>>
907  013414                          MEM     IMM,310                 ;LOAD SUB-TYPE NO BUFFERS
(1)          000435                  MICPC=MICPC+1
(1)  013414  002710                  <MOVE!WRMEM!IMM!<310>>
908  013416                          LDMA    IMM,NTLS
(1)          000436                  MICPC=MICPC+1
(1)  013416  010012                  <MOVE!LDMAR!IMM!<NTLS&377>>
909  013420                          ALWAYS  RH5                     ;BRANCH TO SEND NAK ROUTINE
(1)          000437                  MICPC=MICPC+1
(1)  013420  104557                  <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>
910  013422                  RB3:    BRWRTE  IMM,4                   ;MASK FOR NO BUFFER AVAILABLE
(1)          000440                  MICPC=MICPC+1
(1)  013422  000004                  <MOVE!WRTEBR!IMM!<4>>
911  013424                          SP      BR,AORB,SP1             ;SET THE FLAG
(1)          000441                  MICPC=MICPC+1
(1)  013424  063301                  <MOVE!SPX!BR!AORB!SP1>
912  013426                  RB1:    STATE   RCVC
(1)          000442                  MICPC=MICPC+1
(1)  013426  000462                  <MOVE!WRTEBR!IMM!<RCVC-INIT&777/2>>
913  013430                  RB0:    SP      BR,SELB,SP3
(1)          000443                  MICPC=MICPC+1
(1)  013430  063223                  <MOVE!SPX!BR!SELB!SP3>
914  013432                          OUTPUT  <MEMX!INCMAR>,<SELB!OBA1>       ;OUTPUT LOW ORDER BYTE OF ADDRESS
(1)          000444                  MICPC=MICPC+1
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(1) 013432 056226                       <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA1>>
915 013434                              OUTPUT  MEMX!INCMAR,<SELB!OBA2> ;OUTPUT HIGH BYTE OF ADDRESS
(1)        000445                       MICPC=MICPC+1
(1) 013434 056227                       <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA2>>
916 013436                              SP      IBUS,UBBR,SP0           ;READ THE BUS REQ REGISTER
(1)        000446                       MICPC=MICPC+1
(1) 013436 123220                       <MOVE!SPX!IBUS!UBBR!SP0>
917 013440                              BRWRTE  IMM,101                 ;MASK OFF ALL BUT NXM AND VEC4 BITS
(1)        000447                       MICPC=MICPC+1
(1) 013440 000501                       <MOVE!WRTEBR!IMM!<101>>
918 013442                              SP      BR,AANDB,SP0            ;AND SAVE IN SP0
(1)        000450                       MICPC=MICPC+1
(1) 013442 063200                       <MOVE!SPX!BR!AANDB!SP0>
919 013444                              SP      IMM,300,SP5             ;MASK TO ISOLATE EX. MEM BITS
(1)        000451                       MICPC=MICPC+1
(1) 013444 003305                       <MOVE!SPX!IMM!300!SP5>
920                                                                     ;NOTE THIS REALLY WRITES A 305 BUT THE
921                                                                     ;5 GETS SHIFTED OUT
922 013446                              BRWRTE  MEMX,AANDB!SP5          ;MASK ALL BUT EX. MEM BITS
(1)        000452                       MICPC=MICPC+1
(1) 013446 040665                       <MOVE!WRTEBR!MEMX!<AANDB!SP5>>
923 013450                              BRSHFT                          ;SHIFT THEM INTO THE CORRECT POSITION
(1)        000453                       MICPC=MICPC+1
(1) 013450 001620                       <MOVE!SHFTBR!WRTEBR!SELB>
924 013452                              BRSHFT
(1)        000454                       MICPC=MICPC+1
(1) 013452 001620                       <MOVE!SHFTBR!WRTEBR!SELB>
925 013454                              BRSHFT
(1)        000455                       MICPC=MICPC+1
(1) 013454 001620                       <MOVE!SHFTBR!WRTEBR!SELB>
926 013456                              BRSHFT
(1)        000456                       MICPC=MICPC+1
(1) 013456 001620                       <MOVE!SHFTBR!WRTEBR!SELB>
927 013460                              OUT     BR,AORB!OBR                     ;WRITE EX MEM BITS OUT
(1)        000457                       MICPC=MICPC+1
(1) 013460 061311                       <MOVE!WROUTX!BR!<AORB!OBR>>
928 013462                              ALWAYS  IDLE
(1)        000460                       MICPC=MICPC+1
(1) 013462 100445                       <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
929 013464                      RB2:    ALWAYS  I2
(1)        000461                       MICPC=MICPC+1
(1) 013464 100454                       <JUMP!ALCOND!<I2-INIT&3000*4>!<I2-INIT&777/2>>
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931                                     .SBTTL  RCVC--ROUTINE TO HANDLE SECOND CHARACTER OF COUNT FIELD, SELECT AND FINA
932                                     ;ENTERED FROM IDLE LOOP
933                                     ;INTERPRETS SELECT AND FINAL
934                                     ;CHECKS FOR COUNT TOO LARGE
935                                     ;
936 013466                      RCVC:   ALWAYS  SELQSY                  ;"CALL" SELECT/QSYNC SUBROUTINE
(1)        000462                       MICPC=MICPC+1
(1) 013466 114470                       <JUMP!ALCOND!<SELQSY-INIT&3000*4>!<SELQSY-INIT&777/2>>
937 013470                              LDMA    BR,<SELA!SP14>          ;LOAD ADDRESS OF CURRENT COUNT
(1)        000463                       MICPC=MICPC+1
(1) 013470 070214                       <MOVE!LDMAR!BR!<SELA!SP14>>
938 013472                              BRWRTE  BR!INCMAR,SELA!SP1      ;READ STATUS BYTE
(1)        000464                       MICPC=MICPC+1
(1) 013472 074601                       <MOVE!WRTEBR!BR!INCMAR!<SELA!SP1>>
939 013474                              BRWRTE  SHFTBR!INCMAR,SELB      ;SHIFT IT RIGHT
(1)        000465                       MICPC=MICPC+1
(1) 013474 015620                       <MOVE!WRTEBR!SHFTBR!INCMAR!<SELB>>
940 013476                              BR1     RC5                     ;NO BUFFER ASSIGNED IN MAINT MODE
(1)        000466                       MICPC=MICPC+1
(1) 013476 106475                       <JUMP!BR1CON!<RC5-INIT&3000*4>!<RC5-INIT&777/2>>
941 013500                              BRWRTE  IMM!INCMAR,77           ;MASK FOR COUNT BITS
(1)        000467                       MICPC=MICPC+1
(1) 013500 014477                       <MOVE!WRTEBR!IMM!INCMAR!<77>>
942 013502                              SP      MEMX!INCMAR,SELB,SP0    ;COPY HIGH BYTE OF COUNT TO SP0
(1)        000470                       MICPC=MICPC+1
(1) 013502 057220                       <MOVE!SPX!MEMX!INCMAR!SELB!SP0>
943 013504                              BRWRTE  BR,AANDB!SP0            ;MASK TO BR
(1)        000471                       MICPC=MICPC+1
(1) 013504 060660                       <MOVE!WRTEBR!BR!<AANDB!SP0>>
944 013506                              CMP     BR,SP5          ;COMPARE HIGH ORDER BITS OF COUNT
(1)        000472                       MICPC=MICPC+1
(1) 013506 060365                       <SUBTC!BR!SP5>
945 013510                              C       RCFATL                  ;IF CARRY--TOO BIG ERROR
(1)        000473                       MICPC=MICPC+1
(1) 013510 115116                       <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
946 013512                              Z       RCLOW                   ;IF EQUAL COMPARE LOW ORDER BITS OF COUNT
(1)        000474                       MICPC=MICPC+1
(1) 013512 115513                       <JUMP!ZCOND!<RCLOW-INIT&3000*4>!<RCLOW-INIT&777/2>>
947 013514                      RC5:    STATE   RCVD                    ;SET NEXT STATE TO D
(1)        000475                       MICPC=MICPC+1
(1) 013514 000477                       <MOVE!WRTEBR!IMM!<RCVD-INIT&777/2>>
948 013516                              ALWAYS  REXIT
(1)        000476                       MICPC=MICPC+1
(1) 013516 104422                       <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
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                                        .SBTTL  RCVD--ROUTINE TO HANDLE RESPONSE FIELD FOR NUMBERED MESSAGES
                                        ;
013520                          RCVD:   SP      BR,DECA,SP4             ;DECREMENTLOW BYTE OF COUNT
(1)     000477                          MICPC=MICPC+1
(1)  013520  063164                     <MOVE!SPX!BR!DECA!SP4>
013522                                  C       RD3                     ;NO OVERFLOW
(1)     000500                          MICPC=MICPC+1
(1)  013522  105102                     <JUMP!CCOND!<RD3-INIT&3000*4>!<RD3-INIT&777/2>>
013524                                  SP      BR,DECA,SP5             ;OVERFLOW - DECREMENT HIGH BYTE
(1)     000501                          MICPC=MICPC+1
(1)  013524  063165                     <MOVE!SPX!BR!DECA!SP5>
013526                          RD3:    STATE   RCVE
(1)     000502                          MICPC=MICPC+1
(1)  013526  000523                     <MOVE!WPTEBR!IMM!<RCVE-INIT&777/2>>
013530                          RD2:    SP      BR,SELB,SP3             ;SAVE THE STATE
(1)     000503                          MICPC=MICPC+1
(1)  013530  063223                     <MOVE!SPX!BR!SELB!SP3>
013532                                  SPBR    IBUS,RCVDAT,SP0         ;INPUT THE CHARACTER
(1)     000504                          MICPC=MICPC+1
(1)  013532  023600                     <MOVE!SPBRX!IBUS!RCVDAT!SP0>
013534                                  BRWRTE  BR,SUB!SP17             ;COMPARE NEW R TO LAST R
(1)     000505                          MICPC=MICPC+1
(1)  013534  060757                     <MOVE!WRTEBR!BR!<SUB!SP17>>
013536                                  BR7     10$                     ;IF NEW IS GREATER---PROCESS
(1)     000506                          MICPC=MICPC+1
(1)  013536  107510                     <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
013540                                  ALWAYS  IDLE
(1)     000507                          MICPC=MICPC+1
(1)  013540  100445                     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
013542                          10$:    BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
(1)     000510                          MICPC=MICPC+1
(1)  013542  060601                     <MOVE!WRTEBR!BR!<SELA!SP1>>
013544                                  BR7     IDLE                    ;MAINT. MODE - GET OUT
(1)     000511                          MICPC=MICPC+1
(1)  013544  103445                     <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
013546                                  BRWRTE  BR,SELA!SP10
(1)     000512                          MICPC=MICPC+1
(1)  013546  060610                     <MOVE!WRTEBR!BR!<SELA!SP10>>
013550                                  BRSHFT
(1)     000513                          MICPC=MICPC+1
(1)  013550  001620                     <MOVE!SHFTBR!WRTEBR!SEL8>
013552                                  BR4     IDLE
(1)     000514                          MICPC=MICPC+1
(1)  013552  103045                     <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
013554                                  LDMA    IMM,ISP17               ;ADDRESS LAST ACKED IMAGE
(1)     000515                          MICPC=MICPC+1
(1)  013554  010155                     <MOVE!LDMAR!IMM!<ISP17&377>>
013556                                  MEM     BR,SELA!SP0             ;COPY THE CHAR
(1)     000516                          MICPC=MICPC+1
(1)  013556  062600                     <MOVE!WPMEM!BR!<SELA!SP0>>
013560                          RD5:    BRWRTE  IMM,REPST!LDMAR         ;SET UP COUNT FOR TIMER
(1)     000517                          MICPC=MICPC+1
(1)  013560  010403                     <MOVE!WPTEBR!IMM!<REPST!LDMAR>>
                                                                        ;****DEPENDENT ON REPST = 2
013562                                  MEM     IMM,1                   ;RESET REP THRESHOLD
(1)     000520                          MICPC=MICPC+1
```



```
(1)  013562  002401                     <MOVE!WPMEM!IMM!<1>>
013564                                  SP      BR,SELB,SP15            ;RESET THE COUNT
(1)     000521                          MICPC=MICPC+1
(1)  013564  063235                     <MOVE!SPX!BR!SELB!SP15>
013566                                  ALWAYS  IDLE
(1)     000522                          MICPC=MICPC+1
(1)  013566  100445                     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```

```
                                        .SBTTL  RCVE--ROUTINE TO HANDLE N FIELD OF NUMBERED MESSAGE
                                        ;
013570                          RCVE:   BRWRTE  BR,SELA!SP1             ;READ THE STATUS BYTE
(1)             000523                  MICPC=MICPC+1
(1)     013570  060601                  <MOVE!WRTEBR!BR!<SELA!SP1>>
013572                                  BR7     RCVQ
(1)             000524                  MICPC=MICPC+1
(1)     013572  107713                  <JUMP!BR7CON!<RCVQ-INIT&3000*4>!<RCVQ-INIT&777/2>>
013574                                  BRWRTE  IBUS,RCVDAT             ;INPUT THE CHARACTER
(1)             000525                  MICPC=MICPC+1
(1)     013574  020600                  <MOVE!WRTEBR!IBUS!<RCVDAT>>
013576                                  CMP     BR,SP11
(1)             300526                  MICPC=MICPC+1
(1)     013576  060371                  <SUBTC!BR!SP11>
013600                                  Z       5$
(1)             300527                  MICPC=MICPC+1
(1)     013600  105532                  <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
013602                                  SP      BR,DECA,SP13            ;FORCE MSG TYPE TO -1
(1)             000530                  MICPC=MICPC+1
(1)     013602  063173                  <MOVE!SPX!BR!DECA!SP13>
013604                                  ALWAYS  RE2
(1)             000531                  MICPC=MICPC+1
(1)     013604  104533                  <JUMP!ALCOND!<RE2-INIT&3000*4>!<RE2-INIT&777/2>>
013606                          5$:     SP      BR,INCA,SP11            ;UPDATE R FIELD
(1)             000532                  MICPC=MICPC+1
(1)     013606  063071                  <MOVE!SPX!BR!INCA!SP11>
013610                          RE2:    STATE   RCVF                    ;NEXT RECEIVE STATE IS F
(1)             000533                  MICPC=MICPC+1
(1)     013610  000535                  <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
013612                                  ALWAYS  REXIT
(1)             000534                  MICPC=MICPC+1
(1)     013612  104422                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
```



```
                                        .SBTTL  RCVF--ROUTINE TO IGNORE ADDRESS
013614                          RCVF:   STATE   RCVG
(1)             000535                  MICPC=MICPC+1
(1)     013614  000540                  <MOVE!WRTEBR!IMM!<RCVG-INIT&777/2>>
013616                          RCVF1:  NOP     IBUS,RCVDAT,0           ;INPUT CHARACTER - AND DISCARD
(1)             000536                  MICPC=MICPC+1
(1)     013616  020200                  <IBUS!RCVDAT!0>
013620                                  ALWAYS  REXIT
(1)             000537                  MICPC=MICPC+1
(1)     013620  104422                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
                                        ;
                                        .SBTTL  RCVG--ROUTINE TO IGNORE CRC1
                                        ;
013622                          RCVG:   STATE   RCVH                    ;NEXT STATE IS RCVH
(1)             000540                  MICPC=MICPC+1
(1)     013622  000542                  <MOVE!WRTEBR!IMM!<RCVH-INIT&777/2>>
013624                                  ALWAYS  RCVF1
(1)             000541                  MICPC=MICPC+1
(1)     013624  104536                  <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
```

```
                        .SBTTL  RCVH--ROUTINE TO HANDLE CRC2 AND TO DISPATCH NUMBERED AND UNNUMBERED TYP
                        ;
013626                  RCVH:
013626                          SP      IBUS,RCVDAT,SP0                 ;GET CHAR IN SP0
(1)     000542                  MICPC=MICPC+1
(1)     013626 023200           <MOVE!SPX!IBUS!RCVDAT!SP0>
013630                          BRWRTE  IBUS,RCVCON                     ;READ RECVR CONTROL REGISTER
(1)     000543                  MICPC=MICPC+1
(1)     013630 020640           <MOVE!WRTEBR!IBUS!<RCVCON>>
013632                          BR0     TDON1                           ;IF BCC MATCH SET CRC IS GOOD
(1)     000544                  MICPC=MICPC+1
(1)     013632 116167           <JUMP!BR0CON!<TDON1-INIT&3000*4>!<TDON1-INIT&777/2>>
013634                          BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
(1)     000545                  MICPC=MICPC+1
(1)     013634 060001           <MOVE!WRTEBR!BR!<SELA!SP1>>
013635                          BR7     RHX                             ;MAINT MODE
(1)     000546                  MICPC=MICPC+1
(1)     013636 107751           <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
013640                          BRWRTE  DP,<SELA!SP10>                  ;READ PORT STATUS WORD TO BR
(1)     000547                  MICPC=MICPC+1
(1)     013640 062610           <MOVE!WRTEBR!DP!<SELA!SP10>>
013642                          BRSHFT
(1)     000550                  MICPC=MICPC+1
(1)     013642 001620           <MOVE!SHFTBR!WRTEBR!SELB>
013644                          BR4     SNAK1                           ;IF START MODE--PROCEED TO RESEND START
(1)     000551                  MICPC=MICPC+1
(1)     013644 117315           <JUMP!BR4CON!<SNAK1-INIT&3000*4>!<SNAK1-INIT&777/2>>
013646                          LDMA    IMM,T                           ;ELSE BCC ERROR--LOAD ADDRESS OF TYPE FI
(1)     000552                  MICPC=MICPC+1
(1)     013646 010153           <MOVE!LDMAR!IMM!<T&377>>
013650                          MEMINC  IMM,2                           ;WRITE NAK TYPE
(1)     000553                  MICPC=MICPC+1
(1)     013650 016402           <MOVE!WRMEM!INCMAR!IMM!<2>>
013652                          MEMINC  IMM,301                         ;WRITE HEADER BCC ERROR SUBTYPE
(1)     000554                  MICPC=MICPC+1
(1)     013652 016701           <MOVE!WRMEM!INCMAR!IMM!<301>>
013654                          MEM     BR,SELA!SP17            ;RESTORE LAST ACKED  IMAGE
(1)     000555                  MICPC=MICPC+1
(1)     013654 062617           <MOVE!WRMEM!BR!<SELA!SP17>>
013656                          LDMA    IMM,NHDS                ;ADDRESS CUM ERROR COUNTER
(1)     000556                  MICPC=MICPC+1
(1)     013656 010013           <MOVE!LDMAR!IMM!<NHDS&377>>
013660                  RH5:    SP      MEMX,SELB,SP0           ;WRITE IT TO SP0
(1)     000557                  MICPC=MICPC+1
(1)     013660 043220           <MOVE!SPX!MEMX!SELB!SP0>
013662                          MEM     BR,INCA!SP0             ;INCREMENT IT
(1)     000560                  MICPC=MICPC+1
(1)     013662 062460           <MOVE!WRMEM!BR!<INCA!SP0>>
013664                          LDMA    IMM,NAKST               ;ADDRESS NAKS TMTED DYNAMIC
(1)     000561                  MICPC=MICPC+1
(1)     013664 010001           <MOVE!LDMAR!IMM!<NAKST&377>>
013666                          BRWRTE  MEMX,SELB               ;WRITE IT TO BR
(1)     000562                  MICPC=MICPC+1
(1)     013666 046620           <MOVE!WRTEBR!MEMX!<SELB>>
013670                          BSHFTB                          ;SHIFT IT RIGHT
(1)     000563                  MICPC=MICPC+1
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(1)     013670 061620           <MOVE!SHFTBR!SELB!BR>
013672                          MEM     BR,SELB                 ;UPDATE IT
(1)     000564                  MICPC=MICPC+1
(1)     013672 062620           <MOVE!WRMEM!BR!<SELB>>
013674                          BR0     NTHRES                  ;BRANCH IF THRESHOLD EXCEEDED
(1)     000565                  MICPC=MICPC+1
(1)     013674 116264           <JUMP!BR0CON!<NTHRES-INIT&3000*4>!<NTHRES-INIT&777/2>>
013676                          ALWAYS  SNAK
(1)     000566                  MICPC=MICPC+1
(1)     013676 114712           <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>
013700                  RH3:    BRWRTE  DP,<DECA!SP13>          ;LOAD TYPE RECEIVED--DECREMENTING
(1)     000567                  MICPC=MICPC+1
(1)     013700 060573           <MOVE!WRTEBR!DP!<DECA!SP13>>
013702                          Z       RH1                     ;IF ALUOUT IS ALL ONES IS NUMBERED MSG
(1)     000570                  MICPC=MICPC+1
(1)     013702 115505           <JUMP!ZCOND!<RH1-INIT&3000*4>!<RH1-INIT&777/2>>
013704                          RSTATE  RCVA
(1)     000571                  MICPC=MICPC+1
(1)     013704 000400           <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
(1)     000572                  MICPC=MICPC+1
(1)     013706 063223           <MOVE!SPX!BR!SELB!SP3>
013710                          BRWRTE  DP,<SELA!SP10>          ;LOAD LINE STATUS WORD IN BR
(1)     000573                  MICPC=MICPC+1
(1)     013710 060610           <MOVE!WRTEBR!DP!<SELA!SP10>>
013712                          BR4     FLUSH1
(1)     000574                  MICPC=MICPC+1
(1)     013712 117040           <JUMP!BR4CON!<FLUSH1-INIT&3000*4>!<FLUSH1-INIT&777/2>>
013714                  CG1:    BRSHFT                          ;SHIFT RIGHT
(1)     000575                  MICPC=MICPC+1
(1)     013714 001620           <MOVE!SHFTBR!WRTEBR!SELB>
013716                          BR4     10$
(1)     000576                  MICPC=MICPC+1
(1)     013716 107204           <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
013720                          LDMA    IMM,TYPTAB              ;ADDRESS TYPE TABLE
(1)     000577                  MICPC=MICPC+1
(1)     013720 010163           <MOVE!LDMAR!IMM!<TYPTAB&377>>
013722                          CMP     <MEMX!INCMAR>,SP13
(1)     000600                  MICPC=MICPC+1
(1)     013722 054373           <SUBTC!MEMX!INCMAR!SP13>
013724                          Z       REP
(1)     000601                  MICPC=MICPC+1
(1)     013724 115404           <JUMP!ZCOND!<REP-INIT&3000*4>!<REP-INIT&777/2>>
013726                          CMP     <MEMX!INCMAR>,SP13
(1)     000602                  MICPC=MICPC+1
(1)     013726 054373           <SUBTC!MEMX!INCMAR!SP13>
013730                          Z       NAK
(1)     000603                  MICPC=MICPC+1
(1)     013730 115443           <JUMP!ZCOND!<NAK-INIT&3000*4>!<NAK-INIT&777/2>>
013732                  10$:    LDMA    IMM,TYPSTT              ;SET POINTER TO START TYPE
(1)     000604                  MICPC=MICPC+1
(1)     013732 010165           <MOVE!LDMAR!IMM!<TYPSTT&377>>
013734                          CMP     <MEMX!INCMAR>,SP13
(1)     000605                  MICPC=MICPC+1
(1)     013734 054373           <SUBTC!MEMX!INCMAR!SP13>
013736                          Z       START
(1)     000606                  MICPC=MICPC+1
```

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  (1)  013736  115413                    <JUMP!ZCOND!<START-INIT&3000*4>!<START-INIT&777/2>>
1036                                                                    ;STACK TYPE
1037  013740                            CMP     <MEMX!INCMAR>,SP13
  (1)          000607                   MICPC=MICPC+1
  (1)  013740  054373                   <SUBTC!MEMX!INCMAR!SP13>
1038  013742                            Z       STACK
  (1)          000610                   MICPC=MICPC+1
  (1)  013742  115425                   <JUMP!ZCOND!<STACK-INIT&3000*4>!<STACK-INIT&777/2>>
1039  013744                            CMP     <MEMX!INCMAR>,SP13      ;ACK TYPE
  (1)          000611                   MICPC=MICPC+1
  (1)  013744  054373                   <SUBTC!MEMX!INCMAR!SP13>
1040  013746                            Z       ACK
  (1)          000612                   MICPC=MICPC+1
  (1)  013746  105620                   <JUMP!ZCOND!<ACK-INIT&3000*4>!<ACK-INIT&777/2>>
1041  013750                            ALWAYS  IDLE                    ;OTHERWISE IGNORE--MUST BE OBS MSG
  (1)          000613                   MICPC=MICPC+1
  (1)  013750  100445                   <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1043  013752                    RCVCK:  SPBR    IBUS,RCVCON,SP0         ;READ RCVR CONTROL CSR
  (1)          000614                   MICPC=MICPC+1
  (1)  013752  023640                   <MOVE!SPBRX!IBUS!RCVCON!SP0>
1044  013754                            BRWRTE  BR,ADD!SP0              ;SHIFT LEFT
  (1)          000615                   MICPC=MICPC+1
  (1)  013754  060400                   <MOVE!WRTEBR!BR!<ADD!SP0>>
1045  013756                            BR7     I1
  (1)          000616                   MICPC=MICPC+1
  (1)  013756  103452                   <JUMP!BR7CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1046  013760                            ALWAYS  TA1
  (1)          000617                   MICPC=MICPC+1
  (1)  013760  110405                   <JUMP!ALCOND!<TA1-INIT&3000*4>!<TA1-INIT&777/2>>
1047  013762                    ACK:    BRWRTE  BR,AA!SP10              ;READ LINE STATUS-SHIFTING LEFT
  (1)          000620                   MICPC=MICPC+1
  (1)  013762  060530                   <MOVE!WRTEBR!BR!<AA!SP10>>
1048  013764                            BR4     58                      ;IF START RECD -- CLEAR START MODE
  (1)          000621                   MICPC=MICPC+1
  (1)  013764  107223                   <JUMP!BR4CON!<58-INIT&3000*4>!<58-INIT&777/2>>
1049  013766                            ALWAYS  IDLE
  (1)          000622                   MICPC=MICPC+1
  (1)  013766  100445                   <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1050  013770                    58:     BRWRTE  IMM,327                 ;CLEAR START MODE
  (1)          000623                   MICPC=MICPC+1
  (1)  013770  000727                   <MOVE!WRTEBR!IMM!<327>>
1051  013772                            SP      BR,AANDB,SP10           ;IN LINE STATUS
  (1)          000624                   MICPC=MICPC+1
  (1)  013772  063270                   <MOVE!SPX!BR!AANDB!SP10>
1052  013774                            ALWAYS  RD5
  (1)          000625                   MICPC=MICPC+1
  (1)  013774  104517                   <JUMP!ALCOND!<RD5-INIT&3000*4>!<RD5-INIT&777/2>>
```



```
1055                                ;*****************TIME CRITICAL CODE-- CHANGE WITH GREAT CARE*******************
1056                                        .SBTTL  RCVKO1--ROUTINE TO HANDLE FIRST BYTE ODD RECEIVE
1057  013776                    RCVKO1: SPBR    IBUS,NPR,SP0            ;READ NPR REGISTER
  (1)          000626                   MICPC=MICPC+1
  (1)  013776  123600                   <MOVE!SPBRX!IBUS!NPR!SP0>
1058  014000                            BR0     IDLE
  (1)          000627                   MICPC=MICPC+1
  (1)  014000  102045                   <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1059  014002                            BRWRTE  IMM,200                 ;MASK FOR C0(BYTE TRANSFER)
  (1)          000630                   MICPC=MICPC+1
  (1)  014002  000600                   <MOVE!WRTEBR!IMM!<200>>
1060  014004                            OUT     BR,<AORB!ONPR>          ;TURN ON C0
  (1)          000631                   MICPC=MICPC+1
  (1)  014004  061310                   <MOVE!WROUTX!BR!<AORB!ONPR>>
1061  014006                            STATE   RKE1
  (1)          000632                   MICPC=MICPC+1
  (1)  014006  000670                   <MOVE!WRTEBR!IMM!<RKE1-INIT&777/2>>
1062  014010                            ALWAYS  RCVKO2
  (1)          000633                   MICPC=MICPC+1
  (1)  014010  104637                   <JUMP!ALCOND!<RCVKO2-INIT&3000*4>!<RCVKO2-INIT&777/2>>
1063                                        .SBTTL  RCVKO--PROCESS ODD CHARACTER
1072  014012                    RCVKO:  SPBR    IBUS,NPR,SP0            ;IS AN NPR GOING
  (1)          000634                   MICPC=MICPC+1
  (1)  014012  123600                   <MOVE!SPBRX!IBUS!NPR!SP0>
1073  014014                            BR0     IDLE                    ;IF SO --- GET OUT
  (1)          000635                   MICPC=MICPC+1
  (1)  014014  102045                   <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1074  014016                            STATE   RCVKE
  (1)          000636                   MICPC=MICPC+1
  (1)  014016  000645                   <MOVE!WRTEBR!IMM!<RCVKE-INIT&777/2>>
1075  014020                    RCVKO2: SP      BR,SELB,SP3             ;SET STATE
  (1)          000637                   MICPC=MICPC+1
  (1)  014020  063223                   <MOVE!SPX!BR!SELB!SP3>
1076  014022                            OUTPUT  IBUS,RCVDAT!OUTDA2      ;OUTPUT A CHAR
  (1)          000640                   MICPC=MICPC+1
  (1)  014022  022203                   <MOVE!WROUT!IBUS!<RCVDAT!OUTDA2>>
1077  014024                    RK2:
1079  014024                    RK8:    BRWRTE  IMM,21                  ;SET OUT NPR (C1) AND NPR REQ
  (1)          000641                   MICPC=MICPC+1
  (1)  014024  000421                   <MOVE!WRTEBR!IMM!<21>>
1080  014026                            SP      IBUS,NPR,SP0            ;READ NPR REGISTER
  (1)          000642                   MICPC=MICPC+1
  (1)  014026  123200                   <MOVE!SPX!IBUS!NPR!SP0>
1081  014030                    RK7:    OUT     BR,<AORB!ONPR>          ;WRITE NPR REGISTER
  (1)          000643                   MICPC=MICPC+1
  (1)  014030  061310                   <MOVE!WROUTX!BR!<AORB!ONPR>>
1082  014032                            ALWAYS  IDLE
  (1)          000644                   MICPC=MICPC+1
  (1)  014032  100445                   <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
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1093                                    .SBTTL  RCVKE--HANDLE EVEN BYTES
1094  014034                    RCVKE:  BRWRTE  IBUS,NPR                ;READ NPR CONTROL REGISTER
 (1)          000645                    MICPC=MICPC+1
 (1)  014034  120600                    <MOVE!WRTEBR!IBUS!<NPR>>
1095  014036                            BR0     IDLE
 (1)          000646                    MICPC=MICPC+1
 (1)  014036  102045                    <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1101  014040                    RK5:    SP      IBUS,IOBA1,SP0          ;READ LOW BYTE OF BA TO SP
 (1)          000647                    MICPC=MICPC+1
 (1)  014040  023140                    <MOVE!SPX!IBUS!IOBA1!SP0>
1102  014042                            OUTPUT  DP,<INCA!OBA1>          ;WRITE INCREMENTED BA
 (1)          000650                    MICPC=MICPC+1
 (1)  014042  062066                    <MOVE!WROUT!DP!<INCA!OBA1>>
1103  014044                    RK50:   SP      BR,DECA,SP4             ;DECREMENT CHARACTER COUNT
 (1)          000651                    MICPC=MICPC+1
 (1)  014044  063164                    <MOVE!SPX!BR!DECA!SP4>
1104  014046                            C       10$                     ;NO OVERFLOW
 (1)          000652                    MICPC=MICPC+1
 (1)  014046  105255                    <JUMP!CCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1105  014050                            SP      BR,DECA,SP5             ;OVERFLOW - DECREMENT HIGH BYTE
 (1)          000653                    MICPC=MICPC+1
 (1)  014050  063165                    <MOVE!SPX!BR!DECA!SP5>
1106  014052                            Z       RL3                     ;BYTE COUNT ZERO
 (1)          000654                    MICPC=MICPC+1
 (1)  014052  105721                    <JUMP!ZCOND!<RL3-INIT&3000*4>!<RL3-INIT&777/2>>
1107  014054                    10$:    SP      IBUS,IOBA1,SP0          ;READ INCREMENTED BA
 (1)          000655                    MICPC=MICPC+1
 (1)  014054  023140                    <MOVE!SPX!IBUS!IOBA1!SP0>
1108  014056                            OUTPUT  DP,<INCA!OBA1>          ;WRITE INCREMENTED BA
 (1)          000656                    MICPC=MICPC+1
 (1)  014056  062066                    <MOVE!WROUT!DP!<INCA!OBA1>>
1109  014060                            C       ICBA22                  ;IF CARRY INC BA HIGH
 (1)          000657                    MICPC=MICPC+1
 (1)  014060  115030                    <JUMP!CCOND!<ICBA22-INIT&3000*4>!<ICBA22-INIT&777/2>>
1110  014062                    RK9:    SP      IBUS,RCVDAT,SP0         ;READ CHAR AND SAVE IN SP0
 (1)          000660                    MICPC=MICPC+1
 (1)  014062  023200                    <MOVE!SPX!IBUS!RCVDAT!SP0>
1111  014064                    RK3:    OUTPUT  BR,SELA!OUTDA1          ;WRITE THE CHARACTER
 (1)          000661                    MICPC=MICPC+1
 (1)  014064  062202                    <MOVE!WROUT!BR!<SELA!OUTDA1>>
1112  014066                            SP      BR,DECA,SP4             ;DECREMENT THE COUNTOF BYTES
 (1)          000662                    MICPC=MICPC+1
 (1)  014066  063164                    <MOVE!SPX!BR!DECA!SP4>
1113  014070                            C       RK6                     ;NO OVERFLOW
 (1)          000663                    MICPC=MICPC+1
 (1)  014070  105266                    <JUMP!CCOND!<RK6-INIT&3000*4>!<RK6-INIT&777/2>>
1114  014072                            SP      BR,DECA,SP5             ;DECREMENT HIGH BYTE OF COUNT
 (1)          000664                    MICPC=MICPC+1
 (1)  014072  063165                    <MOVE!SPX!BR!DECA!SP5>
1115  014074                            Z       RL4                     ;BYTE COUNT ZERO
 (1)          000665                    MICPC=MICPC+1
 (1)  014074  111765                    <JUMP!ZCOND!<RL4-INIT&3000*4>!<RL4-INIT&777/2>>
1125  014076                    RK6:    STATE   RCVKO
 (1)          000666                    MICPC=MICPC+1
 (1)  014076  000634                    <MOVE!WRTEBR!IMM!<RCVKO-INIT&777/2>>
1126  014100                            ALWAYS  REXIT
```



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 (1)          000667                    MICPC=MICPC+1
 (1)  014100  104422                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1128                                    ;
1129  014102                    RKE1:   SP      IBUS,NPR,SP0            ;READ NPR REGISTER
 (1)          000670                    MICPC=MICPC+1
 (1)  014102  123200                    <MOVE!SPX!IBUS!NPR!SP0>
1130  014104                            BRWRTE  IMM,177                 ;MASK FOR ALL BUT C0
 (1)          000671                    MICPC=MICPC+1
 (1)  014104  000577                    <MOVE!WRTEBR!IMM!<177>>
1131  014106                            OUT     BR,<AANDB!ONPR>         ;TURN OFF ALL BUT C0
 (1)          000672                    MICPC=MICPC+1
 (1)  014106  061270                    <MOVE!WROUTX!BR!<AANDB!ONPR>>
1132  014110                            ALWAYS  RK50
 (1)          000673                    MICPC=MICPC+1
 (1)  014110  104651                    <JUMP!ALCOND!<RK50-INIT&3000*4>!<RK50-INIT&777/2>>
1133                                   ;*****************END OF TIME CRITICAL PATH************************************
1134
1135  014112                    RCVKE0: SP      IBUS,RCVDAT,SP0         ;READ CHARACTER AND SAVE IN SP0
 (1)          000674                    MICPC=MICPC+1
 (1)  014112  023200                    <MOVE!SPX!IBUS!RCVDAT!SP0>
1136  014114                            BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
 (1)          000675                    MICPC=MICPC+1
 (1)  014114  060001                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1137  014116                            BR7     PASWRD                  ;MAINT MODE - SEE IF RLD MESSAGE
 (1)          000676                    MICPC=MICPC+1
 (1)  014116  117000                    <JUMP!BR7CON!<PASWRD-INIT&3000*4>!<PASWRD-INIT&777/2>>
1138  014120                            ALWAYS  RK3                     ;OTHERWISE PROCESS NORMALLY
 (1)          000677                    MICPC=MICPC+1
 (1)  014120  104661                    <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
```

```
1140
1141  014122                        .SBTTL  RCVI--STORE UNNUMBERED MESSAGE TYPE
RCVI:   SP      IBUS,RCVDAT,SP13        ;STORE UNNUMBERED TYPE
 (1)            000700                  MICPC=MICPC+1
 (1)  014122    023213                  <MOVE!SPX!IBUS!RCVDAT!SP13>
1142  014124                            STATE   RCVJ                    ;NEXT STATE IS J
 (1)            000701                  MICPC=MICPC+1
 (1)  014124    000703                  <MOVE!WRTEBR!IMM!<RCVJ-INIT&777/2>>
1143  014126                            ALWAYS  REXIT
 (1)            000702                  MICPC=MICPC+1
 (1)  014126    104422                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1144                                    ;
```



```
1146                                    .SBTTL  RCVJ--ROUTINE TO HANDLE SUBTYPE FIELD,SELECT AND FINAL
1147  014130                    RCVJ:   ALWAYS  SELQSY          ;"CALL" SELECT AND QSYNC SUBROUTINE
 (1)            000703                  MICPC=MICPC+1
 (1)  014130    114470                  <JUMP!ALCOND!<SELQSY-INIT&3000*4>!<SELQSY-INIT&777/2>>
1148  014132                            STATE   RCVR                    ;NEXT STATE IS R
 (1)            000704                  MICPC=MICPC+1
 (1)  014132    000706                  <MOVE!WRTEBR!IMM!<RCVR-INIT&777/2>>
1149  014134                            ALWAYS  REXIT
 (1)            000705                  MICPC=MICPC+1
 (1)  014134    104422                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
```

```
1151                                    .SBTTL  RCVR--UNNUMBERED MESSAGE RESPONSE FIELD
1152                                    ;ENTERED FROM IDLE LOOP
1153                                    ;
1154  014136                    RCVR: MRWRTE  IMM,3                   ;REP MESSAGE TYPE TO BR
 (1)          000706                  MICPC=MICPC+1
 (1)  014136  000403                  <MOVE!WRTEBR!IMM!<3>>
1155  014140                          NOP     BR,SUB,SP13             ;IS TYPE ACK OR NAK
 (1)          000707                  MICPC=MICPC+1
 (1)  014140  060353                  <BR!SUB!SP13>
1156  014142                          STATE   RCVQ                    ;NEXT STATE IS RCVQ
 (1)          000710                  MICPC=MICPC+1
 (1)  014142  000713                  <MOVE!WRTEBR!IMM!<RCVQ-INIT&777/2>>
1157                                                                  ;***NOTE THIS INSTR DOES NOT CLOCK "C"
1158  014144                          C       RCVF1                   ;IF NOT IGNORE
 (1)          000711                  MICPC=MICPC+1
 (1)  014144  105136                  <JUMP!CCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
1159  014146                          ALWAYS  RD2                     ;DO RANGE CHECKS
 (1)          000712                  MICPC=MICPC+1
 (1)  014146  104503                  <JUMP!ALCOND!<RD2-INIT&3000*4>!<RD2-INIT&777/2>>
```



```
1161                                    .SBTTL  RCVQ--UNNUMBERED MESSAGE--NUMBER FIELD
1162                                    ;ENTER  FROM IDLE
1163                                    ;
1164  014150                    RCVQ: STATE   RCVF                    ;NEXT STATE IS ADDRESS
 (1)          000713                  MICPC=MICPC+1
 (1)  014150  000535                  <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
1165  014152                          ALWAYS  RCVF1
 (1)          000714                  MICPC=MICPC+1
 (1)  014152  104536                  <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
```

```
                                        .SBTTL  RCVL--PROCESS CRC3
                                        ;ENTERED FROM  IDLE LOOP
1169  014154                    RCVL:   SPBR    IBUS,NPR,SP0                    ;READ NPR CONTROL
 (1)          000715                    MICPC=MICPC+1
 (1)  014154  123600                    <MOVE!SPBRX!IBUS!NPR!SP0>
1174  014156                            BR0     IDLE
 (1)          000716                    MICPC=MICPC+1
 (1)  014156  102045                    <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1176  014160                    RL2:    BRWRTE  IMM,177                         ;MASK TO TURN OFF C0
 (1)          000717                    MICPC=MICPC+1
 (1)  014160  000577                    <MOVE!WRTEBR!IMM!<177>>
1177  014162                            OUT     BR,AANDB!ONPR
 (1)          000720                    MICPC=MICPC+1
 (1)  014162  061270                    <MOVE!WROUTX!BR!<AANDB!ONPR>>
1178  014164                    RL3:    SPBR    IBUS,IOBA1,SP0                  ;READ LOW ORDER BYTE OF ADDRESS
 (1)          000721                    MICPC=MICPC+1
 (1)  014164  023540                    <MOVE!SPBRX!IBUS!IOBA1!SP0>
1179  014166                            OUTPUT  BR,INCA!OBA1                    ;INCREMENT THE LOW ORDER BYTE
 (1)          000722                    MICPC=MICPC+1
 (1)  014166  062066                    <MOVE!WROUT!BR!<INCA!OBA1>>
1180  014170                            SP      IBUS,IOBA2,SP0                  ;READ HIGH BYTE
 (1)          000723                    MICPC=MICPC+1
 (1)  014170  023160                    <MOVE!SPX!IBUS!IOBA2!SP0>
1181  014172                            OUTPUT  BR,AC!OBA2                      ;ADD CARRY TO HIGH BYTE
 (1)          000724                    MICPC=MICPC+1
 (1)  014172  062107                    <MOVE!WROUT!BR!<AC!OBA2>>
1182                                    ;
1183  014174                            STATE   RCVM
 (1)          000725                    MICPC=MICPC+1
 (1)  014174  000727                    <MOVE!WRTEBR!IMM!<RCVM-INIT&777/2>>
1184  014176                            ALWAYS  RCVF1
 (1)          000726                    MICPC=MICPC+1
 (1)  014176  104536                    <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
1185                                    ;
1190                                    ;
```



```
                                        .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
1197  014200                    RCVM:   BRWRTE  IBUS,UBBR                       ;READ UNIBUS BR REGISTER
 (1)          000727                    MICPC=MICPC+1
 (1)  014200  120620                    <MOVE!WRTEBR!IBUS!<UBBR>>
1198  014202                            BR0     NXMERR                          ;NON-EXISTANT MEMORY
 (1)          000730                    MICPC=MICPC+1
 (1)  014202  116063                    <JUMP!BR0CON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>
1199  014204                            SP      IBUS,RCVDAT,SP0                 ;READ CRC CHARACTER
 (1)          000731                    MICPC=MICPC+1
 (1)  014204  023200                    <MOVE!SPX!IBUS!RCVDAT!SP0>
1200  014206                            BRWRTE  IBUS,RCVCON                     ;READ RECEIVER CONTROL REGISTER
 (1)          000732                    MICPC=MICPC+1
 (1)  014206  020640                    <MOVE!WRTEBR!IBUS!<RCVCON>>
1201  014210                            BR0     RCVM1                           ;IF CRC GOOD -- PROCESS
 (1)          000733                    MICPC=MICPC+1
 (1)  014210  116216                    <JUMP!BR0CON!<RCVM1-INIT&3000*4>!<RCVM1-INIT&777/2>>
1202  014212                            BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
 (1)          000734                    MICPC=MICPC+1
 (1)  014212  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1203  014214                            BR7     RHX                             ;CRC ERROR IN BOOT MODE - FLUSH
 (1)          000735                    MICPC=MICPC+1
 (1)  014214  107751                    <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
1204  014216                            LDMA    IMM,T                           ;ELSE SEND NAK --DATA ERROR
 (1)          000736                    MICPC=MICPC+1
 (1)  014216  010153                    <MOVE!LDMAR!IMM!<T&377>>
1205  014220                            MEMINC  IMM,2                           ;NAK TYPE
 (1)          000737                    MICPC=MICPC+1
 (1)  014220  016402                    <MOVE!WRMEM!INCMAR!IMM!<2>>
1206  014222                            MEMINC  IMM,302                         ;DATA ERROR SUBTYPE
 (1)          000740                    MICPC=MICPC+1
 (1)  014222  016702                    <MOVE!WRMEM!INCMAR!IMM!<302>>
1207  014224                            LDMA    IMM,NDATS
 (1)          000741                    MICPC=MICPC+1
 (1)  014224  010014                    <MOVE!LDMAR!IMM!<NDATS&377>>
1208  014226                            ALWAYS  RH5                             ;SEND NAK
 (1)          000742                    MICPC=MICPC+1
 (1)  014226  104557                    <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>
1209
1210  014230                    RCVM0:  LDMA    IMM,<<RTHRS+3>>                 ;POINT TO ERROR WORD
 (1)          000743                    MICPC=MICPC+1
 (1)  014230  010177                    <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
1211  014232                            BRWRTE  IMM,10                          ;MAINT MESSAGE ERROR
 (1)          000744                    MICPC=MICPC+1
 (1)  014232  000410                    <MOVE!WRTEBR!IMM!<10>>
1212  014234                            ALWAYS RCEXY                            ;GIVE FATAL ERROR
 (1)          000745                    MICPC=MICPC+1
 (1)  014234  114525                    <JUMP!ALCOND!<RCEXY-INIT&3000*4>!<RCEXY-INIT&777/2>>
```

```
1214                                    .SBTTL  EM2--PROCESS RLD MESSAGE
1215                                    ;ENTERED FROM IDLE LOOP
1216                                    ;IF RLD PASSWORD CHECKS TRIGGER THE BOOT ROM
1217
1218  014236                    EM2:    BRWRTE  IBUS,RCVDAT             ;READ THE CHAR
 (1)          000746                    MICPC=MICPC+1
 (1)  014236  020600                    <MOVE!WRTEBR!IBUS!<RCVDAT>>
1219  014240                            CMP     BR,SP16                 ;IS IT A MATCH
 (1)          000747                    MICPC=MICPC+1
 (1)  014240  060376                    <SUBTC!BR!SP16>
1220  014242                            Z       EM3
 (1)          000750                    MICPC=MICPC+1
 (1)  014242  105757                    <JUMP!ZCOND!<EM3-INIT&3000*4>!<EM3-INIT&777/2>>
1221                                                                    ;FALL INTO RHX
1222  014244                    RHX:    BRWRTE  BR,AA!SP1               ;READ STATUS BYTE SHIFTED LEFT
 (1)          000751                    MICPC=MICPC+1
 (1)  014244  060521                    <MOVE!WRTEBR!BR!<AA!SP1>>
1223  014246                            BR4     10$                     ;DLE RECEIVED IN NORMAL MODE
 (1)          000752                    MICPC=MICPC+1
 (1)  014246  107354                    <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1224  014250                            ALWAYS  FLUSH                   ;ALREADY IN MAINT MODE
 (1)          000753                    MICPC=MICPC+1
 (1)  014250  104415                    <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1225  014252                    10$:    BRWRTE  IMM,163                 ;MASK TO CLEAR ALL MAINT RELATED BITS
 (1)          000754                    MICPC=MICPC+1
 (1)  014252  000563                    <MOVE!WRTEBR!IMM!<163>>
1226  014254                            SP      BR,AANDB,SP1            ;CLEAR THEM
 (1)          000755                    MICPC=MICPC+1
 (1)  014254  063261                    <MOVE!SPX!BR!AANDB!SP1>
1227  014256                            ALWAYS  FLUSH
 (1)          000756                    MICPC=MICPC+1
 (1)  014256  104415                    <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1228
1229  014260                    EM3:    SP      BR,DECA,SP4             ;DECREMENT CHARACTER COUNT BY ONE
 (1)          000757                    MICPC=MICPC+1
 (1)  014260  063164                    <MOVE!SPX!BR!DECA!SP4>
1230  014262                            Z       EMTRIG                  ;TRIGGER AC LOW
 (1)          000760                    MICPC=MICPC+1
 (1)  014262  115720                    <JUMP!ZCOND!<EMTRIG-INIT&3000*4>!<EMTRIG-INIT&777/2>>
1231  014264                            ALWAYS  IDLE
 (1)          000761                    MICPC=MICPC+1
 (1)  014264  104445                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```



```
1233                                    ;
1234  014266                    BOOT:   BRWRTE  BR,SELA!SP1            ;SEE IF IN MAINT. MODE
 (1)          000762                    MICPC=MICPC+1
 (1)  014266  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1235  014270                            BR7     RA3                     ;BRANCH IF SO AND TREAT DLE LIKE NUM. MSG.
 (1)          000763                    MICPC=MICPC+1
 (1)  014270  103747                    <JUMP!BR7CON!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
1236  014272                            BRWRTE  IMM,210                 ;MASK TO SET MAINT MODE AND DLE RECV'D
 (1)          000764                    MICPC=MICPC+1
 (1)  014272  000610                    <MOVE!WRTEBR!IMM!<210>>
1237  014274                            SP      BR,AORB,SP1             ;SET THE BITS
 (1)          000765                    MICPC=MICPC+1
 (1)  014274  063301                    <MOVE!SPX!BR!AORB!SP1>
1238  014276                            ALWAYS  RA3                     ;TREAT LIKE NUMBERED MESSAGE
 (1)          000766                    MICPC=MICPC+1
 (1)  014276  100747                    <JUMP!ALCOND!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
1239  014300                    RESEXT: BRWRTE  IMM,4                   ;ADD TO MXT BITS
 (1)          000767                    MICPC=MICPC+1
 (1)  014300  000404                    <MOVE!WRTEBR!IMM!<4>>
1240  014302                            SP      IBUS,NPR,SP0
 (1)          000770                    MICPC=MICPC+1
 (1)  014302  123200                    <MOVE!SPX!IBUS!NPR!SP0>
1241  014304                            OUT     BR,ADD!ONPR             ;DO IT
 (1)          000771                    MICPC=MICPC+1
 (1)  014304  061010                    <MOVE!WROUTX!BR!<ADD!ONPR>>
1242  014306                            ALWAYS  RES1
 (1)          000772                    MICPC=MICPC+1
 (1)  014306  110753                    <JUMP!ALCOND!<RES1-INIT&3000*4>!<RES1-INIT&777/2>>
1243  014310                    TABMXT: BRWRTE  IMM,4                   ;INCREMENT MXT
 (1)          000773                    MICPC=MICPC+1
 (1)  014310  000404                    <MOVE!WRTEBR!IMM!<4>>
1244  014312                            SP      IBUS,UBBR,SP0           ;READ BR CONTROL
 (1)          000774                    MICPC=MICPC+1
 (1)  014312  123220                    <MOVE!SPX!IBUS!UBBR!SP0>
1245  014314                            OUT     BR,ADD!OBR
 (1)          000775                    MICPC=MICPC+1
 (1)  014314  061011                    <MOVE!WROUTX!BR!<ADD!OBR>>
1246  014316                            ALWAYS  ECX
 (1)          000776                    MICPC=MICPC+1
 (1)  014316  114767                    <JUMP!ALCOND!<ECX-INIT&3000*4>!<ECX-INIT&777/2>>
1247  014320                            $ZERO
 (1)          000777                    MICPC=MICPC+1
 (1)  014320  000000                    000000
```

```
1249          014322                        .=INIT+2000
1250          003777                        MICPC=777
1251                                        .SBTTL  TMTDA--TRANSMITTER DISPATCH ROUTINE
1252                                        ;
1253  014322                        TMTDA:  BRWRTE  IBUS,TMTCON                     ;READ TRANMITTER CONTROL REGISTER
 (1)          001000                        MICPC=MICPC+1
 (1)  014322  020620                        <MOVE!WRTEBR!IBUS!<TMTCON>>
1254  014324                                BR4     DP,SELA,<2!PAGE2>               ;IF READY PROCEED
 (1)          001001                        MICPC=MICPC+1
 (1)  014324  173202                        <JUMP! BR4CON!DP!SELA!2!PAGE2>
1255  014326                                ALWAYS  I1                              ;ELSE IDLE
 (1)          001002                        MICPC=MICPC+1
 (1)  014326  100452                        <JUMP!ALCOND!<I1-INIT&3000*4>!<I1=INIT&777/2>>
```



```
1257                                        .SBTTL  TMTA--FIRST CHARACTER OF HEADER
1258                                        ;
1259  014330                        TMTA:   BRWRTE  BR,AA!SP10                      ;SHIFT LEFT
 (1)          001003                        MICPC=MICPC+1
 (1)  014330  060530                        <MOVE!WRTEBR!BR!<AA!SP10>>
1260  014332                                BR7     RCVCK
 (1)          001004                        MICPC=MICPC+1
 (1)  014332  107614                        <JUMP!BR7CON!<RCVCK-INIT&3000*4>!<RCVCK-INIT&777/2>>
1261  014334                        TA1:    BRWRTE  BR,SELA!SP10                    ;REREAD STATUS
 (1)          001005                        MICPC=MICPC+1
 (1)  014334  060610                        <MOVE!WRTEBR!BR!<SELA!SP10>>
1262  014336                                BR0     NUMSYN                          ;IF UNNUMBPENDING  -- SEND IT
 (1)          001006                        MICPC=MICPC+1
 (1)  014336  112031                        <JUMP!BR0CON!<NUMSYN-INIT&3000*4>!<NUMSYN-INIT&777/2>>
1263  014340                                BRSHFT
 (1)          001007                        MICPC=MICPC+1
 (1)  014340  001620                        <MOVE!SHFTBR!WRTEBR!SELB>
1264  014342                                BR4     I1                              ;IF START MODE--EXIT
 (1)          001010                        MICPC=MICPC+1
 (1)  014342  103052                        <JUMP!BR4CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1265  014344                                BR1     NUMSYN                  ;IF LINE HAS GONE IDLE SEND SYN
 (1)          001011                        MICPC=MICPC+1
 (1)  014344  112431                        <JUMP!BR1CON!<NUMSYN-INIT&3000*4>!<NUMSYN-INIT&777/2>>
1266                                                                        ;ELSE--START TO SEND MESSAGE
1267  014346                        TMTEXT: TSTATE  TMTB
 (1)          001012                        MICPC=MICPC+1
 (1)  014346  000453                        <MOVE!WRTEBR!IMM!<TMTB-INIT&777/2>>
 (1)          001013                        MICPC=MICPC+1
 (1)  014350  063222                        <MOVE!SPX!BR!SELB!SP2>
1268  014352                                BRWRTE  BR,SELA!SP1                     ;ARE WE IN BOOT MODE
 (1)          001014                        MICPC=MICPC+1
 (1)  014352  060601                        <MOVE!WRTEBP!BR!<SELA!SP1>>
1269  014354                                BR7     TMTBT                   ;IF SO SEND DLE
 (1)          001015                        MICPC=MICPC+1
 (1)  014354  113427                        <JUMP!BR7CON!<TMTBT-INIT&3000*4>!<TMTBT-INIT&777/2>>
1270  014356                                BRWRTE  BR,<SELA!SP10>                  ;UNNUMB MESSGE?
 (1)          001016                        MICPC=MICPC+1
 (1)  014356  060610                        <MOVE!WRTEBR!BR!<SELA!SP10>>
1271  014360                                BR0     TMTUN                           ;IF SO --BRANCH
 (1)          001017                        MICPC=MICPC+1
 (1)  014360  112023                        <JUMP!BR0CON!<TMTUN-INIT&3000*4>!<TMTUN-INIT&777/2>>
1272  014362                                BRWRTE  IMM,201                         ;ELSE STORE SOH
 (1)          001020                        MICPC=MICPC+1
 (1)  014362  000001                        <MOVE!WRTEBR!IMM!<201>>
1273  014364                        TMTA5:  OUTPUT  BR,<SELB!TMTDAT>                ;IN TMT SILO
 (1)          001021                        MICPC=MICPC+1
 (1)  014364  062230                        <MOVE!WROUT!BR!<SELB!TMTDAT>>
1274  014366                                ALWAYS  I1
 (1)          001022                        MICPC=MICPC+1
 (1)  014366  100452                        <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1275  014370                        TMTUN:  TSTATE  TMTI
 (1)          001023                        MICPC=MICPC+1
 (1)  014370  000000                        <MOVE!WRTEBR!IMM!<TMTI-INIT&777/2>>
 (1)          001024                        MICPC=MICPC+1
 (1)  014372  063222                        <MOVE!SPX!BR!SELB!SP2>
1276  014374                                BRWRTE  IMM,5                           ;ENQ TO BR
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```
  (1)           001025                  MICPC=MICPC+1
  (1)  014374   000405                  <MOVE!WRTEBR!IMM!<5>>
1277  014376                            ALWAYS  TMTA5
  (1)           001026                  MICPC=MICPC+1
  (1)  014376   110421                  <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
1278  014400                  TMTBT:    BRWRTE  IMM,220                 ;WRITE A DLE TO BR
  (1)           001027                  MICPC=MICPC+1
  (1)  014400   000620                  <MOVE!WRTEBR!IMM!<220>>
1279  014402                            ALWAYS  TMTA5                   ;SEND IT
  (1)           001030                  MICPC=MICPC+1
  (1)  014402   110421                  <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
1280                                    ;
1281  014404                  NUMSYN:   BRWRTE  BR,<SELA!SP10>                  ;READ LINE STATUS WORD
  (1)           001031                  MICPC=MICPC+1
  (1)  014404   060610                  <MOVE!WRTEBR!BR!<SELA!SP10>>
1282  014406                            BR7     5$                              ;IF OK TO SEND--PROCEED
  (1)           001032                  MICPC=MICPC+1
  (1)  014406   113434                  <JUMP!BR7CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
1283  014410                            ALWAYS  I1                              ;ELSE--IDLE
  (1)           001033                  MICPC=MICPC+1
  (1)  014410   100452                  <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1284  014412                  5$:       BRWRTE  IBUS,MODEM              ;ARE WE STILL SENDING?
  (1)           001034                  MICPC=MICPC+1
  (1)  014412   020660                  <MOVE!WRTEBR!IBUS!<MODEM>>
1285  014414                            BRSHFT
  (1)           001035                  MICPC=MICPC+1
  (1)  014414   001620                  <MOVE!SHFTBR!WRTEBR!SELB>
1286  014416                            BR4     I1                      ;RTS SET? IF SO WE ARE--STALL
  (1)           001036                  MICPC=MICPC+1
  (1)  014416   103052                  <JUMP!BR4CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1287  014420                            BRWRTE  IMM,373                 ;MASK TO TURN OFFLINE IDLE
  (1)           001037                  MICPC=MICPC+1
  (1)  014420   000773                  <MOVE!WRTEBR!IMM!<373>>
1288  014422                            SP      BR,AANDB,SP10           ;IN LINE STATUS WORD
  (1)           001040                  MICPC=MICPC+1
  (1)  014422   063270                  <MOVE!SPX!BR!AANDB!SP10>
1289  014424                            TSTATE  TMTA1
  (1)           001041                  MICPC=MICPC+1
  (1)  014424   000445                  <MOVE!WRTEBR!IMM!<TMTA1-INIT&777/2>>
  (1)           001042                  MICPC=MICPC+1
  (1)  014426   063222                  <MOVE!SPX!BR!SELB!SP2>
1290  014430                            BRWRTE  IMM,10
  (1)           001043                  MICPC=MICPC+1
  (1)  014430   000410                  <MOVE!WRTEBR!IMM!<10>>
1296  014432                            SP      BR,SELB,SP6                     ;STORE IN SP6
  (1)           001044                  MICPC=MICPC+1
  (1)  014432   063226                  <MOVE!SPX!BR!SELB!SP6>
1297  014434                  TMTA1:    SP      BR,DECA,SP6                     ;DECREMENT SYN COUNT
  (1)           001045                  MICPC=MICPC+1
  (1)  014434   063166                  <MOVE!SPX!BR!DECA!SP6>
1298  014436                            Z       TMTEXT
  (1)           001046                  MICPC=MICPC+1
  (1)  014436   111412                  <JUMP!ZCOND!<TMTEXT-INIT&3000*4>!<TMTEXT-INIT&777/2>>
1299  014440                            BRWRTE  IMM,1                           ;MASK FOR SOM
  (1)           001047                  MICPC=MICPC+1
  (1)  014440   000401                  <MOVE!WRTEBR!IMM!<1>>
```



```
1300  014442                            OUTPUT  BR,SELB!OTMTCO                  ;WRITE IT TO TMTR CONTROL
  (1)           001050                  MICPC=MICPC+1
  (1)  014442   062231                  <MOVE!WROUT!BR!<SELB!OTMTCO>>
1301  014444                            BRWRTE  IMM,226                         ;SYNC CHAR
  (1)           001051                  MICPC=MICPC+1
  (1)  014444   000626                  <MOVE!WRTEBR!IMM!<226>>
1302  014446                            ALWAYS  TMTA5
  (1)           001052                  MICPC=MICPC+1
  (1)  014446   110421                  <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
```

```
1304                                        .SBTTL  TMTB--OUTPUT FIRST CHAR OF COUNT
1305                                        ;
1306  014450                        TMTB:   SPBR    IBUS,NPR,SP0                    ;READ BR CONTROL REG
 (1)            001053                      MICPC=MICPC+1
 (1)  014450    123600                      <MOVE!SPBRX!IBUS!NPR!SP0>
1307  014452                                BR0     IDLE                    ;NPR GOING--GET OUT
 (1)            001054                      MICPC=MICPC+1
 (1)  014452    102445                      <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1308  014454                                LDMA    IMM,LTC                         ;GETPOINTER TO NEXT TMT LINK
 (1)            001055                      MICPC=MICPC+1
 (1)  014454    010071                      <MOVE!LDMAR!IMM!<LTC&377>>
1309  014456                                LDMA    MEMX,SELB!SPX!SP16              ;POINT TO THE LINK
 (1)            001056                      MICPC=MICPC+1
 (1)  014456    053236                      <MOVE!LDMAR!MEMX!<SELB!SPX!SP16>>
1310  014460                                MEMINC  IMM,3                           ;WRITE MSG TMTED TO FLAGS
 (1)            001057                      MICPC=MICPC+1
 (1)  014460    016403                      <MOVE!WRMEM!INCMAR!IMM!<3>>
1311  014462                                MEMINC  DP,SELA!SP12                    ;PICK UP MSGNO
 (1)            001060                      MICPC=MICPC+1
 (1)  014462    076612                      <MOVE!WRMEM!INCMAR!DP!<SELA!SP12>>
1312  014464                                STATE   TMTC                            ;ADDRESS TMTR STATE
 (1)            001061                      MICPC=MICPC+1
 (1)  014464    000500                      <MOVE!WRTEBR!IMM!<TMTC-INIT&777/2>>
1313  014466                        TB0:    SP      BR,SELB,SP2                     ;UPDATE IT
 (1)            001062                      MICPC=MICPC+1
 (1)  014466    063222                      <MOVE!SPX!BR!SELB!SP2>
1314  014470                                OUTPUT  <MEMX!INCMAR>,SELB!IBA1         ;WRITELOWBYTEOFADDRESS
 (1)            001063                      MICPC=MICPC+1
 (1)  014470    056224                      <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA1>>
1315  014472                                OUTPUT  <MEMX!INCMAR>,SELB!IBA2         ;WRITE HIGH BYTE OF ADDRESS
 (1)            001064                      MICPC=MICPC+1
 (1)  014472    056225                      <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA2>>
1316  014474                                SP      MEMX,SELB,SP7   ;HIGH BYTE OF COUNT TO SP7
 (1)            001065                      MICPC=MICPC+1
 (1)  014474    043227                      <MOVE!SPX!MEMX!SELB!SP7>
1317                                                    ;WAIT TO MASK OFF MEM EXT. BITS
1318  014476                                SP      1MM,300,SP0                     ;MASK FOR MXT
 (1)            001066                      MICPC=MICPC+1
 (1)  014476    003300                      <MOVE!SPX!IMM!300!SP0>
1319  014500                                BRWRTE  MEMX!INCMAR,AANDB!SP0                   ;TURN OFF CC2
 (1)            001067                      MICPC=MICPC+1
 (1)  014500    054660                      <MOVE!WRTEBR!MEMX!INCMAR!<AANDB!SP0>>
1320  014502                                BRSHFT                                  ;SHIFT BITS INTO CORRECT POSITION
 (1)            001070                      MICPC=MICPC+1
 (1)  014502    001620                      <MOVE!SHFTBR!WRTEBR!SELB>
1321  014504                                BRSHFT
 (1)            001071                      MICPC=MICPC+1
 (1)  014504    001620                      <MOVE!SHFTBR!WRTEBR!SELB>
1322  014506                                BRSHFT
 (1)            001072                      MICPC=MICPC+1
 (1)  014506    001620                      <MOVE!SHFTBR!WRTEBR!SELB>
1323  014510                                BRSHFT
 (1)            001073                      MICPC=MICPC+1
 (1)  014510    001620                      <MOVE!SHFTBR!WRTEBR!SELB>
1324  014512                                OUT     BR,SELB!ONPR
 (1)            001074                      MICPC=MICPC+1
```



```
 (1)  014512    061230                      <MOVE!WROUTX!BR!<SELB!ONPR>>
1325  014514                                SPBR    MEMX!INCMAR,SELB,SP6            ;LOWBYTE OF COUNT TO SP6
 (1)            001075                      MICPC=MICPC+1
 (1)  014514    057626                      <MOVE!SPBRX!MEMX!INCMAR!SELB!SP6>
1326  014516                                OUTPUT  BR,SELB!TMTDAT                  ;WRITE IT TO TMTR SILO
 (1)            001076                      MICPC=MICPC+1
 (1)  014516    062230                      <MOVE!WROUT!BR!<SELB!TMTDAT>>
1327  014520                                ALWAYS  IDLE
 (1)            001077                      MICPC=MICPC+1
 (1)  014520    100445                      <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1328                                        ;
```

```
1330                                    .SBTTL  TMTC--OUTPUT SECOND CHAR OF COUNT
1331                                    ;
1332  014522                    TMTC:   BRWRTE  IMM,77                          ;MASK TO CLEAR MXT BITS
 (1)          001100                    MICPC=MICPC+1
 (1)  014522  000477                    <MOVE!WRTEBR!IMM!<77>>
1333  014524                            SPBR    BR,AANDB,SP7                    ;CLEAR THEM
 (1)          001101                    MICPC=MICPC+1
 (1)  014524  063667                    <MOVE!SPBRX!BR!AANDB!SP7>
1334  014526                            OUTPUT  DP,<SELB!TMTDAT>                ;WRITE TO TMT SILO
 (1)          001102                    MICPC=MICPC+1
 (1)  014526  062230                    <MOVE!WROUT!DP!<SELB!TMTDAT>>
1335  014530                            LDMA    IMM,LTC                         ;POINT TO TMT BUFFER
 (1)          001103                    MICPC=MICPC+1
 (1)  014530  010071                    <MOVE!LDMAR!IMM!<LTC&377>>
1336  014532                            BRWRTE  IMM,6                           ;OFFSET TO NEXT LINK
 (1)          001104                    MICPC=MICPC+1
 (1)  014532  000406                    <MOVE!WRTEBR!IMM!<6>>
1337  014534                            MEM     BP,ADD!SP16                     ;UPDATE THE POINTER
 (1)          001105                    MICPC=MICPC+1
 (1)  014534  062416                    <MOVE!WRMEM!BR!<ADD!SP16>>
1338  014536                            BRWRTE  IMM,TML8                                ;GET WRAPAROUND ADDRESS
 (1)          001106                    MICPC=MICPC+1
 (1)  014536  000545                    <MOVE!WRTEBR!IMM!<TML8>>
1339  014540                            CMP     BR,SP16                         ;WRAPAORUND
 (1)          001107                    MICPC=MICPC+1
 (1)  014540  060376                    <SUBTC!BR!SP16>
1340  014542                            Z       10$
 (1)          001110                    MICPC=MICPC+1
 (1)  014542  111513                    <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1341  014544                    5$:     STATE   TMTD
 (1)          001111                    MICPC=MICPC+1
 (1)  014544  000515                    <MOVE!WRTEBR!IMM!<TMTD-INIT&777/2>>
1342  014546                            ALWAYS  XEXIT
 (1)          001112                    MICPC=MICPC+1
 (1)  014546  100451                    <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
1343  014550                    10$:    MEM     IMM,TML1                        ;GO BACK TO FIRST LINK
 (1)          001113                    MICPC=MICPC+1
 (1)  014550  002473                    <MOVE!WRMEM!IMM!<TML1>>
1344  014552                            ALWAYS  5$
 (1)          001114                    MICPC=MICPC+1
 (1)  014552  110511                    <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
1345                                    ;
```



```
1347                                    .SBTTL  TMTD--RESPONSE FIELD-NUMBERED MESSAGE
1348  014554                    TMTD:   STATE   TMTE
 (1)          001115                    MICPC=MICPC+1
 (1)  014554  000523                    <MOVE!WRTEBR!IMM!<TMTE-INIT&777/2>>
1349  014556                            SP      BR,DECA,SP6                     ;ADJUSRT COUNT FOR  TWO'S  COMPLEMENT
 (1)          001116                    MICPC=MICPC+1
 (1)  014556  063166                    <MOVE!SPX!BR!DECA!SP6>
1350  014560                            C       TD2                             ;NO OVERFLOW
 (1)          001117                    MICPC=MICPC+1
 (1)  014560  111121                    <JUMP!CCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>
1351  014562                            SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF COUNT
 (1)          001120                    MICPC=MICPC+1
 (1)  014562  063167                    <MOVE!SPX!BR!DECA!SP7>
1352  014564                    TD2:    LDMA    IMM,ISP11                       ;RESP FIELD ADDR TO MAR
 (1)          001121                    MICPC=MICPC+1
 (1)  014564  010171                    <MOVE!LDMAR!IMM!<ISP11&377>>
```

```
1363  014566                          ALWAYS  TJ1
 (1)          001122                 MICPC=MICPC+1
 (1)  014566  112606                 <JUMP!ALCOND!<TJ1-INIT&3000*4>!<TJ1-INIT&777/2>>
```



```
1367                                  .SBTTL  TMTE--NUMBER FIELD--NUMBERED MESSAGE
1368  014573                        TMTE:
1369  014570                          SPBR    IBUS,NPR,SP0            ;READ NPR CONTROL REGISTER
 (1)          001123                 MICPC=MICPC+1
 (1)  014570  123600                 <MOVE!SPBRX!IBUS!NPR!SP0>
1370  014572                          BR0     I1                      ;BUSY = GET OUT
 (1)          001124                 MICPC=MICPC+1
 (1)  014572  102052                 <JUMP!BR0CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1371  014574                          BRWRTE  BR,SELA!SP12
 (1)          001125                 MICPC=MICPC+1
 (1)  014574  060612                 <MOVE!WRTEBR!BR!<SELA!SP12>>
1372  014576                          OUTPUT  BR,<SELB!TMTDAT>                ;WRITE IT TO THE SILO
 (1)          001126                 MICPC=MICPC+1
 (1)  014576  062230                 <MOVE!WROUT!BR!<SELB!TMTDAT>>
1373  014600                          STATE   TMTF
 (1)          001127                 MICPC=MICPC+1
 (1)  014600  000531                 <MOVE!WRTEBR!IMM!<TMTF-INIT&777/2>>
1374  014602                          ALWAYS  TH3
 (1)          001130                 MICPC=MICPC+1
 (1)  014602  110573                 <JUMP!ALCOND!<TH3-INIT&3000*4>!<TH3-INIT&777/2>>
```

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1376                                            .SBTTL  TMTF--NUMBERED MSG ADDRESS FIELD
1377                                            ;
1378  014604                            TMTF:   STATE   TF1
 (1)          001131                            MICPC=MICPC+1
 (1)  014601  000535                            <MOVE!WRTEBR!IMM!<TF1-INIT&777/2>>
1379  014606                            TF2:    SP      BR,SELB,SP2
 (1)          001132                            MICPC=MICPC+1
 (1)  014606  063222                            <MOVE!SPX!BR!SELB!SP2>
1380  014610                                    BRWRTE  IMM,1                   ;LOAD ADDRESS
 (1)          001133                            MICPC=MICPC+1
 (1)  014610  000401                            <MOVE!WRTEBR!IMM!<1>>
1386  014612                                    ALWAYS  TMTA5
 (1)          001134                            MICPC=MICPC+1
 (1)  014612  110421                            <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
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1389                                            .SBTTL  TF1-NUMBERED MSG HEADER EOM
1390  014614                            TF1:    BRWRTE  IMM,2                   ;EOM  MASK TO BR
 (1)          001135                            MICPC=MICPC+1
 (1)  014614  000402                            <MOVE!WRTEBR!IMM!<2>>
1391  014616                                    OUTPUT  BR,<SELB!OTMTCO>        ;UPDATE TMTR CONTROL REGISTER
 (1)          001136                            MICPC=MICPC+1
 (1)  014616  062231                            <MOVE!WROUT!BR!<SELB!OTMTCO>>
1392  014620                                    OUTPUT  BR,<SELB!TMTDAT>        ;OUTPUT A GARBAGE CHAR
 (1)          001137                            MICPC=MICPC+1
 (1)  014620  062230                            <MOVE!WROUT!BR!<SELB!TMTDAT>>
1393  014622                                    BRWRTE  IBUS,IIBA1              ;READ LOW ORDER FROM INBA
 (1)          001140                            MICPC=MICPC+1
 (1)  014622  020500                            <MOVE!WRTEBR!IBUS!<IIBA1>>
1394  014624                                    BR0     TMTF1                   ;IF ODD BYTE--BRANCH
 (1)          001141                            MICPC=MICPC+1
 (1)  014624  112155                            <JUMP!BR0CON!<TMTF1-INIT&3000*4>!<TMTF1-INIT&777/2>>
1395  014626                                    STATE   TMTH
 (1)          001142                            MICPC=MICPC+1
 (1)  014626  000544                            <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
1396  014630                                    ALWAYS  XEXIT
 (1)          001143                            MICPC=MICPC+1
 (1)  014630  100451                            <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
```

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1398                                    ;************TIME CRITICAL PATH--MODIFY WITH GREAT CARE
1399                                            .SBTTL  TMTH--ROUTINE TO OUTPUT DATA CHARACTERS
1400                                            ;
1401  014632                            TMTH:   SPBR    IBUS,NPR,SP0                    ;READ NPR CONTROL
 (1)          001144                            MICPC=MICPC+1
 (1)  014632  123600                            <MOVE!SPBRX!IBUS!NPR!SP0>
1405  014634                                    BR0     I1                              ;IF NPR IN PROGRESS --BRANCH
 (1)          001145                            MICPC=MICPC+1
 (1)  014634  102052                            <JUMP!BR0CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1406  014636                            5$:     OUTPUT  IBUS,<INDAT1!TMTDAT>            ;WRITE THE EVEN CHAR TO TMT SILO
 (1)          001146                            MICPC=MICPC+1
 (1)  014636  022010                            <MOVE!WROUT!IBUS!<INDAT1!TMTDAT>>
1407  014640                                    SP      IBUS,IIBA1,SP0                  ;READ LOW BYTE OF BA TO SP
 (1)          001147                            MICPC=MICPC+1
 (1)  014640  023100                            <MOVE!SPX!IBUS!IIBA1!SP0>
1408  014642                                    OUTPUT  BR,<INCA!IBA1>                  ;OUTPUT INCREMENTED BA
 (1)          001150                            MICPC=MICPC+1
 (1)  014642  062064                            <MOVE!WROUT!BR!<INCA!IBA1>>
1409  014644                                    SP      BR,DECA,SP6                     ;DECREMENT CHARACTER  COUNT
 (1)          001151                            MICPC=MICPC+1
 (1)  014644  063166                            <MOVE!SPX!BR!DECA!SP6>
1410  014646                                    C       TH6                             ;NO OVERFLOW
 (1)          001152                            MICPC=MICPC+1
 (1)  014646  111155                            <JUMP!CCOND!<TH6-INIT&3000*4>!<TH6-INIT&777/2>>
1411  014650                                    SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF COUNT
 (1)          001153                            MICPC=MICPC+1
 (1)  014650  063167                            <MOVE!SPX!BR!DECA!SP7>
1412  014652                                    Z       HEH1                            ;BYTE  COUNT ZERO
 (1)          001154                            MICPC=MICPC+1
 (1)  014652  115402                            <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>
1413  014654                            TH6:
1418  014654                            TMTF1:  STATE   TMTHO
 (1)          001155                            MICPC=MICPC+1
 (1)  014654  000557                            <MOVE!WRTEBR!IMM!<TMTHO-INIT&777/2>>
1419  014656                                    ALWAYS  XEXIT
 (1)          001156                            MICPC=MICPC+1
 (1)  014656  100451                            <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
1420  014660                            TMTHO:
1422  014660                                    SPBR    IBUS,NPR,SP0            ;NPR BUSY
 (1)          001157                            MICPC=MICPC+1
 (1)  014660  123600                            <MOVE!SPBRX!IBUS!NPR!SP0>
1423  014662                                    BP0     I1
 (1)          001160                            MICPC=MICPC+1
 (1)  014662  102052                            <JUMP!BR0CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1425  014664                            TH9:    OUTPUT  IBUS,<INDAT2!TMTDAT>            ;ODD CHAR TO SILO
 (1)          001161                            MICPC=MICPC+1
 (1)  014664  022030                            <MOVE!WROUT!IBUS!<INDAT2!TMTDAT>>
1426  014666                                    SP      IBUS,IIBA1,SP0                  ;READ LOW BYTE TO BA
 (1)          001162                            MICPC=MICPC+1
 (1)  014666  023100                            <MOVE!SPX!IBUS!IIBA1!SP0>
1427  014670                                    OUTPUT  BR,<INCA!IBA1>                  ;OUTPUT THE INCREMENTED BA
 (1)          001163                            MICPC=MICPC+1
 (1)  014670  062064                            <MOVE!WROUT!BR!<INCA!IBA1>>
1428  014672                                    C       HOINCH
 (1)          001164                            MICPC=MICPC+1
 (1)  014672  111372                            <JUMP!CCOND!<HOINCH-INIT&3000*4>!<HOINCH-INIT&777/2>>
```



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1429  014674                            TH8:    SP      BR,DECA,SP6                     ;DECREMENT CHARACTERCOUNT
 (1)          001165                            MICPC=MICPC+1
 (1)  014674  063166                            <MOVE!SPX!BR!DECA!SP6>
1430  014676                                    C       TH7                             ;NO OVERFLOW
 (1)          001166                            MICPC=MICPC+1
 (1)  014676  111171                            <JUMP!CCOND!<TH7-INIT&3000*4>!<TH7-INIT&777/2>>
1431  014700                                    SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF  COUNT
 (1)          001167                            MICPC=MICPC+1
 (1)  014700  063167                            <MOVE!SPX!BR!DECA!SP7>
1432  014702                                    Z       HEH1                            ;BYTE COUNT ZERO
 (1)          001170                            MICPC=MICPC+1
 (1)  014702  115402                            <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>
1433  014704                            TH7:    SPBR    IBUS,NPR,SP0                    ;READ NPR REGISTER
 (1)          001171                            MICPC=MICPC+1
 (1)  014704  123600                            <MOVE!SPBRX!IBUS!NPR!SP0>
1437  014706                                    STATE   TMTH
 (1)          001172                            MICPC=MICPC+1
 (1)  014706  000544                            <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
1438  014710                            TH3:    SP      BR,SELB,SP2                     ;SAVE TSTATE
 (1)          001173                            MICPC=MICPC+1
 (1)  014710  063222                            <MOVE!SPX!BR!SELB!SP2>
1439  014712                            TH3X:   BRWRTE  IMM,157                         ;CLEAR C0 AND C1
 (1)          001174                            MICPC=MICPC+1
 (1)  014712  000557                            <MOVE!WRTEBR!IMM!<157>>
1440  014714                                    SP      BR,AANDB,SP0                    ;CLEAR THE BITS
 (1)          001175                            MICPC=MICPC+1
 (1)  014714  063260                            <MOVE!SPX!BR!AANDB!SP0>
1441  014716                                    BRWRTE  IMM,1                           ;WRITE  NPR BITS TO BR
 (1)          001176                            MICPC=MICPC+1
 (1)  014716  000401                            <MOVE!WRTEBR!IMM!<1>>
1449  014720                                    ALWAYS  RK7
 (1)          001177                            MICPC=MICPC+1
 (1)  014720  104643                            <JUMP!ALCOND!<RK7-INIT&3000*4>!<RK7-INIT&777/2>>
1451                                    ;**************END TIME CRITICAL PATH*****************************
1452                                            ;
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1454                                        .SBTTL  TMTI--SEND UNNUMBERED TYPE FIELD
1455  014722                        TMTI:   LDMA    IMM,T                   ;ADDRESS OF TYPE FIELD TO MAR
 (1)          001200                       MICPC=MICPC+1
 (1)  014722  010153                       <MOVE!LDMAR!IMM!<T&377>>
1456  014724                               SP      MEMX,SELB,SP6           ;COPY IT TO SP6
 (1)          001201                       MICPC=MICPC+1
 (1)  014724  043226                       <MOVE!SPX!MEMX!SELB!SP6>
1457  014726                               STATE   TMTJ
 (1)          001202                       MICPC=MICPC+1
 (1)  014726  000004                       <MOVE!WRTEBR!IMM!<TMTJ-INIT&777/2>>
1458  014730                               ALWAYS  TJ1
 (1)          001203                       MICPC=MICPC+1
 (1)  014730  110606                       <JUMP!ALCOND!<TJ1-INIT&3000*4>!<TJ1-INIT&777/2>>
1459                                        ;
1460                                        .SBTTL  TMTJ--SEND SUB-TYPE FIELD
1461  014732                        TMTJ:   LDMA    IMM,ST                  ;ADDRESS OF SUB-TYPE FIELD TO MAR
 (1)          001204                       MICPC=MICPC+1
 (1)  014732  010154                       <MOVE!LDMAR!IMM!<ST&377>>
1462  014734                               STATE   TMTK
 (1)          001205                       MICPC=MICPC+1
 (1)  014734  000610                       <MOVE!WRTEBR!IMM!<TMTK-INIT&777/2>>
1463  014736                        TJ1:    OUTPUT  MEMX,SELB!TMTDAT
 (1)          001206                       MICPC=MICPC+1
 (1)  014736  042230                       <MOVE!WROUT!MEMX!<SELB!TMTDAT>>
1464  014740                               ALWAYS  XEXIT
 (1)          001207                       MICPC=MICPC+1
 (1)  014740  100451                       <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
1465                                        ;
```



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1467                                        .SBTTL  TMTK--OUTPUT RESPONSE FIELD (UNNUMB MSG)
1468                                        ;
1469  014742                        TMTK:   BRWRTE  IMM,3                   ;WRITE A 3 TO BR
 (1)          001210                       MICPC=MICPC+1
 (1)  014742  000403                       <MOVE!WRTEBR!IMM!<3>>
1470  014744                               NOP     BR,SUB,SP6              ;IF TYPE LESS THAN 3
 (1)          001211                       MICPC=MICPC+1
 (1)  014744  060346                       <BR!SUB!SP6>
1471  014746                               TSTATE  TMTL
 (1)          001212                       MICPC=MICPC+1
 (1)  014746  000616                       <MOVE!WRTEBR!IMM!<TMTL-INIT&777/2>>
 (1)          001213                       MICPC=MICPC+1
 (1)  014750  063222                       <MOVE!SPX!BR!SELB!SP2>
1472  014752                               C       TMTL0
 (1)          001214                       MICPC=MICPC+1
 (1)  014752  111223                       <JUMP!CCOND!<TMTL0-INIT&3000*4>!<TMTL0-INIT&777/2>>
1473  014754                               ALWAYS  TD2
 (1)          001215                       MICPC=MICPC+1
 (1)  014754  110521                       <JUMP!ALCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>
1474                                        ;
1475                                        .SBTTL  TMTL--UNNUMB MSG NUMBER FIELD
1476  014756                        TMTL:   TSTATE  TMTM
 (1)          001216                       MICPC=MICPC+1
 (1)  014756  000627                       <MOVE!WRTEBR!IMM!<TMTM-INIT&777/2>>
 (1)          001217                       MICPC=MICPC+1
 (1)  014760  063222                       <MOVE!SPX!BR!SELB!SP2>
1477  014762                               BRWRTE  IMM,3
 (1)          001220                       MICPC=MICPC+1
 (1)  014762  000403                       <MOVE!WRTEBR!IMM!<3>>
1478  014764                               CMP     BR,SP6                  ;IS MESSAGE REP
 (1)          001221                       MICPC=MICPC+1
 (1)  014764  062366                       <SUBTC!BR!SP6>
1479  014766                               Z       TMTL1                   ;YES
 (1)          001222                       MICPC=MICPC+1
 (1)  014766  111625                       <JUMP!ZCOND!<TMTL1-INIT&3000*4>!<TMTL1-INIT&777/2>>
1480  014770                        TMTL0:  BRWRTE  IMM,0                   ;ADDRESS CONTNAT OF ZERO
 (1)          001223                       MICPC=MICPC+1
 (1)  014770  000400                       <MOVE!WRTEBR!IMM!<0>>
1481  014772                               ALWAYS  TMTA5
 (1)          001224                       MICPC=MICPC+1
 (1)  014772  110421                       <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
1482                                        ;
1483  014774                        TMTL1:  BRWRTE  BR,DECA!SP12            ;WRITE A RESPONSE
 (1)          001225                       MICPC=MICPC+1
 (1)  014774  060572                       <MOVE!WRTEBR!BR!<DECA!SP12>>
1489  014776                               ALWAYS  TMTA5
 (1)          001226                       MICPC=MICPC+1
 (1)  014776  110421                       <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
1491                                        ;
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1493                                    .SBTTL  TMTM--UNNUMB MSG--STATION ADDRESS
1494  015000                    TMTM:   STATE   TNEOM
 (1)          001227                    MICPC=MICPC+1
 (1)  015000  000631                    <MOVE!WRTEBR!IMM!<TNEOM-INIT&777/2>>
1495  015002                            ALWAYS  TF2
 (1)          001230                    MICPC=MICPC+1
 (1)  015002  110532                    <JUMP!ALCOND!<TF2-INIT&3000*4>!<TF2-INIT&777/2>>
1496  015004                    TNEOM:  BRWRTE  IMM,2                   ;END OF MESSAGE TO BR
 (1)          001231                    MICPC=MICPC+1
 (1)  015004  000402                    <MOVE!WRTEBR!IMM!<2>>
1497  015006                            OUTPUT  BR,<SELB!OTMTCO>
 (1)          001232                    MICPC=MICPC+1
 (1)  015006  062231                    <MOVE!WROUT!BR!<SELB!OTMTCO>>
1498  015010                            OUTPUT  BR,<SELB!TMTDAT>              ;OUTPUT A GARBAGE CHARACTER
 (1)          001233                    MICPC=MICPC+1
 (1)  015010  062230                    <MOVE!WROUT!BR!<SELB!TMTDAT>>
1499  015012                            BRWRTE  IMM,4                         ;SET UP LINE HAS GONE IDLE MASK
 (1)          001234                    MICPC=MICPC+1
 (1)  015012  000404                    <MOVE!WRTEBR!IMM!<4>>
1500  015014                            SPBR    BR,AORB,SP10                  ;UPDATE LINE STATUS WORD
 (1)          001235                    MICPC=MICPC+1
 (1)  015014  063710                    <MOVE!SPBRX!BR!AORB!SP10>
1501  015016                            BRWRTE  BR,AA!SP10                    ;SHIFT STATUS LEFT
 (1)          001236                    MICPC=MICPC+1
 (1)  015016  060530                    <MOVE!WRTEBR!BR!<AA!SP10>>
1502  015020                            BR7     10$                           ;IF HDX SET---BRANCH TO CLEAR OK TO SEND
 (1)          001237                    MICPC=MICPC+1
 (1)  015020  113643                    <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1503  015022                            BRWRTE  IMM,376                       ;MASK TO TURN OFF UNNUMB PENDDING
 (1)          001240                    MICPC=MICPC+1
 (1)  015022  000776                    <MOVE!WRTEBR!IMM!<376>>
1504  015024                    5$:     SP      BR,AANDB,SP10                 ;MASK TO LINE STATUS WORD
 (1)          001241                    MICPC=MICPC+1
 (1)  015024  063270                    <MOVE!SPX!BR!AANDB!SP10>
1505  015026                            ALWAYS  TEOM2
 (1)          001242                    MICPC=MICPC+1
 (1)  015026  110734                    <JUMP!ALCOND!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
1506  015030                    10$:    BRWRTE  IMM,176                       ;CLEAR OK TO SEND AND UNNUMB PENPENDING
 (1)          001243                    MICPC=MICPC+1
 (1)  015030  000576                    <MOVE!WRTEBR!IMM!<176>>
1507  015032                            ALWAYS  5$
 (1)          001244                    MICPC=MICPC+1
 (1)  015032  110641                    <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
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1509                                    .SBTTL  TIMSRV--TIMEOUT ROUTINE--SENDS  REP
1510                                    ;
1511                                    .ENABLE LSB
1512  015034                    TIMSRV: SP      IBUS,UBBR,SP0                 ;READ UNIBUS BR REGISTER
 (1)          001245                    MICPC=MICPC+1
 (1)  015034  123220                    <MOVE!SPX!IBUS!UBBR!SP0>
1513  015036                            BRWRTE  IMM,177                       ;MASK OFF  BR REQ
 (1)          001246                    MICPC=MICPC+1
 (1)  015036  000577                    <MOVE!WRTEBR!IMM!<177>>
1514                                                                          ;RESET TIMER---SLICK MOVE
1515                                                                          ;SINCE TIMER IS RESET BY WRITING
1516                                                                          ;A 1 AND THE EXPIRATION  LOOKS
1517                                                                          ;LIKE 1--VOILA
1518  015040                            OUT     BR,<AANDB!OBR>                ;AND THE BIT ON
 (1)          001247                    MICPC=MICPC+1
 (1)  015040  061271                    <MOVE!WROUTX!BR!<AANDB!OBR>>
1519  015042                            BRWRTE  BR,SELA!SP1                   ;READ STATUS BYTE
 (1)          001250                    MICPC=MICPC+1
 (1)  015042  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1520  015044                            BR7     IDLE                          ;IF IN MAINT. MODE DISABLE TIMER
 (1)          001251                    MICPC=MICPC+1
 (1)  015044  103445                    <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1521  015046                            SP      BR,DECA,SP15                  ;DECREMENT THE COUNTER
 (1)          001252                    MICPC=MICPC+1
 (1)  015046  063175                    <MOVE!SPX!BR!DECA!SP15>
1522  015050                            Z       20$                           ;IF ALL ONES HAS EXPIRED
 (1)          001253                    MICPC=MICPC+1
 (1)  015050  111662                    <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
1523  015052                    10$:    BRWRTE  BR,SELA!SP10            ;READ LINE STATUS
 (1)          001254                    MICPC=MICPC+1
 (1)  015052  060610                    <MOVE!WRTEBR!BR!<SELA!SP10>>
1524  015054                            BR1     TABUPD                        ;NUMBERED MESSAGE IN PROGRESS
 (1)          001255                    MICPC=MICPC+1
 (1)  015054  116737                    <JUMP!BR1CON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
1525  015056                            BR0     TABUPD                        ;UNNUMBMSGIN PROGRESS
 (1)          001256                    MICPC=MICPC+1
 (1)  015056  116337                    <JUMP!BR0CON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
1526  015060                            BRSHFT
 (1)          001257                    MICPC=MICPC+1
 (1)  015060  001623                    <MOVE!SHFTBR!WRTEBR!SELB>
1527  015062                            BR4     IDLE                          ;START MODE
 (1)          001260                    MICPC=MICPC+1
 (1)  015062  103445                    <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1528  015064                            ALWAYS  SNDACK                        ;ELSE SEND ACK
 (1)          001261                    MICPC=MICPC+1
 (1)  015064  110727                    <JUMP!ALCOND!<SNDACK-INIT&3000*4>!<SNDACK-INIT&777/2>>
1529  015066                    TIME1:
1530  015066                    20$:    BRWRTE  IMM,2                         ;
 (1)          001262                    MICPC=MICPC+1
 (1)  015066  000402                    <MOVE!WRTEBR!IMM!<2>>
1531  015070                            SP      BR,SELB,SP15                  ;RESET THE TIMER TICK COUNT
 (1)          001263                    MICPC=MICPC+1
 (1)  015070  063235                    <MOVE!SPX!BR!SELB!SP15>
1532  015072                            BRWRTE  DP,<SELA!SP10>                ;READ LINE STATUS WORD
 (1)          001264                    MICPC=MICPC+1
 (1)  015072  060010                    <MOVE!WRTEBR!DP!<SELA!SP10>>
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1533  015074                          BRSHFT
 (1)          001265                 MICPC=MICPC+1
 (1)  015074  001620                 <MOVE!SHFTBR!WRTEBR!SELB>
1534  015076                          BR4     BS1                     ;IF IN START MODE--BRANCH
 (1)          001266                 MICPC=MICPC+1
 (1)  015076  103076                 <JUMP!BR4CON!<BS1-INIT&3000*4>!<BS1-INIT&777/2>>
1535  015100                          BRWRTE  BR,DECA!SP12            ;GET LAST NUMBER SENT
 (1)          001267                 MICPC=MICPC+1
 (1)  015100  000572                 <MOVE!WRTEBR!BR!<DECA!SP12>>
1536  015102                          CMP     BR,SP17                 ;COMPARE TO LAST ACKED
 (1)          001270                 MICPC=MICPC+1
 (1)  015102  000377                 <SUBTC!BR!SP17>
1537  015104                          Z       10$                     ;IF EQ --SEND ACK
 (1)          001271                 MICPC=MICPC+1
 (1)  015104  111654                 <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1538  015106                    TIME2:LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD IN UNNUMB SK
 (1)          001272                 MICPC=MICPC+1
 (1)  015106  010153                 <MOVE!LDMAR!IMM!<T&377>>
1539  015110                          MEMINC  IMM,3                   ;LOAD REP TYPE
 (1)          001273                 MICPC=MICPC+1
 (1)  015110  016403                 <MOVE!WRMEM!INCMAR!IMM!<3>>
1540  015112                          MEMINC  IMM,300                 ;ZERO THE SUB-TYPE
 (1)          001274                 MICPC=MICPC+1
 (1)  015112  016700                 <MOVE!WRMEM!INCMAR!IMM!<300>>
1541  015114                          LDMA    IMM,REPCS               ;CUMULATIVE REPS RECD
 (1)          001275                 MICPC=MICPC+1
 (1)  015114  010015                 <MOVE!LDMAR!IMM!<REPCS&377>>
1542  015116                          SP      MEMX,SELB,SP0           ;COPY IT TO SP0
 (1)          001276                 MICPC=MICPC+1
 (1)  015116  043220                 <MOVE!SPX!MEMX!SELB!SP0>
1543  015120                          MEM     BR,INCA!SP0             ;INCREMENT IT
 (1)          001277                 MICPC=MICPC+1
 (1)  015120  062460                 <MOVE!WRMEM!BR!<INCA!SP0>>
1544  015122                          LDMA    IMM,REPST               ;ADDRESS DYNAMIC REP COUNTER
 (1)          001300                 MICPC=MICPC+1
 (1)  015122  010003                 <MOVE!LDMAR!IMM!<REPST&377>>
1545  015124                          BRWRTE  MEMX,SELB               ;COPY IT TO THE BR
 (1)          001301                 MICPC=MICPC+1
 (1)  015124  040620                 <MOVE!WRTEBR!MEMX!<SELB>>
1546  015126                          BSHFTB
 (1)          001302                 MICPC=MICPC+1
 (1)  015126  061620                 <MOVE!SHFTBR!SELB!BR>
1547  015130                          MEM     BR,SELB
 (1)          001303                 MICPC=MICPC+1
 (1)  015130  062620                 <MOVE!WRMEM!BR!<SELB>>
1548  015132                          BR0     RTHRES
 (1)          001304                 MICPC=MICPC+1
 (1)  015132  102353                 <JUMP!BR0CON!<RTHRES-INIT&3000*4>!<RTHRES-INIT&777/2>>
1549  015134                          BRWRTE  IMM,201                 ;MASK FOR OK TO SEND
 (1)          001305                 MICPC=MICPC+1
 (1)  015134  000601                 <MOVE!WRTEBR!IMM!<201>>
1550  015136                          SP      BR,AORB,SP10            ;OR IT IN
 (1)          001306                 MICPC=MICPC+1
 (1)  015136  063310                 <MOVE!SPX!BR!AORB!SP10>
1551  015140                          ALWAYS  IDLE
 (1)          001307                 MICPC=MICPC+1
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 (1)  015140  100445                 <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1552                                 .DSABLE LSB
1553                                 ;
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1555  015142                    TEOM:   BRWRTE  IBUS,UBBR
 (1)          001310                    MICPC=MICPC+1
 (1)  015142  120620                    <MOVE!WRTEBR!IBUS!<UBBR>>
1556  015144                            BR0     NXMERR                  ;NON-EXISTANT MEMORY
 (1)          001311                    MICPC=MICPC+1
 (1)  015144  116063                    <JUMP!BR0CON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>
1557  015146                            BRWRTE  IMM,2                   ;EOM TO BR
 (1)          001312                    MICPC=MICPC+1
 (1)  015146  000402                    <MOVE!WRTEBR!IMM!<2>>
1558  015150                            OUTPUT  BR,<SELB!OTMTCO>        ;WRITE TMTR CONTROL
 (1)          001313                    MICPC=MICPC+1
 (1)  015150  062231                    <MOVE!WROUT!BR!<SELB!OTMTCO>>
1559  015152                            OUTPUT  BR,<SELB!TMTDAT>        ;WRITE GARBAGE DATA
 (1)          001314                    MICPC=MICPC+1
 (1)  015152  062230                    <MOVE!WROUT!BR!<SELB!TMTDAT>>
1560  015154                            BRWRTE  BR,SELA!SP1             ;CKECK FOR BOOT MODE
 (1)          001315                    MICPC=MICPC+1
 (1)  015154  060001                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1561  015156                            BR7     BTEOM                   ;---IF SET IS MAINT MSG
 (1)          001316                    MICPC=MICPC+1
 (1)  015156  113755                    <JUMP!BR7CON!<BTEOM-INIT&3000*4>!<BTEOM-INIT&777/2>>
1562  015160                            SP      BR,INCA,SP12            ;INCREMENT THE MESSAGE NUMBER
 (1)          001317                    MICPC=MICPC+1
 (1)  015160  063072                    <MOVE!SPX!BR!INCA!SP12>
1563  015162                    TEOM1:  LDMA    IMM,LTC                 ;ADDRESS LAST TMT LINK
 (1)          001320                    MICPC=MICPC+1
 (1)  015162  010071                    <MOVE!LDMAR!IMM!<LTC&377>>
1564  015164                            LDMA    MEMX,SELB
 (1)          001321                    MICPC=MICPC+1
 (1)  015164  050220                    <MOVE!LDMAR!MEMX!<SELB>>
1565  015166                            BRWRTE  MEMX,SELB
 (1)          001322                    MICPC=MICPC+1
 (1)  015166  040620                    <MOVE!WRTEBR!MEMX!<SELB>>
1566  015170                            BR0     TEOM2
 (1)          001323                    MICPC=MICPC+1
 (1)  015170  112334                    <JUMP!BR0CON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
1567  015172                    TEOM3:  BRWRTE  IMM,375                 ;TURN OFF MESSAGE PENDING
 (1)          001324                    MICPC=MICPC+1
 (1)  015172  000775                    <MOVE!WRTEBR!IMM!<375>>
1568  015174                            SPBR    BR,AANDB,SP10           ;
 (1)          001325                    MICPC=MICPC+1
 (1)  015174  063670                    <MOVE!SPBRX!BR!AANDB!SP10>
1569  015176                            BR0     TEOM2                   ;IF UNNUMB PENDING--GO AWAY
 (1)          001326                    MICPC=MICPC+1
 (1)  015176  112334                    <JUMP!BR0CON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
1570                                ;SBTTL  SNDACK--ROUTINE TO SEND AN ACK
1571  015200                    SNDACK: LDMA    IMM,T
 (1)          001327                    MICPC=MICPC+1
 (1)  015200  010153                    <MOVE!LDMAR!IMM!<T&377>>
1572  015202                            MEMINC  IMM,1
 (1)          001330                    MICPC=MICPC+1
 (1)  015202  016401                    <MOVE!WRMEM!INCMAR!IMM!<1>>
1573  015204                            BRWRTE  IMM,5
 (1)          001331                    MICPC=MICPC+1
 (1)  015204  000405                    <MOVE!WRTEBR!IMM!<5>>
1574  015206                    SA2:    MEMINC  IMM,300
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 (1)          001332                    MICPC=MICPC+1
 (1)  015206  016700                    <MOVE!WRMEM!INCMAR!IMM!<300>>
1575  015210                    SA3:    SP      BR,AORB,SP10
 (1)          001333                    MICPC=MICPC+1
 (1)  015210  063310                    <MOVE!SPX!BR!AORB!SP10>
1576                                    ;
1577  015212                    TEOM2:  STATE   TMTA
 (1)          001334                    MICPC=MICPC+1
 (1)  015212  000403                    <MOVE!WRTEBR!IMM!<TMTA-INIT&777/2>>
1578  015214                            ALWAYS  XEXIT
 (1)          001335                    MICPC=MICPC+1
 (1)  015214  100451                    <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
1579  015216                    FUDGE:  BRWRTE  IBUS,NPR                ;READ NPR CONTROL
 (1)          001336                    MICPC=MICPC+1
 (1)  015216  120600                    <MOVE!WRTEBR!IBUS!<NPR>>
1580  015220                            BR0     IDLE                    ;IF NPR GOING---LEAVE
 (1)          001337                    MICPC=MICPC+1
 (1)  015220  102045                    <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1581  015222                            BRWRTE  BR!LDMAR,SELA!SP4       ;LOAD THE MAR
 (1)          001340                    MICPC=MICPC+1
 (1)  015222  070004                    <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
1582  015224                            BR7     BS2                     ;IF SET - READ BACK ALL 200
 (1)          001341                    MICPC=MICPC+1
 (1)  015224  103505                    <JUMP!BR7CON!<BS2-INIT&3000*4>!<BS2-INIT&777/2>>
1583  015226                            MEMINC  IBUS,INDAT1             ;OTHERWISE RESTORE TWO BYTES
 (1)          001342                    MICPC=MICPC+1
 (1)  015226  036400                    <MOVE!WRMEM!INCMAR!IBUS!<INDAT1>>
1584  015230                            MEMINC  IBUS,INDAT2             ;..
 (1)          001343                    MICPC=MICPC+1
 (1)  015230  036420                    <MOVE!WRMEM!INCMAR!IBUS!<INDAT2>>
1585  015232                            BRWRTE  IMM,2                   ;UPDATE---UNIBUS ADDRESS
 (1)          001344                    MICPC=MICPC+1
 (1)  015232  000402                    <MOVE!WRTEBR!IMM!<2>>
1586  015234                            SP      BR,ADD,SP4              ;UPDATE NPR COUNTER
 (1)          001345                    MICPC=MICPC+1
 (1)  015234  063004                    <MOVE!SPX!BR!ADD!SP4>
1587  015236                            SP      IBUS,IIBA1,SP0          ;UPDATE ADDRESS LOW
 (1)          001346                    MICPC=MICPC+1
 (1)  015236  023100                    <MOVE!SPX!IBUS!IIBA1!SP0>
1588  015240                            OUTPUT  BR,ADD!IBA1
 (1)          001347                    MICPC=MICPC+1
 (1)  015240  062004                    <MOVE!WROUT!BR!<ADD!IBA1>>
1589  015242                            SP      IBUS,IIBA2,SP0          ;READ HIGH ADDRESS
 (1)          001350                    MICPC=MICPC+1
 (1)  015242  023120                    <MOVE!SPX!IBUS!IIBA2!SP0>
1590  015244                            OUTPUT  BR,AC!IBA2              ;UPDATE HIGH
 (1)          001351                    MICPC=MICPC+1
 (1)  015244  062105                    <MOVE!WROUT!BR!<AC!IBA2>>
1591  015246                            C       RESEXT                  ;IF CARRY---UPDATE NXT
 (1)          001352                    MICPC=MICPC+1
 (1)  015246  105367                    <JUMP!CCOND!<RESEXT-INIT&3000*4>!<RESEXT-INIT&777/2>>
1592  015250                    RES1:   SP      IBUS,NPR,SP0            ;READ NPR REGISTER
 (1)          001353                    MICPC=MICPC+1
 (1)  015250  123200                    <MOVE!SPX!IBUS!NPR!SP0>
1593  015252                            ALWAYS  TH3X                    ;GO DO ANOTHER NPR
 (1)          001354                    MICPC=MICPC+1
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   (1)  015252  110574                    <JUMP!ALCOND!<TH3X-INIT&3000*4>!<TH3X-INIT&777/2>>
 1594   015254                  BTEOM:    BRWRTE  IMM,374                 ;MASK FOR CLEAR MSG PENDING
   (1)          001355                    MICPC=MICPC+1
   (1)  015254  000774                    <MOVE!WRTEBR!IMM!<374>>
 1595   015256                            SP      BR,AANDB,SP10           ;TURN THEM OFF IN LINE STATUS WORD
   (1)          001356                    MICPC=MICPC+1
   (1)  015256  063270                    <MOVE!SPX!BR!AANDB!SP10>
 1596   015260                            SP      BR,SELB,SP13            ;STORE UNRECOGNIZABLE VALUE INTO SP13
   (1)          001357                    MICPC=MICPC+1
   (1)  015260  063233                    <MOVE!SPX!BR!SELB!SP13>
 1597                                                                     ;SO "RH3" WILL EXIT BACK TO IDLE LOOP
 1598   015262                            LDMA    IMM,STC                 ;ADDRESS START OF TMT  CHAIN
   (1)          001360                    MICPC=MICPC+1
   (1)  015262  310070                    <MOVE!LDMAR!IMM!<STC&377>>
 1599   015264                            SP      MEMX,SELB,SP0           ;COPY LINK ADDRESS
   (1)          001361                    MICPC=MICPC+1
   (1)  015264  043220                    <MOVE!SPX!MEMX!SELB!SP0>
 1600   015266                            TSTATE  NUMSYN                  ;CHANGE XMIT STATE TO LINE IS IDLE
   (1)          001362                    MICPC=MICPC+1
   (1)  015266  000431                    <MOVE!WRTEBR!IMM!<NUMSYN-INIT&777/2>>
   (1)          001363                    MICPC=MICPC+1
   (1)  015270  063222                    <MOVE!SPX!BR!SELB!SP2>
 1601   015272                            ALWAYS  TDON2                   ;POST A DONE
   (1)          001364                    MICPC=MICPC+1
   (1)  015272  114534                    <JUMP!ALCOND!<TDON2-INIT&3000*4>!<TDON2-INIT&777/2>>
 1602   015274                  RL4:      RSTATE  RCVL
   (1)          001365                    MICPC=MICPC+1
   (1)  015274  000715                    <MOVE!WRTEBR!IMM!<RCVL-INIT&777/2>>
   (1)          001366                    MICPC=MICPC+1
   (1)  015276  063223                    <MOVE!SPX!BR!SELB!SP3>
 1603   015300                            SP      IBUS,NPR,SP0            ;READ NPR CONTROL REGISTER
   (1)          001367                    MICPC=MICPC+1
   (1)  015300  123200                    <MOVE!SPX!IBUS!NPR!SP0>
 1604   015302                            BRWRTE  IMM,221
   (1)          001370                    MICPC=MICPC+1
   (1)  015302  000621                    <MOVE!WRTEBR!IMM!<221>>
 1605   015304                            ALWAYS  RK7
   (1)          001371                    MICPC=MICPC+1
   (1)  015304  104643                    <JUMP!ALCOND!<RK7-INIT&3000*4>!<RK7-INIT&777/2>>
 1606   015306                  HOINCH:   SP      IBUS,IIBA2,SP0
   (1)          001372                    MICPC=MICPC+1
   (1)  015306  023120                    <MOVE!SPX!IBUS!IIBA2!SP0>
 1607   015310                            OUTPUT  BR,INCA!IBA2                    ;OUTPUT INCREMENTED BA
   (1)          001373                    MICPC=MICPC+1
   (1)  015310  062065                    <MOVE!WROUT!BR!<INCA!IBA2>>
 1608   015312                            C       5$                      ;INCREMENT BYTEW COUNT
   (1)          001374                    MICPC=MICPC+1
   (1)  015312  111376                    <JUMP!CCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
 1609   015314                            ALWAYS  TH8
   (1)          001375                    MICPC=MICPC+1
   (1)  015314  110565                    <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
 1610                                     ;INCREMENT MXT BITS
 1611   015316                  5$:       SP      IBUS,NPR,SP0            ;READ NPR REG WITH CURRENT MXT BITS
   (1)          001376                    MICPC=MICPC+1
   (1)  015316  123200                    <MOVE!SPX!IBUS!NPR!SP0>
 1612   015320                            BRWRTE  IMM,4                   ;WRITE BIT TO ADD
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   (1)          001377                    MICPC=MICPC+1
   (1)  015320  000404                    <MOVE!WRTEBR!IMM!<4>>
 1613   015322                            OUT     BR,<ADD!ONPR>           ;TURN ON PROPER MXT BITS
   (1)          001400                    MICPC=MICPC+1
   (1)  015322  061010                    <MOVE!WROUTX!BR!<ADD!ONPR>>
 1614   015324                            ALWAYS  TH8
   (1)          001401                    MICPC=MICPC+1
   (1)  015324  110565                    <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
 1615                                     ;
 1616   015326                  HEH1:     STATE   TEOM
   (1)          001402                    MICPC=MICPC+1
   (1)  015326  000710                    <MOVE!WRTEBR!IMM!<TEOM-INIT&777/2>>
 1617   015330                            ALWAYS  XEXIT
   (1)          001403                    MICPC=MICPC+1
   (1)  015330  100451                    <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
 1618                                     ;
```

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1627                                        .SBTTL  REP HANDLER
1628  015332                        REP:    LDMA    IMM,REPCR               ;LOAD MAR ADDRESS WITH POINTER TO REPS RECC
 (1)          001404                        MICPC=MICPC+1
 (1)  015332  010016                        <MOVE!LDMAR!IMM!<REPCR&377>>
1629  015334                                SP      MEMX,SELB,SP0           ;READ NUMBER OF REPS RECD
 (1)          001405                        MICPC=MICPC+1
 (1)  015334  043220                        <MOVE!SPX!MEMX!SELB!SP0>
1630  015336                                MEM     DP,<INCA!SP0>           ;INCREMNT REPS RECD
 (1)          001406                        MICPC=MICPC+1
 (1)  015336  062462                        <MOVE!WRMEM!DP!<INCA!SP0>>
1631  015340                                LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
 (1)          001407                        MICPC=MICPC+1
 (1)  015340  010153                        <MOVE!LDMAR!IMM!<T&377>>
1632  015342                                MEMINC  IMM,2                   ; LOAD NAK TYPE
 (1)          001410                        MICPC=MICPC+1
 (1)  015342  016402                        <MOVE!WRMEM!INCMAR!IMM!<2>>
1633  015344                                MEMINC  IMM,303                 ;LOAD REP RESPONSE SUB-TYPE
 (1)          001411                        MICPC=MICPC+1
 (1)  015344  016703                        <MOVE!WRMEM!INCMAR!IMM!<303>>
1634  015346                                ALWAYS  SNAK                    ;SEND AN UNNUMB MSG
 (1)          001412                        MICPC=MICPC+1
 (1)  015346  114712                        <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>
1635                                        ;
1636                                        .SBTTL  START HANDLER
1637  015350                        START:  BRWRTE  DP,<SELA!SP10>          ;READ LINE STATUS WORD
 (1)          001413                        MICPC=MICPC+1
 (1)  015350  060610                        <MOVE!WRTEBR!DP!<SELA!SP10>>
1638  015352                                BRSHFT                          ;GET START MODE BIT IN TESTABLE POSITION
 (1)          001414                        MICPC=MICPC+1
 (1)  015352  001620                        <MOVE!SHFTBR!WRTEBR!SELB>
1639  015354                                BR4     10$                     ;IF IN START MODE SET STACK
 (1)          001415                        MICPC=MICPC+1
 (1)  015354  117021                        <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1640                                                                        ;ELSE SET UP START ERROR
1641  015356                                LDMA    IMM,<<RTHRS+3>>
 (1)          001416                        MICPC=MICPC+1
 (1)  015356  010177                        <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
1642  015360                                BRWRTE  IMM,200
 (1)          001417                        MICPC=MICPC+1
 (1)  015360  000600                        <MOVE!WRTEBR!IMM!<200>>
1643  015362                                ALWAYS  RCEXY
 (1)          001420                        MICPC=MICPC+1
 (1)  015362  114525                        <JUMP!ALCOND!<RCEXY-INIT&3000*4>!<RCEXY-INIT&777/2>>
1644  015364                        10$:    LDMA    IMM,T                   ;SET UP ADDRESS OF TYPE FIELD
 (1)          001421                        MICPC=MICPC+1
 (1)  015364  010153                        <MOVE!LDMAR!IMM!<T&377>>
1645  015366                                MEMINC  IMM,7                   ;WRITE STACK TYPE
 (1)          001422                        MICPC=MICPC+1
 (1)  015366  016407                        <MOVE!WRMEM!INCMAR!IMM!<7>>
1646  015370                                BRWRTE  IMM,11                  ;SET START RECD AND UNNUMB PENDING
 (1)          001423                        MICPC=MICPC+1
 (1)  015370  000411                        <MOVE!WRTEBR!IMM!<11>>
1647  015372                                ALWAYS  SA2                     ;SEND THE UNNUMBERED MESSAGE
 (1)          001424                        MICPC=MICPC+1
 (1)  015372  110732                        <JUMP!ALCOND!<SA2-INIT&3000*4>!<SA2-INIT&777/2>>
1648                                        ;
```



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1649                                        .SBTTL  STACK HANDLER
1650  015374                        STACK:  BRWRTE  IMM,327                 ;MASK TO CLEAR START MODE
 (1)          001425                        MICPC=MICPC+1
 (1)  015374  000727                        <MOVE!WRTEBR!IMM!<327>>
1651  015376                                SP      BR,AANDB,SP10           ;CLEAR START MODE
 (1)          001426                        MICPC=MICPC+1
 (1)  015376  063270                        <MOVE!SPX!BR!AANDB!SP10>
1652  015400                                ALWAYS  TIME1                   ;RESET TIMER AND IDLE
 (1)          001427                        MICPC=MICPC+1
 (1)  015400  110662                        <JUMP!ALCOND!<TIME1-INIT&3000*4>!<TIME1-INIT&777/2>>
```

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1654  015402                    ICBA22: SP      IBUS,IOBA2,SP0                  ;READTHEHIGH ORDERBITS OF BA TO SP0
 (1)          001430                    MICPC=MICPC+1
 (1)  015402  023160                    <MOVE!SPX!IBUS!IOBA2!SP0>
1655  015404                            OUTPUT  DP,<INCA!OBA2>                  ;OUTPUT THE INCREMENTED COUNT
 (1)          001431                    MICPC=MICPC+1
 (1)  015404  062067                    <MOVE!WROUT!DP!<INCA!OBA2>>
1656  015406                            C       5$                              ;IF CARRY SET INCREMENT THE MXTBITS
 (1)          001432                    MICPC=MICPC+1
 (1)  015406  115034                    <JUMP!CCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
1657  015410                            ALWAYS  RK9
 (1)          001433                    MICPC=MICPC+1
 (1)  015410  104660                    <JUMP!ALCOND!<RK9-INIT&3000*4>!<RK9-INIT&777/2>>
1658                                    ;
1659  015412                    5$:     SP      IBUS,UBBR,SP0
 (1)          001434                    MICPC=MICPC+1
 (1)  015412  123220                    <MOVE!SPX!IBUS!UBBR!SP0>
1660  015414                            BRWRTE  IMM,4
 (1)          001435                    MICPC=MICPC+1
 (1)  015414  000404                    <MOVE!WRTEBR!IMM!<4>>
1661  015416                            OUT     BR,<ADD!OBR>
 (1)          001436                    MICPC=MICPC+1
 (1)  015416  061011                    <MOVE!WROUTX!BR!<ADD!OBR>>
1662  015420                            ALWAYS  RK9
 (1)          001437                    MICPC=MICPC+1
 (1)  015420  104660                    <JUMP!ALCOND!<RK9-INIT&3000*4>!<RK9-INIT&777/2>>
1663  015422                    FLUSH1: SP      IMM,200,SP0                     ;FLUSH THE RECVR
 (1)          001440                    MICPC=MICPC+1
 (1)  015422  003200                    <MOVE!SPX!IMM!200!SP0>
1664  015424                            OUTPUT  BR,<SELA!ORCVCO>
 (1)          001441                    MICPC=MICPC+1
 (1)  015424  062212                    <MOVE!WROUT!BR!<SELA!ORCVCO>>
1665  015426                            ALWAYS  CG1
 (1)          001442                    MICPC=MICPC+1
 (1)  015426  104575                    <JUMP!ALCOND!<CG1-INIT&3000*4>!<CG1-INIT&777/2>>
1666  015430                    NAK:    LDMA    IMM,STC                 ;ADDRESS START OF TMT CHAIN
 (1)          001443                    MICPC=MICPC+1
 (1)  015430  010070                    <MOVE!LDMAR!IMM!<STC&377>>
1667  015432                            SP      MEMX!INCMAR,SELB,SP0            ;COPY IT TO SP0
 (1)          001444                    MICPC=MICPC+1
 (1)  015432  057220                    <MOVE!SPX!MEMX!INCMAR!SELB!SP0>
1668  015434                            MEM     BR,SELA!SP0             ;COPY START  OF CHAIN
 (1)          001445                    MICPC=MICPC+1
 (1)  015434  062000                    <MOVE!WRMEM!BR!<SELA!SP0>>
1669  015436                            BRWRTE  BR,INCA!SP17                    ;GETLASTMESSAGE ACKED
 (1)          001446                    MICPC=MICPC+1
 (1)  015436  060477                    <MOVE!WRTEBR!BR!<INCA!SP17>>
1670  015440                            SP      BR,SELB,SP12                    ;COPY TO CURRENT NUMBER
 (1)          001447                    MICPC=MICPC+1
 (1)  015440  063232                    <MOVE!SPX!BR!SELB!SP12>
1671  015442                            BRWRTE  IMM,6                   ;WRITE NUMBERED MSG PENDING
 (1)          001450                    MICPC=MICPC+1
 (1)  015442  000406                    <MOVE!WRTEBR!IMM!<6>>
1672                                                                    ; AND LINE HAS GONE IDLE
1673  015444                            SP      BR,AORB,SP10            ;SET IT IN LINE STATUS WORD
 (1)          001451                    MICPC=MICPC+1
 (1)  015444  063310                    <MOVE!SPX!BR!AORB!SP10>
```



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1674  015446                            SP      BR,SELB,SP15            ;RESET TIMER COUNT
 (1)          001452                    MICPC=MICPC+1
 (1)  015446  063235                    <MOVE!SPX!BR!SELB!SP15>
1675  015450                            ALWAYS  TEOM1
 (1)          001453                    MICPC=MICPC+1
 (1)  015450  110720                    <JUMP!ALCOND!<TEOM1-INIT&3000*4>!<TEOM1-INIT&777/2>>
1676  015452                    ININT:  BRWRTE  IMM,15                  ;MASK FOR TURN OFF ALL BUT EXT MEM BITS + NXM
 (1)          001454                    MICPC=MICPC+1
 (1)  015452  000415                    <MOVE!WRTEBR!IMM!<15>>
1677  015454                            SP      IBUS,UBBR,SP0           ;READ BR  CONTROL REGISTER
 (1)          001455                    MICPC=MICPC+1
 (1)  015454  123220                    <MOVE!SPX!IBUS!UBBR!SP0>
1678  015456                            SP      BR,AANDB,SP0            ;MASK OFF VECTOR TO X04
 (1)          001456                    MICPC=MICPC+1
 (1)  015456  063260                    <MOVE!SPX!BR!AANDB!SP0>
1679  015460                            BRWRTE  IMM,200                 ;MASK FOR INTERRUPT
 (1)          001457                    MICPC=MICPC+1
 (1)  015460  000600                    <MOVE!WRTEBR!IMM!<200>>
1680  015462                            OUT     BR,AORB!OBR             ;INTERRUPT
 (1)          001460                    MICPC=MICPC+1
 (1)  015462  061311                    <MOVE!WROUTX!BR!<AORB!OBR>>
1681  015464                            SP      IBUS,INCON,SP0          ;RESTORE INPUT CONTROLCSR
 (1)          001461                    MICPC=MICPC+1
 (1)  015464  123000                    <MOVE!SPX!IBUS!INCON!SP0>
1682  015466                            ALWAYS  NIDLE4
 (1)          001462                    MICPC=MICPC+1
 (1)  015466  100563                    <JUMP!ALCOND!<NIDLE4-INIT&3000*4>!<NIDLE4-INIT&777/2>>
1683                                    ;
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                                        .SBTTL NXMERR ---NON EXISTANT MEMORY HANDLER
015470                          NXMERR: LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
(1)     001463                          MICPC=MICPC+1
(1)     015470  010177                  <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
015472                                  MEMINC  IMM,1
(1)     001464                          MICPC=MICPC+1
(1)     015472  016401                  <MOVE!WRMEM!INCMAR!IMM!<1>>
015474                                  MEM     IMM,0                   ;NXM ERROR BIT
(1)     001465                          MICPC=MICPC+1
(1)     015474  002400                  <MOVE!WRMEM!IMM!<0>>
015476                                  SP      MEMX,SELB,SP10          ;CLEAR STATUS
(1)     001466                          MICPC=MICPC+1
(1)     015476  043230                  <MOVE!SPX!MEMX!SELB!SP10>
015500                                  ALWAYS  RCEXX
(1)     001467                          MICPC=MICPC+1
(1)     015500  114527                  <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
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                                        .SBTTL  SELQSY--ROUTINETOCHECK SELECT AND QSYNC AND DIDDLE LINE STATUS WORD
                                        ;USES SP5, ALWAYS CALLED BY FIRST INSTR IN A RSTATE
015502                          SELQSY: SPBR    IBUS,RCVDAT,SP5         ;READCHARACTERINTO  SP5 AND THE BR
(1)     001470                          MICPC=MICPC+1
(1)     015502  023605                  <MOVE!SPBRX!IBUS!RCVDAT!SP5>
015504                                  BR7     15$                     ;SELECT SET?--BRANCH
(1)     001471                          MICPC=MICPC+1
(1)     015504  117477                  <JUMP!BR7CON!<15$-INIT&3000*4>!<15$-INIT&777/2>>
015506                          5$:     BRWRTE  BR,AA!SP5               ;SHIFTBR LEFT
(1)     001472                          MICPC=MICPC+1
(1)     015506  060525                  <MOVE!WRTEBR!BR!<AA!SP5>>
015510                                  BR7     20$                     ;FINAL SET?
(1)     001473                          MICPC=MICPC+1
(1)     015510  117502                  <JUMP!BR7CON!<20$-INIT&3000*4>!<20$-INIT&777/2>>
015512                          10$:    BRWRTE  IMM,77                  ;MASK   TO BR
(1)     001474                          MICPC=MICPC+1
(1)     015512  000477                  <MOVE!WRTEBR!IMM!<77>>
015514                                  SPBR    BR,AANDB,SP5            ;TURN OFF SELECTANDFINAL
(1)     001475                          MICPC=MICPC+1
(1)     015514  063065                  <MOVE!SPBRX!BR!AANDB!SP5>
015516                                  .ALWAY  BR,INCA,SP3!PAGE1
(1)     001476                          MICPC=MICPC+1
(1)     015516  164463                  <JUMP!ALCOND!BR!INCA!SP3!PAGE1>
                                ;
015520                          15$:    BRWRTE  IMM,200                 ;SET OK TO SEND
(1)     001477                          MICPC=MICPC+1
(1)     015520  000600                  <MOVE!WRTEBR!IMM!<200>>
015522                                  SP      BR,AORB,SP10            ;IN LINE STATUS WORD
(1)     001500                          MICPC=MICPC+1
(1)     015522  063310                  <MOVE!SPX!BR!AORB!SP10>
015524                                  ALWAYS  5$
(1)     001501                          MICPC=MICPC+1
(1)     015524  114472                  <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
015526                          20$:    BRWRTE  IMM,20                  ;SETCLEARACTIVE
(1)     001502                          MICPC=MICPC+1
(1)     015526  000420                  <MOVE!WRTEBR!IMM!<20>>
015530                                  SP      BR,AORB,SP10            ;IN LINE STATUS WORD
(1)     001503                          MICPC=MICPC+1
(1)     015530  063310                  <MOVE!SPX!BR!AORB!SP10>
015532                                  ALWAYS  10$
(1)     001504                          MICPC=MICPC+1
(1)     015532  114474                  <JUMP!ALCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
```

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1709
1710  015534                        ;FUGITIVE RECEIVE ROUTINES---DON'T FIT IN PAGE
 (1)          001505  RH1:    BRWRTE  IBUS,IOBA1                      ;READ LOW BYTE OF IN BA
 (1)  015534  020540          MICPC=MICPC+1
 (1)  015534  020540          <MOVE!WRTEBR!IBUS!<IOBA1>>
1711  015536                        BR0     RCVODD                      ;IF SET IS ODD TRANSFER
 (1)          001506          MICPC=MICPC+1
 (1)  015536  116111          <JUMP!BR0CON!<RCVODD-INIT&3000*4>!<RCVODD-INIT&777/2>>
1716  015540                        STATE   RCVKE0
 (1)          001507          MICPC=MICPC+1
 (1)  015540  000674          <MOVE!WRTEBR!IMM!<RCVKE0-INIT&777/2>>
1717  015542                        ALWAYS  REXIT
 (1)          001510          MICPC=MICPC+1
 (1)  015542  104422          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1718                          ;
1719  015544                  RCVODD: STATE   RCVKO1
 (1)          001511          MICPC=MICPC+1
 (1)  015544  000626          <MOVE!WRTEBR!IMM!<RCVKO1-INIT&777/2>>
1720  015546                        ALWAYS  REXIT
 (1)          001512          MICPC=MICPC+1
 (1)  015546  104422          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1721                          ;
1722  015550                  RCLOW:  CMP     MEMX,SP4                    ;COMPARE LOW ORDER BITS OF COUNT
 (1)          001513          MICPC=MICPC+1
 (1)  015550  040364          <SUBTC!MEMX!SP4>
1723  015552                        C       RCFATL                      ;CARRY--TOO BIG
 (1)          001514          MICPC=MICPC+1
 (1)  015552  115116          <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
1724  015554                        ALWAYS  RC5                 ;ELSE CONTINUE
 (1)          001515          MICPC=MICPC+1
 (1)  015554  104475          <JUMP!ALCOND!<RC5-INIT&3000*4>!<RC5-INIT&777/2>>
1725  015556                  RCFATL: LDMA    IMM,T
 (1)          001516          MICPC=MICPC+1
 (1)  015556  010153          <MOVE!LDMAR!IMM!<T&377>>
1726  015560                        MEMINC  IMM,2
 (1)          001517          MICPC=MICPC+1
 (1)  015560  010402          <MOVE!WRMEM!INCMAR!IMM!<2>>
1727  015562                        MEM     IMM,311
 (1)          001520          MICPC=MICPC+1
 (1)  015562  002711          <MOVE!WRMEM!IMM!<311>>
1728  015564                        LDMA    IMM,<<RTHRS+1>>         ;ADDRESS ERROR LINK
 (1)          001521          MICPC=MICPC+1
 (1)  015564  010175          <MOVE!LDMAR!IMM!<<RTHRS+1>&377>>
1729  015566                        MEMINC  IBUS,IOBA1
 (1)          001522          MICPC=MICPC+1
 (1)  015566  036540          <MOVE!WRMEM!INCMAR!IBUS!<IOBA1>>
1730  015570                        MEMINC  IBUS,IOBA2
 (1)          001523          MICPC=MICPC+1
 (1)  015570  036560          <MOVE!WRMEM!INCMAR!IBUS!<IOBA2>>
1731  015572                        BRWRTE  IMM,20
 (1)          001524          MICPC=MICPC+1
 (1)  015572  000420          <MOVE!WRTEBR!IMM!<20>>
1732  015574                  RCEXY:  MEMINC  IMM,0
 (1)          001525          MICPC=MICPC+1
 (1)  015574  010400          <MOVE!WRMEM!INCMAR!IMM!<0>>
1733  015576                        MEM     BR,SELB
 (1)          001526          MICPC=MICPC+1
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 (1)  015576  062620          <MOVE!WRMEM!BR!<SELB>>
1734  015600                  RCEXX:  OUTPUT  IMM,<200!ORCVCO>        ;FLUSH THE INPUT SILO
 (1)          001527          MICPC=MICPC+1
 (1)  015600  002212          <MOVE!WPOUT!IMM!<200!ORCVCO>>
1735  015602                        SP      IMM,1,SP1       ;SET INIT MODE IN PORT STATUS WORD
 (1)          001530          MICPC=MICPC+1
 (1)  015602  003001          <MOVE!SPX!IMM!!1!SP1>
1736  015604                        ALWAYS  NTRS1
 (1)          001531          MICPC=MICPC+1
 (1)  015604  114674          <JUMP!ALCOND!<NTRS1-INIT&3000*4>!<NTRS1-INIT&777/2>>
1737                          ;
1738  015606                  TDON3:  BRWRTE  MEMX,SUB!SP17                   ;COMPARE RESPONSE TO MSG NO
 (1)          001532          MICPC=MICPC+1
 (1)  015606  040757          <MOVE!WRTEBR!MEMX!<SUB!&P17>>
1739  015610                        BR7     RH3                         ;IF NEGATIVE EXIT
 (1)          001533          MICPC=MICPC+1
 (1)  015610  107567          <JUMP!BR7CON!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
1740  015612                  TDON2:  LDMA    BR,SELA!SP0                     ;ADDRESS THE TRANSMITLINK
 (1)          001534          MICPC=MICPC+1
 (1)  015612  070200          <MOVE!LDMAR!BR!<SELA!SP0>>
1741  015614                        MEM     IMM,0                       ;TURN OF ASSIGNEDAND TMTED BITS IN FLAG
 (1)          001535          MICPC=MICPC+1
 (1)  015614  002400          <MOVE!WRMEM!IMM!<0>>
1742  015616                        LDMA    IMM,STC
 (1)          001536          MICPC=MICPC+1
 (1)  015616  010070          <MOVE!LDMAR!IMM!<STC&377>>
1743  015620                        MEM     IMM,TML1                    ;ASSUME WRAPAROUND
 (1)          001537          MICPC=MICPC+1
 (1)  015620  002473          <MOVE!WRMEM!IMM!<TML1>>
1744  015622                        BRWRTE  IMM,TML8                    ;WRAPAROUND?
 (1)          001540          MICPC=MICPC+1
 (1)  015622  000545          <MOVE!WRTEBR!IMM!<TML8>>
1745  015624                        CMP     BR,SP0
 (1)          001541          MICPC=MICPC+1
 (1)  015624  060360          <SUBTC!BR!SP0>
1746  015626                        Z       TDON4                       ;YES
 (1)          001542          MICPC=MICPC+1
 (1)  015626  115545          <JUMP!ZCOND!<TDON4-INIT&3000*4>!<TDON4-INIT&777/2>>
1747  015630                        BRWRTE  IMM,6                       ;OFFSET FOR NEXT TMT LINK
 (1)          001543          MICPC=MICPC+1
 (1)  015630  000406          <MOVE!WRTEBR!IMM!<6>>
1748  015632                        MEM     BR,ADD!SP0                  ;UPDATE THE POINTER
 (1)          001544          MICPC=MICPC+1
 (1)  015632  062400          <MOVE!WRMEM!BR!<ADD!SP0>>
1749  015634                  IDON4:  LDMA    IMM,NXTSP                   ;ADDRESS DONE LINK
 (1)          001545          MICPC=MICPC+1
 (1)  015634  010241          <MOVE!LDMAR!IMM!<NXTSP&377>>
1750  015636                        LDMA    MEMX,SELB!SPX!SP3           ;ADDRESS THE LINK,COPYING
 (1)          001546          MICPC=MICPC+1
 (1)  015636  053223          <MOVE!LDMAR!MEMX!<SELB!SPX!SP3>>
1751                                                                    ;ITS ADDRESS TO SP0
1752  015640                        MEMINC  IMM,200                     ;WRITE THE INTERRUPT TYPE
 (1)          001547          MICPC=MICPC+1
 (1)  015640  010600          <MOVE!WRMEM!INCMAR!IMM!<200>>
1753  015642                        MEM     BR,INCA!SP0                 ;COPY ACTUAL LINK ADDRESS
 (1)          001550          MICPC=MICPC+1
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  (1)  015642  062460                    <MOVE!WRMEM!BR!<INCA!SP0>>
1754   015644                            LDMA    IMM,NXTSP                       ;ADDRESS PTR INT STACK
  (1)         001551                    MICPC=MICPC+1
  (1)  015644  010241                    <MOVE!LDMAR!IMM!<NXTSP&377>>
1755   015646                            MEM     IMM,INTSTK                      ;ASSUME WRAP AROUND
  (1)         001552                    MICPC=MICPC+1
  (1)  015646  002642                    <MOVE!WRMEM!IMM!<INTSTK>>
1756   015650                            BRWRTE  IMM,<<MMEND-2>>                 ;ADDRESS ENDOFINT STACK
  (1)         001553                    MICPC=MICPC+1
  (1)  015650  000776                    <MOVE!WRTEBR!IMM!<<MMEND-2>>>
1757   015652                            CMP     BR,SP3                          ;WRAPAROUND?
  (1)         001554                    MICPC=MICPC+1
  (1)  015652  062363                    <SUBTC!BR!SP3>
1758   015654                            Z       TDON40                          ;YES---BRANCH
  (1)         001555                    MICPC=MICPC+1
  (1)  015654  115560                    <JUMP!ZCOND!<TDON40-INIT&3000*4>!<TDON40-INIT&777/2>>
1759   015656                            BRWRTE  IMM,2                           ;OFFSET TO NEXT PAIR
  (1)         001556                    MICPC=MICPC+1
  (1)  015656  000402                    <MOVE!WRTEBR!IMM!<2>>
1760   015660                            MEM     BR,ADD!SP3                      ;UPDATE POINTER
  (1)         001557                    MICPC=MICPC+1
  (1)  015660  062403                    <MOVE!WRMEM!BR!<ADD!SP3>>
1761   015662                    TDON40: BRWRTE  IMM,20                          ;WRITE INTERUPT PENDING
  (1)         001560                    MICPC=MICPC+1
  (1)  015662  000420                    <MOVE!WRTEBR!IMM!<20>>
1762   015664                            SP      BR,AORB,SP1                     ;IN PORT STATUS WORD
  (1)         001561                    MICPC=MICPC+1
  (1)  015664  063301                    <MOVE!SPX!BR!AORB!SP1>
1763   015666                            LDMA    IMM,ETC                         ;ADDRESS NEXT EMPTY PTR
  (1)         001562                    MICPC=MICPC+1
  (1)  015666  010072                    <MOVE!LDMAR!IMM!<ETC&377>>
1764   015670                            SP      MEMX,SELB,SP0                   ;COPY IT TO SP0
  (1)         001563                    MICPC=MICPC+1
  (1)  015670  043220                    <MOVE!SPX!MEMX!SELB!SP0>
1765   015672                            LDMA    IMM,STC                         ;GET NEXT DONE PTR
  (1)         001564                    MICPC=MICPC+1
  (1)  015672  010070                    <MOVE!LDMAR!IMM!<STC&377>>
1766   015674                            CMP     MEMX,SP0                        ;IDENTICAL?
  (1)         001565                    MICPC=MICPC+1
  (1)  015674  040360                    <SUBTC!MEMX!SP0>
1767   015676                            Z       RH3                             ;FINISH PROCESSING HEADER
  (1)         001566                    MICPC=MICPC+1
  (1)  015676  105567                    <JUMP!ZCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
1768
1769   015700                    TDON1:  LDMA    IMM,ISP17                       ;GET LAST ACKED
  (1)         001567                    MICPC=MICPC+1
  (1)  015700  010155                    <MOVE!LDMAR!IMM!<ISP17&377>>
1770   015702                            SP      MEMX,SELB,SP17                  ;STORE IT IN SP17
  (1)         001570                    MICPC=MICPC+1
  (1)  015702  043237                    <MOVE!SPX!MEMX!SELB!SP17>
1771   015704                            LDMA    IMM,STC                         ;GET START OF TMT CHAIN
  (1)         001571                    MICPC=MICPC+1
  (1)  015704  010070                    <MOVE!LDMAR!IMM!<STC&377>>
1772   015706                            LDMA    MEMX,SELB!SPBRX!SP0             ;ADDRESS THE LINK
  (1)         001572                    MICPC=MICPC+1
  (1)  015706  053620                    <MOVE!LDMAR!MEMX!<SELB!SPBRX!SP0>>
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1773   015710                            BRWRTE  MEMX!INCMAR,SELB                ;GET THE FLAGS
  (1)         001573                    MICPC=MICPC+1
  (1)  015710  054620                    <MOVE!WRTEBR!MEMX!INCMAR!<SELB>>
1774   015712                            BR1     TDON3                           ;IFBUFFER ASSIGNED PROCEED
  (1)         001574                    MICPC=MICPC+1
  (1)  015712  116532                    <JUMP!BR1CON!<TDON3-INIT&3000*4>!<TDON3-INIT&777/2>>
1775   015714                            ALWAYS  RH3                             ;ELSE---EXIT
  (1)         001575                    MICPC=MICPC+1
  (1)  015714  104567                    <JUMP!ALCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
1776
1777   015716                    OVRRUN: BRWRTE  IMM,4
  (1)         001576                    MICPC=MICPC+1
  (1)  015716  000404                    <MOVE!WRTEBR!IMM!<4>>
1778   015720                            ALWAYS  NTRS0
  (1)         001577                    MICPC=MICPC+1
  (1)  015720  114671                    <JUMP!ALCOND!<NTRS0-INIT&3000*4>!<NTRS0-INIT&777/2>>
1779
1780                                    ; INPUTS:
1781                                    ;       SP0 = RECEIVE CHARACTER
1782
1783   015722                    PASWRD: SP      IBUS,LNOSW,SP16                 ;READ PASSWD SWITCH
  (1)         001600                    MICPC=MICPC+1
  (1)  015722  023336                    <MOVE!SPX!IBUS!LNOSW!SP16>
1784   015724                            Z       10$                             ;IF ALL ONES NO RLD ENABLED
  (1)         001601                    MICPC=MICPC+1
  (1)  015724  115605                    <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1785   015726                            BRWRTE  IMM,6                           ;CHECK FOR ENTER MOP MODE
  (1)         001602                    MICPC=MICPC+1
  (1)  015726  000406                    <MOVE!WRTEBR!IMM!<6>>
1786   015730                            CMP     BR,SP0
  (1)         001603                    MICPC=MICPC+1
  (1)  015730  060360                    <SUBTC!BR!SP0>
1787   015732                            Z       20$                             ;IF EQUAL   ENTER MOP
  (1)         001604                    MICPC=MICPC+1
  (1)  015732  115613                    <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
1788   015734                    10$:    BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
  (1)         001605                    MICPC=MICPC+1
  (1)  015734  060001                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1789   015736                            BRSHFT                                  ;SHIFT IT RIGHT
  (1)         001606                    MICPC=MICPC+1
  (1)  015736  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1790   015740                            BR1     RHX                             ;MESSAGE WITH NO BUFFER ASSIGNED
  (1)         001607                    MICPC=MICPC+1
  (1)  015740  106751                    <JUMP!BR1CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
1791   015742                            BRSHFT                                  ;SHIFT RIGHT AGAIN
  (1)         001610                    MICPC=MICPC+1
  (1)  015742  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1792   015744                            BR1     RCVM0                           ;DLE RECEIVED IN NORMAL MODE
  (1)         001611                    MICPC=MICPC+1
  (1)  015744  106743                    <JUMP!BR1CON!<RCVM0-INIT&3000*4>!<RCVM0-INIT&777/2>>
1793   015746                            ALWAYS  RK3                             ;HANDLE MAINT MODE MESSAGE
  (1)         001612                    MICPC=MICPC+1
  (1)  015746  104001                    <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
1794   015750                    20$:    SP      BR,DECA,SP4                     ;COUNT FOR NUMB OF COMPARES
  (1)         001613                    MICPC=MICPC+1
  (1)  015750  063164                    <MOVE!SPX!BR!DECA!SP4>
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1795  015752                          STATE   EM2
 (1)          001614                 MICPC=MICPC+1
 (1)  015752  000746                 <MOVE!WRTEBR!IMM!<EM2-INIT&777/2>>
1796  015754                         ALWAYS  REXIT
 (1)          001615                 MICPC=MICPC+1
 (1)  015754  104422                 <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1797  015756                 RCVM1:  LDMA    IMM,ISP11                ;ADDRESS SP11 IMAGE
 (1)          001616                 MICPC=MICPC+1
 (1)  015756  013171                 <MOVE!LDMAR!IMM!<ISP11&377>>
1798  015760                         MEM     BR,DECA!SP11             ;COPY SP11
 (1)          001617                 MICPC=MICPC+1
 (1)  015760  062571                 <MOVE!WRMEM!BR!<DECA!SP11>>
1799  015762                         LDMA    IMM,NXTSP
 (1)          001620                 MICPC=MICPC+1
 (1)  015762  010241                 <MOVE!LDMAR!IMM!<NXTSP&377>>
1800  015764                         SP      MEMX!LDMAR,SELB,SP3              ;COPY TO SP3
 (1)          001621                 MICPC=MICPC+1
 (1)  015764  053223                 <MOVE!SPX!MEMX!LDMAR!SELB!SP3>
1801  015766                         MEMINC  IMM,204                  ;RECEIVE DONE IMAGE
 (1)          001622                 MICPC=MICPC+1
 (1)  015766  016004                 <MOVE!WRMEM!INCMAR!IMM!<204>>
1802  015770                         MEM     BR!LDMAR,SELA!SP14               ;COPY LINK ADDRWESS TO NEXT INTE
 (1)          001623                 MICPC=MICPC+1
 (1)  015770  072614                 <MOVE!WRMEM!BR!LDMAR!<SELA!SP14>>
1803  015772                         MEMINC  IMM,0                    ;ZERO THE FLAGS
 (1)          001624                 MICPC=MICPC+1
 (1)  015772  016400                 <MOVE!WRMEM!INCMAR!IMM!<0>>
1804  015774                         SP      IBUS,IOBA1,SP4           ;GET BEGIN ADDRESS LOW
 (1)          001625                 MICPC=MICPC+1
 (1)  015774  023144                 <MOVE!SPX!IBUS!IOBA1!SP4>
1805  015776                         SP      IBUS,IOBA2,SP5           ;AND HIGH BYTE
 (1)          001626                 MICPC=MICPC+1
 (1)  015776  023165                 <MOVE!SPX!IBUS!IOBA2!SP5>.
1806  016000                         SP      MEMX!INCMAR,SUB,SP4      ;SUBTRACT TO GET COUNT
 (1)          001627                 MICPC=MICPC+1
 (1)  016000  057344                 <MOVE!SPX!MEMX!INCMAR!SUB!SP4>
1807  016002                         C       10$              ;IF CARRY SET THEN NO CARRY!
 (1)          001630                 MICPC=MICPC+1
 (1)  016002  115232                 <JUMP!CCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1808  016004                         SP      BR,DECA,SP5              ;DECREMENT HIGH BYTE OF ADDRESS
 (1)          001631                 MICPC=MICPC+1
 (1)  016004  063165                 <MOVE!SPX!BR!DECA!SP5>
1809  016006                 10$:    SP      MEMX!INCMAR,SUB,SP5      ;SUBTRACT FOR COUNT
 (1)          001632                 MICPC=MICPC+1
 (1)  016006  057345                 <MOVE!SPX!MEMX!INCMAR!SUB!SP5>
1810  016010                         MEMINC  BR,SELA!SP5              ;COPY TO MEMORY LINK
 (1)          001633                 MICPC=MICPC+1
 (1)  016010  076605                 <MOVE!WRMEM!INCMAR!BR!<SELA!SP5>>
1811  016012                         MEMINC  BR,SELA!SP4
 (1)          001634                 MICPC=MICPC+1
 (1)  016012  076604                 <MOVE!WRMEM!INCMAR!BR!<SELA!SP4>>
1812  016014                         BRWRTE  IMM,2
 (1)          001635                 MICPC=MICPC+1
 (1)  016014  000002                 <MOVE!WRTEBR!IMM!<2>>
1813  016016                         LDMA    IMM,NXTSP                ;ADDRESS NEXT INT STACK
 (1)          001636                 MICPC=MICPC+1
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 (1)  016016  010241                 <MOVE!LDMAR!IMM!<NXTSP&377>>
1814  016020                         MEM     BR,ADD!SP3
 (1)          001637                 MICPC=MICPC+1
 (1)  016020  062403                 <MOVE!WRMEM!BR!<ADD!SP3>>
1815  016022                         BRWRTE  IMM,<<MMEND-2>>          ;ADDRESSEND OF INT STACK
 (1)          001640                 MICPC=MICPC+1
 (1)  016022  000776                 <MOVE!WRTEBR!IMM!<<MMEND-2>>>
1816  016024                         CMP     BR,SP3                   ;WRAP AROUND
 (1)          001641                 MICPC=MICPC+1
 (1)  016024  060363                 <SUBTC!BR!SP3>
1817  016026                         Z       RMIFLP                   ;IFYES-- BRANCH
 (1)          001642                 MICPC=MICPC+1
 (1)  016026  115644                 <JUMP!ZCOND!<RMIFLP-INIT&3000*4>!<RMIFLP-INIT&777/2>>
1818  016030                         ALWAYS  RMX1
 (1)          001643                 MICPC=MICPC+1
 (1)  016030  114645                 <JUMP!ALCOND!<RMX1-INIT&3000*4>!<RMX1-INIT&777/2>>
1819  016032                 RMIFLP: MEM     IMM,INTSTK
 (1)          001644                 MICPC=MICPC+1
 (1)  016032  002642                 <MOVE!WRMEM!IMM!<INTSTK>>
1820  016034                 RMX1:
1821  016034                         LDMA    IMM,LRC
 (1)          001645                 MICPC=MICPC+1
 (1)  016034  010024                 <MOVE!LDMAR!IMM!<LRC&377>>
1822  016036                         BRWRTE  IMM,5                    ;INDEX TO NEXT BUFFER
 (1)          001646                 MICPC=MICPC+1
 (1)  016036  000405                 <MOVE!WRTEBR!IMM!<5>>
1823  016040                         SP      BR,ADD,SP14              ;UPDATE COPY OF POINTER
 (1)          001647                 MICPC=MICPC+1
 (1)  016040  063014                 <MOVE!SPX!BR!ADD!SP14>
1824  016042                         BRWRTE  IMM,STC                  ;ADDRESS OF WRAP AROUND POINT
 (1)          001650                 MICPC=MICPC+1
 (1)  016042  000470                 <MOVE!WRTEBR!IMM!<STC>>
1825  016044                         CMP     BR,SP14                  ;WRAPAROUND?
 (1)          001651                 MICPC=MICPC+1
 (1)  016044  060374                 <SUBTC!BR!SP14>
1826  016046                         Z       RMFLIP                   ;IF YES---BRANCH
 (1)          001652                 MICPC=MICPC+1
 (1)  016046  115655                 <JUMP!ZCOND!<RMFLIP-INIT&3000*4>!<RMFLIP-INIT&777/2>>
1827  016050                         MEM     BR,SELA!SP14             ;ELSE UPDATE THE POINTER
 (1)          001653                 MICPC=MICPC+1
 (1)  016050  062614                 <MOVE!WRMEM!BR!<SELA!SP14>>
1828  016052                         ALWAYS  RMX
 (1)          001654                 MICPC=MICPC+1
 (1)  016052  114656                 <JUMP!ALCOND!<RMX-INIT&3000*4>!<RMX-INIT&777/2>>
1829  016054                 RMFLIP: MEM     IMM,RCL1                 ;POINT TO FIRST LINK
 (1)          001655                 MICPC=MICPC+1
 (1)  016054  002425                 <MOVE!WRMEM!IMM!<RCL1>>
1830  016056                 RMX:    BRWRTE  IMM,20                   ;MASK FOR INTERUPT PENDING
 (1)          001656                 MICPC=MICPC+1
 (1)  016056  000420                 <MOVE!WRTEBR!IMM!<20>>
1831  016060                         SP      DP,AORB,SP1              ;UPDATE PORT STATUS WORD
 (1)          001657                 MICPC=MICPC+1
 (1)  016060  063301                 <MOVE!SPX!DP!AORB!SP1>
1832  016062                         BRWRTE  DP,<SELA!SP10>           ;READ LINE STATUS WORD
 (1)          001660                 MICPC=MICPC+1
 (1)  016062  060614                 <MOVE!WRTEBR!DP!<SELA!SP10>>
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1833  016064                        BR4     FLUSH                   ;IF CLEAR ACTIVE SET---FLUSH
 (1)          001661                MICPC=MICPC+1
 (1)  016064  107015                <JUMP!BR4CON!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1834  016066                  RM1:  STATE   RCVA
 (1)          001662                MICPC=MICPC+1
 (1)  016066  000400                <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
1835  016070                        ALWAYS  REXIT
 (1)          001663                MICPC=MICPC+1
 (1)  016070  104422                <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1836  016072                  NTHRES: LDMA    IMM,ST
 (1)          001664                MICPC=MICPC+1
 (1)  016072  010154                <MOVE!LDMAR!IMM!<ST&377>>
1837  016074                        SPBR    MEMX,SELB,SP0
 (1)          001665                MICPC=MICPC+1
 (1)  016074  043620                <MOVE!SPBRX!MEMX!SELB!SP0>
1838  016076                        BRWRTE  BR,ADD!SP0              ;SHIFT LEFT
 (1)          001666                MICPC=MICPC+1
 (1)  016076  060400                <MOVE!WRTEBR!BR!<ADD!SP0>>
1839  016100                        BR4     OVRRUN
 (1)          001667                MICPC=MICPC+1
 (1)  016100  117176                <JUMP!BR4CON!<OVRRUN-INIT&3000*4>!<OVRRUN-INIT&777/2>>
1840  016102                        BRWRTE  IMM,1
 (1)          001670                MICPC=MICPC+1
 (1)  016102  000401                <MOVE!WRTEBR!IMM!<1>>
1841  016104                  ERRXX:
1842  016104                  NTRS0:  LDMA    IMM,<<RTHRS+3>>
 (1)          001671                MICPC=MICPC+1
 (1)  016104  010177                <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
1843  016106                        MEMINC  IMM,0
 (1)          001672                MICPC=MICPC+1
 (1)  016106  016400                <MOVE!WRMEM!INCMAR!IMM!<0>>
1844  016110                        MEM     BR,SELB
 (1)          001673                MICPC=MICPC+1
 (1)  016110  062620                <MOVE!WRMEM!BR!<SELB>>
1845  016112                  NTRS1:  LDMA    IMM,NXTSP
 (1)          001674                MICPC=MICPC+1
 (1)  016112  010241                <MOVE!LDMAR!IMM!<NXTSP&377>>
1846  016114                        LDMA    MEMX,SELB!SPX!SP0
 (1)          001675                MICPC=MICPC+1
 (1)  016114  053220                <MOVE!LDMAR!MEMX!<SELB!SPX!SP0>>
1847  016116                        MEMINC  IMM,201
 (1)          001676                MICPC=MICPC+1
 (1)  016116  016001                <MOVE!WRMEM!INCMAR!IMM!<201>>
1848  016120                        MEM     IMM,<<RTHRS>>
 (1)          001677                MICPC=MICPC+1
 (1)  016120  002574                <MOVE!WRMEM!IMM!<<RTHRS>>>
1849  016122                        LDMA    IMM,NXTSP
 (1)          001700                MICPC=MICPC+1
 (1)  016122  010241                <MOVE!LDMAR!IMM!<NXTSP&377>>
1850  016124                        MEM     IMM,INTSTK              ;ASSUME QUEUE WRAP AROUND
 (1)          001701                MICPC=MICPC+1
 (1)  016124  002642                <MOVE!WRMEM!IMM!<INTSTK>>
1851  016126                        BRWRTE  IMM,<<MMEND-2>>
 (1)          001702                MICPC=MICPC+1
 (1)  016126  000776                <MOVE!WRTEBR!IMM!<<MMEND-2>>>
1852  016130                        CMP     BR,SP0
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 (1)          001703                MICPC=MICPC+1
 (1)  016130  060360                <SUBTC!BR!SP0>
1853  016132                        Z       NTRS2                   ;IT DID WRAP AROUND
 (1)          001704                MICPC=MICPC+1
 (1)  016132  115707                <JUMP!ZCOND!<NTRS2-INIT&3000*4>!<NTRS2-INIT&777/2>>
1854  016134                        BRWRTE  IMM,2                   ;OFFSET TO NEXT PAIR
 (1)          001705                MICPC=MICPC+1
 (1)  016134  000402                <MOVE!WRTEBR!IMM!<2>>
1855  016136                        MEM     BR,ADD!SP0              ;UPDATE QUEUE POINTER
 (1)          001706                MICPC=MICPC+1
 (1)  016136  062400                <MOVE!WRMEM!BR!<ADD!SP0>>
1856  016140                  NTRS2:  BRWRTE  IMM,20
 (1)          001707                MICPC=MICPC+1
 (1)  016140  000420                <MOVE!WRTEBR!IMM!<20>>
1857  016142                        SPBR    BR,AORB,SP1
 (1)          001710                MICPC=MICPC+1
 (1)  016142  063701                <MOVE!SPBRX!BR!AORB!SP1>
1858  016144                        BR0     TAB1                    ;FLAGGED BY ERROR TYPE
 (1)          001711                MICPC=MICPC+1
 (1)  016144  116342                <JUMP!BR0CON!<TAB1-INIT&3000*4>!<TAB1-INIT&777/2>>
1859  016146                  SNAK:   LDMA    IMM,ISP11
 (1)          001712                MICPC=MICPC+1
 (1)  016146  010171                <MOVE!LDMAR!IMM!<ISP11&377>>
1860  016150                        SP      MEMX,SELB,SP11
 (1)          001713                MICPC=MICPC+1
 (1)  016150  043231                <MOVE!SPX!MEMX!SELB!SP11>
1861  016152                        SP      BR,INCA,SP11            ;INCREMENT MSG EXPECTED
 (1)          001714                MICPC=MICPC+1
 (1)  016152  063071                <MOVE!SPX!BR!INCA!SP11>
1862  016154                  SNAK1:  BRWRTE  IMM,1                   ;UNNUMB PENING BIT TO BR
 (1)          001715                MICPC=MICPC+1
 (1)  016154  000401                <MOVE!WRTEBR!IMM!<1>>
1863  016156                  SNAK2:  SP      BR,AORB,SP10            ;UPDATE LINE STATUS WORD
 (1)          001716                MICPC=MICPC+1
 (1)  016156  063310                <MOVE!SPX!BR!AORB!SP10>
1864  016160                        ALWAYS  FLUSH
 (1)          001717                MICPC=MICPC+1
 (1)  016160  104415                <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1865                            ;
1866  016162                  EMTRIG: BRWRTE  IMM,24
 (1)          001720                MICPC=MICPC+1
 (1)  016162  000424                <MOVE!WRTEBR!IMM!<24>>
1867  016164                        OUTPUT  BR,<SELB!OBA1>
 (1)          001721                MICPC=MICPC+1
 (1)  016164  062226                <MOVE!WROUT!BR!<SELB!OBA1>>
1868  016166                        BRWRTE  IMM,0
 (1)          001722                MICPC=MICPC+1
 (1)  016166  000400                <MOVE!WRTEBR!IMM!<0>>
1869  016170                        OUTPUT  BR,<SELB!OBA2>
 (1)          001723                MICPC=MICPC+1
 (1)  016170  062227                <MOVE!WROUT!BR!<SELB!OBA2>>
1870  016172                        SPBR    IBUS,BM873,SP0          ;READ BM873 ADDRESS---
 (1)          001724                MICPC=MICPC+1
 (1)  016172  023740                <MOVE!SPBRX!IBUS!BM873!SP0>
1871  016174                        OUTPUT  BR,SELB!OUTDA1          ;SET UP LOW BYTE OF ADDRESS
 (1)          001725                MICPC=MICPC+1
```

```
  (1)  016174  062222                    <MOVE!WROUT!BR!<SELB!OUTDA1>>
1872   016176                           BRWRTE  IMM,366                 ;HIGH BYTE BASE FOR ROM BOOT
  (1)         001726                    MICPC=MICPC+1
  (1)  016176  000766                    <MOVE!WRTEBR!IMM!<366>>
1873   016200                           OUTPUT  BR,SELB!OUTDA2          ;
  (1)         001727                    MICPC=MICPC+1
  (1)  016200  062223                    <MOVE!WROUT!BR!<SELB!OUTDA2>>
1874   016202                    EM6:   BRWRTE  IMM,21                  ;MASK FOR TIMER AND ALSO TO START NPR
  (1)         001730                    MICPC=MICPC+1
  (1)  016202  000421                    <MOVE!WRTEBR!IMM!<21>>
1875   016204                           OUT     BR,<SELB!OBR>
  (1)         001731                    MICPC=MICPC+1
  (1)  016204  061231                    <MOVE!WROUTX!BR!<SELB!OBR>>
1876   016206                           OUT     BR,<SELB!ONPR>
  (1)         001732                    MICPC=MICPC+1
  (1)  016206  061230                    <MOVE!WROUTX!BR!<SELB!ONPR>>
1877   016210                    EM1:   BRWRTE  IBUS,NPR                        ;READ NPR CONTROL
  (1)         001733                    MICPC=MICPC+1
  (1)  016210  120600                    <MOVE!WRTEBR!IBUS!<NPR>>
1878   016212                           BR0     CKTIME
  (1)         001734                    MICPC=MICPC+1
  (1)  016212  102372                    <JUMP!BR0CON!<CKTIME-INIT&3000*4>!<CKTIME-INIT&777/2>>
1879   016214                           MEMADR  RM1                            ;IF NPR DONE
  (1)         001735                    MICPC=MICPC+1
  (1)  016214  002662                    <MOVE!WRMEM!<RM1-INIT&777/2>>
1880   016216                           ALWAYS  ACLOW
  (1)         001736                    MICPC=MICPC+1
  (1)  016216  100765                    <JUMP!ALCOND!<ACLOW-INIT&3000*4>!<ACLOW-INIT&777/2>>
1881   016220                    TABUPD: SPBR    IBUS,RCVCON,SP0        ;READ RECEIVER CONTROL REG
  (1)         001737                    MICPC=MICPC+1
  (1)  016220  023640                    <MOVE!SPBRX!IBUS!RCVCON!SP0>
1882   016222                           BRWRTE  BR,ADD!SP0              ;SHIFT LEFT
  (1)         001740                    MICPC=MICPC+1
  (1)  016222  060400                    <MOVE!WRTEBR!BR!<ADD!SP0>>
1883   016224                           BR7     IDLE                    ;RECEIVE ACTIVE--IDLE
  (1)         001741                    MICPC=MICPC+1
  (1)  016224  103445                    <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1884   016226                    TAB1:  LDMA    IMM,IMG10
  (1)         001742                    MICPC=MICPC+1
  (1)  016226  010156                    <MOVE!LDMAR!IMM!<IMG10&377>>
1885   016230                           BRWRTE  IMM,2
  (1)         001743                    MICPC=MICPC+1
  (1)  016230  000402                    <MOVE!WRTEBR!IMM!<2>>
1886   016232                           MEMINC  BR,AANDB!SP10           ;SAVE BIT 1 OF SP10
  (1)         001744                    MICPC=MICPC+1
  (1)  016232  076670                    <MOVE!WRMEM!INCMAR!BR!<AANDB!SP10>>
1887   016234                           MEMINC  BR,SELA!SP11            ;SAVE SP11
  (1)         001745                    MICPC=MICPC+1
  (1)  016234  076611                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP11>>
1888   016236                           MEMINC  BR,SELA!SP12            ;SAVE SP12
  (1)         001746                    MICPC=MICPC+1
  (1)  016236  076612                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP12>>
1889   016240                           MEMINC  BR,SELA!SP17            ;SAVE SP17
  (1)         001747                    MICPC=MICPC+1
  (1)  016240  076617                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP17>>
1890                                     ;
```



```
1891   016242                           STATE   RB2             ;NOTE: THE BRG CANNOT BE CHANGED FROM THIS
  (1)         001750                    MICPC=MICPC+1
  (1)  016242  000461                    <MOVE!WRTEBR!IMM!<RB2-INIT&777/2>>
1892                                                             ;POINT UNTIL THE BRANCH TO RB0
1893   016244                           CMP     BR,SP3
  (1)         001751                    MICPC=MICPC+1
  (1)  016244  060363                    <SUBTC!BR!SP3>
1894   016246                           Z       IDLE
  (1)         001752                    MICPC=MICPC+1
  (1)  016246  101445                    <JUMP!ZCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1895                                     ;
1896   016250                           SP      MEMX,SELB,SP13
  (1)         001753                    MICPC=MICPC+1
  (1)  016250  043233                    <MOVE!SPX!MEMX!SELB!SP13>
1897   016252                           PSTATE  TBU1                    ;NEW PORT STATE ADDRESS
  (1)  016252                           MEM     IMM,<<TBU1-INIT&777/2>>
  (2)         001754                    MICPC=MICPC+1
  (2)  016252  002775                    <MOVE!WRMEM!IMM!<<TBU1-INIT&777/2>>>
1898   016254                           SP      IMM,4,SP4               ;INITIALIZE COUNT
  (1)         001755                    MICPC=MICPC+1
  (1)  016254  003004                    <MOVE!SPX!IMM!4!SP4>
1899                                                             ;NOTE: FIRST 6 RAM LOCATIONS ARE NOT WRITTEN
1900                                                             ;TO CORE TABLE.
1901   016256                           LDMA    IMM,BASE                ;MAR NOW POINTS TO BASE
  (1)         001756                    MICPC=MICPC+1
  (1)  016256  010017                    <MOVE!LDMAR!IMM!<BASE&377>>
1902   016260                           ALWAYS  RB0             ;THE BRG MUST BE PRESET TO STATE RB2
  (1)         001757                    MICPC=MICPC+1
  (1)  016260  100443                    <JUMP!ALCOND!<RB0-INIT&3000*4>!<RB0-INIT&777/2>>
1903   016262                    EC2:   BRWRTE  IMM,2                   ;INCREMENT COUNT/TEST
  (1)         001760                    MICPC=MICPC+1
  (1)  016262  000402                    <MOVE!WRTEBR!IMM!<2>>
1904   016264                           SP      BR,ADD,SP4
  (1)         001761                    MICPC=MICPC+1
  (1)  016264  063004                    <MOVE!SPX!BR!ADD!SP4>
1905   016266                           SP      IBUS,IOBA1,SP0                 ;POINT TO NEXT ADDRESS
  (1)         001762                    MICPC=MICPC+1
  (1)  016266  023140                    <MOVE!SPX!IBUS!IOBA1!SP0>
1906   016270                           OUTPUT  BR,ADD!OBA1
  (1)         001763                    MICPC=MICPC+1
  (1)  016270  062206                    <MOVE!WROUT!BR!<ADD!OBA1>>
1907   016272                           SP      IBUS,IOBA2,SP0
  (1)         001764                    MICPC=MICPC+1
  (1)  016272  023160                    <MOVE!SPX!IBUS!IOBA2!SP0>
1908   016274                           OUTPUT  BR,AC!OBA2
  (1)         001765                    MICPC=MICPC+1
  (1)  016274  062107                    <MOVE!WROUT!BR!<AC!OBA2>>
1909   016276                           C       TABMXT
  (1)         001766                    MICPC=MICPC+1
  (1)  016276  105373                    <JUMP!CCOND!<TABMXT-INIT&3000*4>!<TABMXT-INIT&777/2>>
1910
1911   016300                    ECX:   BRWRTE  BR!LDMAR,SELA!SP4               ;READ COUNTER
  (1)         001767                    MICPC=MICPC+1
  (1)  016300  070604                    <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
1912   016302                           BR7     20$                     ;ALL DONE
  (1)         001770                    MICPC=MICPC+1
```

```
   (1)  016302  117774                    <JUMP!BR7CON!<20$-INIT&3000*4>!<20$-INIT&777/2>>
  1913  016304                            OUTPUT  MEMX!INCMAR,SELB!OUTDA1          ;STORE COUNTS OF ERRORS
   (1)          001771                    MICPC=MICPC+1
   (1)  016304  056222                    <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA1>>
  1914  016306                            OUTPUT  MEMX!INCMAR,SELB!OUTDA2
   (1)          001772                    MICPC=MICPC+1
   (1)  016306  056223                    <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA2>>
  1915  016310                            ALWAYS  RK8
   (1)          001773                    MICPC=MICPC+1
   (1)  016310  104641                    <JUMP!ALCOND!<RK8-INIT&3000*4>!<RK8-INIT&777/2>>
  1916
  1917  016312                    20$:    LDMA    IMM,PRTST
   (1)          001774                    MICPC=MICPC+1
   (1)  016312  010162                    <MOVE!LDMAR!IMM!<PRTST&377>>
  1918  016314                            MEM     BR,SELA!SP13
   (1)          001775                    MICPC=MICPC+1
   (1)  016314  062613                    <MOVE!WRMEM!BR!<SELA!SP13>>
  1919  016316                            ALWAYS  RM1
   (1)          001776                    MICPC=MICPC+1
   (1)  016316  114662                    <JUMP!ALCOND!<RM1-INIT&3000*4>!<RM1-INIT&777/2>>
  1920  016320                            $ZERO
   (1)          001777                    MICPC=MICPC+1
   (1)  016320  000000                    000000
  1921          000001                    .END


. ABS.  016322     000

 ERRORS DETECTED:  0

 ,DDCMP/CRF/DS:CRF_DMCNEW,LOW,DDCNEW
 RUN-TIME: 5 8 0 SECONDS
 RUN-TIME RATIO: 70/13=5.1
 CORE USED:  6K  (11 PAGES)

  1668                              01400
```



```
  1669                              02800
  1670  016322                      02900   HIMAP:                  ;HIGH SPEED (LOCAL) MICRO-CODE
```

```
                        .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
                        ;
```



```
000000                  NEW=0
                        ;MICROPPOCESSOR INSTRUCTION WORD DEFINITIONS
000000          MOVE=0                  ;OPCODE MOVE
100000          JUMP=100000             ;OPCODE JUMP
020000          IBUS=20000              ;SOURCE IBUS
000000          IMM=0                   ;SOURCE 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
000360             SUBTC=360            ;FUNCTION= TWOS COMPLEMENT SUBTRACT
000000          ADD=0                   ;ADD A+B
000020          ADDC=20                 ;A+B+CARRY
000040          SUBC=40                 ;A-B-C
000060          INCA=60                 ;INCREMENT A
000100          AC=100                  ;A PLUS CARRY
000120          AA=120                  ;A PLUS A
000140          AAC=140                 ;A PLUS A PLUS C
000160          DECA=160                ;DECREMENT A
                        ;END FUNCTIONS
004000                  PAGE1=4000
010000                  PAGE2=10000
014000                  PAGE3=14000
001000          CCOND=1000              ;CONDITION C
001400          ZCOND=1400              ;CONDITION Z
000400          ALCOND=400              ;ALWAYS
002000          BP0CON=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
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                                .SBTTL          INDEXED BRANCH INSTRUCTIONS
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                                .SBTTL          MOVE INSTRUCTIONS
                        ;
000000                  MOVE=0          ;MOVE OPCODE
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
```



```
                                .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
000026                  OBA1=6                          ;OUTPUT BA LOW BYTE
000027                  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                  OPCVCO=12                       ;RCVR CONTROL
000013                  OMODEM=13                       ;MODEM CONTROL
000014                  SYNC=14                         ;SYN REGISTER
000017                  OLUMAN=17                       ;LINE UNIT MAINT.
```

```
                                        .SBTTL PROTOCOL DEPENDANT MACROS
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
177777                                  MICPC=177777    ;INIT MICRO PC
```



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

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



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

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

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



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

```
                                        .SBTTL  INIT--INITIALIZATION ROUTINE
                                        ;ZEROS MAIN MEMORY
                                        ;LOOPS WAITING FOR RECEIVE DATA(BOOT?)
                                        ;OR FOR RQI TO BE SET
                                        ;WILL ACCEPT ONLY BASE FORMAT, ALL OTHERS WILL RETURN A PROCEDURE ERROR
                                        ;
                                        ;AT INITIALIZATION --- THE HARDWARE CLEARS THE BR AND MAR
                016322                  .=16322
016322  016322                  INIT:   SP      BR,SELB,SP0             ;CLEAR   SP0
(1)             000000                  MICPC=MICPC+1
(1)     016322  063220                  <MOVE!SPX!BR!SELB!SP0>
016324  016324                          SP      BR,SELB,SP3             ;PAGE ONE TRANSFER ADDRESS
(1)             000001                  MICPC=MICPC+1
(1)     016324  063223                  <MOVE!SPX!BR!SELB!SP3>
016326                                  SP      BR,SELB,SP17            ;CLEAR SP17
(1)             000002                  MICPC=MICPC+1
(1)     016326  063237                  <MOVE!SPX!BR!SELB!SP17>
016330                                  OUT     BR,<SELA!OINCON>        ;ZERO THE IN CONTROL CSR
(1)             000003                  MICPC=MICPC+1
(1)     016330  061200                  <MOVE!WROUTX!BR!<SELA!OINCON>>
016332                                  OUT     BR,<SELA!OOCON>         ;ZERO THE OUT CONTROL CSR
(1)             000004                  MICPC=MICPC+1
(1)     016332  061202                  <MOVE!WROUTX!BR!<SELA!OOCON>>
016334                                  SP      IMM,370,SP10            ;WRITE 5 ONE BITS TO THE HIGH ORDER
(1)             000005                  MICPC=MICPC+1
(1)     016334  003370                  <MOVE!SPX!IMM!370!SP10>
                                                                        ;BITS OF SP10
016336                          5$:     SP      BR,AA,SP10              ;SHIFT SP10 LEFT SETTING CARRY THE
(1)             000006                  MICPC=MICPC+1
(1)     016336  063130                  <MOVE!SPX!BR!AA!SP10>
                                                                        ;FIRST 5 TIMES THRU THE LOOP
016340                                  MEMINC  BR,ADDC!SP3             ;WRITE A ONE TO THE FIRST 5 MEMORY
(1)             000007                  MICPC=MICPC+1
(1)     016340  076423                  <MOVE!WRMEM!INCMAR!BR!<ADDC!SP3>>
                                                                        ;LOCATIONS AND ZERO THE REST
016342                                  SP      BR,INCA,SP0             ;INCREMENT COUNTER
(1)             000010                  MICPC=MICPC+1
(1)     016342  063060                  <MOVE!SPX!BR!INCA!SP0>
016344                                  Z       10$                     ;ALL DONE
(1)             000011                  MICPC=MICPC+1
(1)     016344  101413                  <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
016345                                  ALWAYS  5$                      ;KEEP GOING
(1)             000012                  MICPC=MICPC+1
(1)     016346  100400                  <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
016350                          10$:    SPBR    IMM,1,SP1               ;WRITE A 1 TO THE BR AND SP1
(1)             000013                  MICPC=MICPC+1
(1)     016350  003401                  <MOVE!SPBRX!IMM!1!SP1>
016352                                  SP      BR,SELB,SP11            ;WRITE A 1 TO SP11
(1)             000014                  MICPC=MICPC+1
(1)     016352  063231                  <MOVE!SPX!BR!SELB!SP11>
016354                                  SP      BR,SELB,SP12            ;WRITE A 1 TO SP12
(1)             000015                  MICPC=MICPC+1
(1)     016354  063232                  <MOVE!SPX!BR!SELB!SP12>
016356                                  LDMA    IMM,TYPTAB              ;POINT MAR TO TYPE TABLE
(1)             000016                  MICPC=MICPC+1
(1)     016356  012162                  <MOVE!LDMAR!IMM!<TYPTAB&377>>
```



```
                                        BRWRTE  IMM,226                 ;WRITE SYNC TO MEMORY
(1)             000017                  MICPC=MICPC+1
(1)     016360  000626                  <MOVE!WRTEBR!IMM!<226>>
016362                                  OUTPUT  BR,SELB!SYNC    ;LOAD THE SYNC REGISTER
(1)             000020                  MICPC=MICPC+1
(1)     016362  062234                  <MOVE!WROUT!BR!<SELB!SYNC>>
016364                                  MEMINC  IMM,3                   ;REP
(1)             000021                  MICPC=MICPC+1
(1)     016364  016403                  <MOVE!WRMEM!INCMAR!IMM!<3>>
016366                                  MEM     IMM,2                   ;MAX
(1)             000022                  MICPC=MICPC+1
(1)     016366  002402                  <MOVE!WRMEM!IMM!<2>>
016370                                  SP      MEMX!INCMAR,SELB,SP15           ;SET STARTING COUNT
(1)             000023                  MICPC=MICPC+1
(1)     016370  057235                  <MOVE!SPX!MEMX!INCMAR!SELB!SP15>
016372                                  MEMINC  IMM,6                   ;START
(1)             000024                  MICPC=MICPC+1
(1)     016372  016406                  <MOVE!WRMEM!INCMAR!IMM!<6>>
016374                                  MEMINC  IMM,7                   ;STACK
(1)             000025                  MICPC=MICPC+1
(1)     016374  016407                  <MOVE!WRMEM!INCMAR!IMM!<7>>
016376                                  MEMINC  IMM,1                   ;ACK
(1)             000026                  MICPC=MICPC+1
(1)     016376  016401                  <MOVE!WRMEM!INCMAR!IMM!<1>>
016400                                  LDMA    IMM,TABST               ;POINT TO TABLE UPDATE STATE
(1)             000027                  MICPC=MICPC+1
(1)     016400  010210                  <MOVE!LDMAR!IMM!<TABST&377>>
016402                                  PSTAT1  I3                      ;INITIALIZE IT
(1)     016402                          MEMINC  IMM,<<I3-INIT&777/2>>
(2)             000030                  MICPC=MICPC+1
(2)     016402  016460                  <MOVE!WRMEM!INCMAR!IMM!<<I3-INIT&777/2>>>
016404                                  PSTATI  NIDLE2                  ;INITIALIZE PORT STATUS
(1)     016404                          MEMINC  IMM,<<NIDLE2-INIT&777/2>>
(2)             000031                  MICPC=MICPC+1
(2)     016404  016533                  <MOVE!WRMEM!INCMAR!IMM!<<NIDLE2-INIT&777/2>>>
016406                                  LDMA    IMM,STC                 ;LOAD ADDRESS OF LAST TMT CHAIN
(1)             000032                  MICPC=MICPC+1
(1)     016406  010057                  <MOVE!LDMAR!IMM!<STC&377>>
016410                                  MEMINC  IMM,TML1                ;STORE ADDRESS OF FIRST TMT LINK
(1)             000033                  MICPC=MICPC+1
(1)     016410  016471                  <MOVE!WRMEM!INCMAR!IMM!<TML1>>
016412                                  MEM     IMM,TML1
(1)             000034                  MICPC=MICPC+1
(1)     016412  002471                  <MOVE!WRMEM!IMM!<TML1>>
016414                                  SP      MEMX,SELB,SP16          ;INITIALIZE LAST XMIT POINTER
(1)             000035                  MICPC=MICPC+1
(1)     016414  043236                  <MOVE!SPX!MEMX!SELB!SP16>
016416                                  LDMA    IMM,SRC                 ;LOAD ADDRESS OF LAST RECV CHAIN
(1)             000036                  MICPC=MICPC+1
(1)     016416  010022                  <MOVE!LDMAR!IMM!<SRC&377>>
016420                                  MEMINC  IMM,RCL1                ;SET UP ADDRESS OF FIRST RECV LINK
(1)             000037                  MICPC=MICPC+1
(1)     016420  016424                  <MOVE!WRMEM!INCMAR!IMM!<RCL1>>
016422                                  MEM     IMM,RCL1
(1)             000040                  MICPC=MICPC+1
(1)     016422  002424                  <MOVE!WRMEM!IMM!<RCL1>>
```

```
   521  016424                          SP      MEMX,SELB,SP14
   (1)          000041                 MICPC=MICPC+1
   (1)  016424  043234                 <MOVE!SPX!MEMX!SELB!SP14>
   522  016426                          LDMA    IMM,NXTINT              ;ADDRESS OF NEXT INTERRUPT POINTER TO MAR
   (1)          000042                 MICPC=MICPC+1
   (1)  016426  010240                 <MOVE!LDMAR!IMM!<NXTINT&377>>
   523  016430                          MEMINC  IMM,INTSTK                      ;INITIALIZE NEXT INTERRUPT POINTER
   (1)          000043                 MICPC=MICPC+1
   (1)  016430  016642                 <MOVE!WRMEM!INCMAR!IMM!<INTSTK>>
   524  016432                          MEM     IMM,INTSTK                      ;INITIALIZE INSERTION POINTER
   (1)          000044                 MICPC=MICPC+1
   (1)  016432  002642                 <MOVE!WRMEM!IMM!<INTSTK>>
   525  016434                          BRWRTE  IMM,200                 ;WRITE THE RUN BIT TO THE BR
   (1)          000045                 MICPC=MICPC+1
   (1)  016434  000600                 <MOVE!WRTEBR!IMM!<200>>
   526  016436                          OUT     BR,<SELB!OMAIN>         ;WRITE  THE RUN BIT TO MAINT CSR
   (1)          000046                 MICPC=MICPC+1
   (1)  016436  061221                 <MOVE!WROUTX!BR!<SELB!OMAIN>>
   527                                                                  ;FALL INTO IDLE LOOP
   529  016440                          ALWAYS  TEOM2
   (1)          000047                 MICPC=MICPC+1
   (1)  016440  110740                 <JUMP!ALCOND!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
   530                                  ;
   531  016442                  REXIT:  SP      BR,SELB,SP3
   (1)          000050                 MICPC=MICPC+1
   (1)  016442  063223                 <MOVE!SPX!BR!SELB!SP3>
```



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   534                                  .SBTTL  IDLE--PROGRAM IDLE LOOP
   535                                  ;PROGRAM IDLE LOOP
   536                                  ;DISPATCHES TO APPROPRIATE SERVICE ROUTINES
   537                                  ;USES STATE POINTERS FOR TMT,RCV,C&R ACTIVITY
   538                                  ;
   539  016444                  IDLE:   BRWRTE  BR,<SELA!SP10>          ;READ TRANSMIT STATUS WORD FROM SP10 TO BR
   (1)          000051                 MICPC=MICPC+1
   (1)  016444  060610                 <MOVE!WRTEBR!BR!<SELA!SP10>>
   540  016446                          BR1     TMTDA                   ;IF DATA TO SEND-- BRANCH
   (1)          000052                 MICPC=MICPC+1
   (1)  016446  112400                 <JUMP!BR1CON!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
   541  016450                          BR0     TMTDA                   ;IF DATA TO SEND-- BRANCH
   (1)          000053                 MICPC=MICPC+1
   (1)  016450  112000                 <JUMP!BR0CON!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
   547  016452                  I1:     BRWRTE  IBUS,RCVCON             ;READ LINE UNIT RECEIVE CONTROL WORD
   (1)          000054                 MICPC=MICPC+1
   (1)  016452  020640                 <MOVE!WRTEBR!IBUS!<RCVCON>>
   548  016454                          .BR4    BR,SELA,SP3!PAGE1       ;BRANCH BASED UPON RECV STATE
   (1)          000055                 MICPC=MICPC+1
   (1)  016454  167203                 <JUMP! BR4CON!BR!SELA!SP3!PAGE1>
   549  016456                  I2:     LDMA    IMM,TABST               ;POINT TO TABLE UPDATE STATE
   (1)          000056                 MICPC=MICPC+1
   (1)  016456  010210                 <MOVE!LDMAR!IMM!<TABST&377>>
   550  016460                          .ALWAY  MEMX,SELB,0
   (1)          000057                 MICPC=MICPC+1
   (1)  016460  140620                 <JUMP!ALCOND!MEMX!SELB!0>
   551  016462                  I3:
   553  016462                          STATE   TMTA+2                  ;GET IDLE TRANSMIT STATE + 1
   (1)          000060                 MICPC=MICPC+1
   (1)  016462  000404                 <MOVE!WRTEBR!IMM!<TMTA+2-INIT&777/2>>
   554  016464                          NOP     BR,SUB,SP2              ;SUBTRACT FROM CURRENT STATE
   (1)          000061                 MICPC=MICPC+1
   (1)  016464  060342                 <BR!SUB!SP2>
   555  016466                          C       TMTDA                   ;NON-IDLE STATE
   (1)          000062                 MICPC=MICPC+1
   (1)  016466  111000                 <JUMP!CCOND!<TMTDA-INIT&3000*4>!<TMTDA-INIT&777/2>>
   557  016470                  IDLE0:  SPBR    IBUS,UBBR,SP0           ;TIMER EXPIRES?
   (1)          000063                 MICPC=MICPC+1
   (1)  016470  123620                 <MOVE!SPBRX!IBUS!UBBR!SP0>
   558  016472                          BR4     TIMSRV
   (1)          000064                 MICPC=MICPC+1
   (1)  016472  113255                 <JUMP!BR4CON!<TIMSRV-INIT&3000*4>!<TIMSRV-INIT&777/2>>
   559  016474                          SP      IBUS,RCVCON,SP0         ;READ THE RECEIVE CONTROL REGISTER
   (1)          000065                 MICPC=MICPC+1
   (1)  016474  023240                 <MOVE!SPX!IBUS!RCVCON!SP0>
   560  016476                          BRWRTE  BR,AA!SP0               ;SHIFT IT LEFT
   (1)          000066                 MICPC=MICPC+1
   (1)  016476  060520                 <MOVE!WRTEBR!BR!<AA!SP0>>
   561  016500                          BR7     I1                      ;RECEIVE ACTIVE, DON'T DO PORT STATUS
   (1)          000067                 MICPC=MICPC+1
   (1)  016500  103454                 <JUMP!BR7CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
   562  016502                          LDMA    IMM,PRTST               ;ADDRESS PORT STATE
   (1)          000070                 MICPC=MICPC+1
   (1)  016502  010211                 <MOVE!LDMAR!IMM!<PRTST&377>>
   563  016504                          .ALWAY  MEMX,SELB,0             ;INDEX
   (1)          000071                 MICPC=MICPC+1
```

```
(1)  016504  140620                    <JUMP!ALCOND!MEMX!SELB!0>
```



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565                                    ,SBTTL  BASSRV---- BASE SERVICE ROUTINE
566  016506                            BASSRV: PSTATE  NIDLE2
(1)  016506                                    MEM     IMM,<<NIDLE2-INIT&777/2>>
(2)          000072                            MICPC=MICPC+1
(2)  016506  002533                            <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>
567  016510                                    LDMA    IMM,BASE                        ;CLEAR TO MAR SO IT POINTS TO BASE POINT
(1)          000073                            MICPC=MICPC+1
(1)  016510  010017                            <MOVE!LDMAR!IMM!<BASE&377>>
568  016512                                    MEMINC  IBUS,PORT1              ;READ CSR4
(1)          000074                            MICPC=MICPC+1
(1)  016512  136500                            <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
569  016514                                    MEMINC  IBUS,PORT2              ;READ CSR5
(1)          000075                            MICPC=MICPC+1
(1)  016514  136520                            <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
570  016516                                    MEM     IBUS,PORT4
(1)          000076                            MICPC=MICPC+1
(1)  016516  122560                            <MOVE!WRMEM!IBUS!<PORT4>>
571  016520                                    SP      IBUS,INCON,SP0          ;READ INPUT CONTROL CSR
(1)          000077                            MICPC=MICPC+1
(1)  016520  123000                            <MOVE!SPX!IBUS!INCON!SP0>
572  016522                                    BRWRTE  IMM,100                 ;CLEAR THE BR
(1)          000100                            MICPC=MICPC+1
(1)  016522  000500                            <MOVE!WRTEBR!IMM!<100>>
573  016524                                    OUT     BR,<AANDB!OINCON>       ;CLEAR THE INCONTROL CSR
(1)          000101                            MICPC=MICPC+1
(1)  016524  061260                            <MOVE!WROUTX!BR!<AANDB!OINCON>>
574  016526                                    OUTPUT  IMM,<120!OMODEM>        ;MASK FOR HDX AND DTR
(1)          000102                            MICPC=MICPC+1
(1)  016526  002133                            <MOVE!WROUT!IMM!<120!OMODEM>>
575  016530                                    BRWRTE  MEMX,SELB               ;READ SEL6
(1)          000103                            MICPC=MICPC+1
(1)  016530  040620                            <MOVE!WRTEBR!MEMX!<SELB>>
576  016532                                    BR4     RESUME                  ;IF SET RESUME
(1)          000104                            MICPC=MICPC+1
(1)  016532  103113                            <JUMP!BR4CON!<RESUME-INIT&3000*4>!<RESUME-INIT&777/2>>
577  016534                                    LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
(1)          000105                            MICPC=MICPC+1
(1)  016534  010151                            <MOVE!LDMAR!IMM!<T&377>>
578  016536                                    MEMINC  IMM,6                   ;WRITE START TYPE TO MEMORY
(1)          000106                            MICPC=MICPC+1
(1)  016536  016406                            <MOVE!WRMEM!INCMAR!IMM!<6>>
579  016540                                    MEM     IMM,300                 ;WRITE SELECT AND FINAL TO MEMORY
(1)          000107                            MICPC=MICPC+1
(1)  016540  002700                            <MOVE!WRMEM!IMM!<300>>
580  016542                                    SP      BR,DECA,SP1     ;TURN OFF INIT MODE
(1)          000110                            MICPC=MICPC+1
(1)  016542  063161                            <MOVE!SPX!BR!DECA!SP1>
581  016544                            BS1:    BRWRTE  IMM,241         ;SET OK TO SEND,STARTMODE AND UNNUM PENDING
(1)          000111                            MICPC=MICPC+1
(1)  016544  000641                            <MOVE!WRTEBR!IMM!<241>>
582  016546                                    ALWAYS  SA3
(1)          000112                            MICPC=MICPC+1
(1)  016546  110737                            <JUMP!ALCOND!<SA3-INIT&3000*4>!<SA3-INIT&777/2>>
583  016550                            RESUME: SP      IMM,SP4,4               ;SET UP SP4 FOR COUNTING NPRS
(1)          000113                            MICPC=MICPC+1
(1)  016550  003204                            <MOVE!SPX!IMM!SP4!4>
```

```
  584  016552                          SP      BR,INCA,SP10            ;SET UNNUMB MESSAGE PENDING TO
  (1)          000114                  MICPC=MICPC+1
  (1)  016552  063070                  <MOVE!SPX!BR!INCA!SP10>
  585                                                                  ;TRICK TRANSMITTER CODE
  586  016554                          LDMA    IMM,BASE                ;ADDRESS BASE TABLE ADDRESS
  (1)          000115                  MICPC=MICPC+1
  (1)  016554  013017                  <MOVE!LDMAR!IMM!<BASE&377>>
  587  016556                          STATE   FUDGE                   ;SET TMTR STATE TO ENTER TABLE UPDATE
  (1)          000116                  MICPC=MICPC+1
  (1)  016556  000743                  <MOVE!WRTEBR!IMM!<FUDGE-INIT&777/2>>
  588  016560                          ALWAYS  TB0                     ;GO SET UP MXT BITS AND ADRESS OF BASE FOR NPRS
  (1)          000117                  MICPC=MICPC+1
  (1)  016560  110455                  <JUMP!ALCOND!<TB0-INIT&3000*4>!<TB0-INIT&777/2>>
  589  016562                  BS2:    LDMA    IMM,IMG10
  (1)          000120                  MICPC=MICPC+1
  (1)  016562  010154                  <MOVE!LDMAR!IMM!<IMG10&377>>
  590  016564                          SP      MEMX!INCMAR,AORB,SP10           ;RESTORE BIT 1 OF SP10
  (1)          000121                  MICPC=MICPC+1
  (1)  016564  057310                  <MOVE!SPX!MEMX!INCMAR!AORB!SP10>
  591  016566                          SP      MEMX!INCMAR,SELB,SP11           ;RESTORE SP11
  (1)          000122                  MICPC=MICPC+1
  (1)  016566  057231                  <MOVE!SPX!MEMX!INCMAR!SELB!SP11>
  592  016570                          SP      MEMX!INCMAR,SELB,SP12           ;RESTORE SP12
  (1)          000123                  MICPC=MICPC+1
  (1)  016570  057232                  <MOVE!SPX!MEMX!INCMAR!SELB!SP12>
  593  016572                          SP      MEMX!INCMAR,SELB,SP14           ;RESTORE SP14
  (1)          000124                  MICPC=MICPC+1
  (1)  016572  057234                  <MOVE!SPX!MEMX!INCMAR!SELB!SP14>
  594  016574                          SP      MEMX!INCMAR,SELB,SP16           ;RESTORE SP16
  (1)          000125                  MICPC=MICPC+1
  (1)  016574  057236                  <MOVE!SPX!MEMX!INCMAR!SELB!SP16>
  595  016576                          SP      MEMX,SELB,SP17          ;RESTORE        SP17
  (1)          000126                  MICPC=MICPC+1
  (1)  016576  043237                  <MOVE!SPX!MEMX!SELB!SP17>
  596  016600                          SP      BR,DECA,SP10            ;TURN OFF UNNUM MESSAGE PENDING AND
  (1)          000127                  MICPC=MICPC+1
  (1)  016600  063170                  <MOVE!SPX!BR!DECA!SP10>
  597                                                                  ;ZERO THE BRG
  598  016602                          SP      BR,DECA,SP1             ;CLEAR INIT MODE
  (1)          000130                  MICPC=MICPC+1
  (1)  016602  063161                  <MOVE!SPX!BR!DECA!SP1>
  599  016604                          BRWRTE  IMM,200                 ;SET OK TO SEND
  (1)          000131                  MICPC=MICPC+1
  (1)  016604  000200                  <MOVE!WRTEBR!IMM!<200>>
  600  016606                          ALWAYS  SA3
  (1)          000132                  MICPC=MICPC+1
  (1)  016606  110737                  <JUMP!ALCOND!<SA3-INIT&3000*4>!<SA3-INIT&777/2>>
```



```
  602
  603  016610                          .SBTTL  NIDLE2---NO CSR ACTIVITY STATE
                          NIDLE2: BRWRTE  BR,SELA!SP1             ;READ PORT STATUS WORD
  (1)          000133                  MICPC=MICPC+1
  (1)  016610  060001                  <MOVE!WRTEBR!BR!<SELA!SP1>>
  605  016612                          BR4     NIDLE5                  ;INTERRUPT PENDING?---BRANCH
  (1)          000134                  MICPC=MICPC+1
  (1)  016612  103141                  <JUMP!BR4CON!<NIDLE5-INIT&3000*4>!<NIDLE5-INIT&777/2>>
  610  016614                          SPBR    IBUS,INCON,SP0          ;READ INPUT CONTROL CSR
  (1)          000135                  MICPC=MICPC+1
  (1)  016614  123400                  <MOVE!SPBRX!IBUS!INCON!SP0>
  611  016616                          BRSHFT                          ;SHIFT IT RIGHT
  (1)          000136                  MICPC=MICPC+1
  (1)  016616  001620                  <MOVE!SHFTBR!WRTEBR!SELB>
  612  016620                          BR4     INWAT1                  ;IF RQI SET -- BRANCH
  (1)          000137                  MICPC=MICPC+1
  (1)  016620  103146                  <JUMP!BR4CON!<INWAT1-INIT&3000*4>!<INWAT1-INIT&777/2>>
  613                                                                  ;TO RE-READ THE IN CNTRL REGISTER TO AVOID
  614                                                                  ;A RACE IN MICRO-P READ/UNIBUS WRITE
  616  016622                          ALWAYS  IDLE
  (1)          000140                  MICPC=MICPC+1
  (1)  016622  100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
  618  016624                  NIDLE6:
  639  016624                  NIDLE5: PSTATE  OUTINT                  ;SET STATE FOR INTERRUPT PROCESSING
  (1)  016624                          MEM     IMM,<<OUTINT-INIT&777/2>>
  (2)          000141                  MICPC=MICPC+1
  (2)  016624  002614                  <MOVE!WRMEM!IMM!<<OUTINT-INIT&777/2>>>
  640  016626                          ALWAYS  IDLE
  (1)          000142                  MICPC=MICPC+1
  (1)  016626  100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```

```
                        .SBTTL INWAIT---WAIT FOR RQI TO CLEAR
016630          INWAIT: SPBR    IBUS,INCON,SP0          ;READ INPUT CONTROL CSR
(1)     000143          MICPC=MICPC+1
(1)  016630  123400     <MOVE!SPBRX!IBUS!INCON!SP0>
016632                  BRWRTE  BR,<AA!SP0>             ;SHIFT IT LEFT
(1)     000144          MICPC=MICPC+1
(1)  016632  060520     <MOVE!WRTEBR!BR!<AA!SP0>>
016634                  BR7     NIDLE3                  ;INTERRUPT ENABLE HAS BEEN SET
(1)     000145          MICPC=MICPC+1
(1)  016634  103550     <JUMP!BR7CON!<NIDLE3-INIT&3000*4>!<NIDLE3-INIT&777/2>>

016636          INWAT1: SPBR    IBUS,INCON,SP0          ;READ THE INPUT CONTROL CSR
(1)     000146          MICPC=MICPC+1
(1)  016636  123400     <MOVE!SPBRX!IBUS!INCON!SP0>
016640                  BR7     INWAT2                  ;READY IN STILL SET
(1)     000147          MICPC=MICPC+1
(1)  016640  103557     <JUMP!BR7CON!<INWAT2-INIT&3000*4>!<INWAT2-INIT&777/2>>
016642          NIDLE3: PSTATE  INWAT1                  ;UPDATE STATE TO INPUT
(1)  016642             MEM     IMM,<<INWAT1-INIT&777/2>>
(2)     000150          MICPC=MICPC+1
(2)  016642  002546     <MOVE!WRMEM!IMM!<<INWAT1-INIT&777/2>>>
016644                  BRWRTE  BR,AA!SP0               ;SHIFT CSR LEFT
(1)     000151          MICPC=MICPC+1
(1)  016644  060520     <MOVE!WRTEBR!BR!<AA!SP0>>
016646                  BR7     ININT
(1)     000152          MICPC=MICPC+1
(1)  016646  117460     <JUMP!BR7CON!<ININT-INIT&3000*4>!<ININT-INIT&777/2>>
016650                  PSTATE  INWAIT                  ;UPDATE STATE POINTER TO NO INTERRUPT GENERATED
(1)  016650             MEM     IMM,<<INWAIT-INIT&777/2>>
(2)     000153          MICPC=MICPC+1
(2)  016650  002543     <MOVE!WRMEM!IMM!<<INWAIT-INIT&777/2>>>
016652          NIDLE4: BRWRTE  IMM,200
(1)     000154          MICPC=MICPC+1
(1)  016652  060600     <MOVE!WRTEBR!IMM!<200>>
016654                  OUT     BR,AORB!OINCON          ;SET THE RDYI
(1)     000155          MICPC=MICPC+1
(1)  016654  061300     <MOVE!WROUTX!BR!<AORB!OINCON>>
016656                  ALWAYS  IDLE
(1)     000156          MICPC=MICPC+1
(1)  016656  100451     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>

016660          INWAT2: BRSHFT                          ;SHIFT THE BR RIGHT
(1)     000157          MICPC=MICPC+1
(1)  016660  001620     <MOVE!SHFTBR!WRTEBR!SELB>
016662                  BR4     IDLE
(1)     000160          MICPC=MICPC+1
(1)  016662  103051     <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
016664                  PSTATE  INSRV                   ;SET NEXT STATE TO INPUT SERVICE
(1)  016664             MEM     IMM,<<INSRV-INIT&777/2>>
(2)     000161          MICPC=MICPC+1
(2)  016664  002563     <MOVE!WRMEM!IMM!<<INSRV-INIT&777/2>>>
016666                  ALWAYS  IDLE
(1)     000162          MICPC=MICPC+1
(1)  016666  100451     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
016670          INSRV:  SPBR    IBUS,INCON,SP0          ;READ THE INPUT CONTROL CSR
(1)     000163          MICPC=MICPC+1
```



```
(1)  016670  123400     <MOVE!SPBRX!IBUS!INCON!SP0>
016672                  BR1     30$                     ;--SENSE OR BASE
(1)     000164          MICPC=MICPC+1
(1)  016672  102000     <JUMP!BR1CON!<30$-INIT&3000*4>!<30$-INIT&777/2>>
016674                  BR0     10$                     ;CNTL I
(1)     000165          MICPC=MICPC+1
(1)  016674  132172     <JUMP!BR0CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
016676                  BRSHFT                          ;MUST BE BA/CC-SHIFT FOR IN OR OUT
(1)     000166          MICPC=MICPC+1
(1)  016676  001620     <MOVE!SHFTBR!WRTEBR!SELB>
016700                  BR1     15$
(1)     000167          MICPC=MICPC+1
(1)  016700  102574     <JUMP!BR1CON!<15$-INIT&3000*4>!<15$-INIT&777/2>>
016702          10$:    PSTATE  TBASRV                  ;TRANSMITTER
(1)  016702             MEM     IMM,<<TBASRV-INIT&777/2>>
(2)     000170          MICPC=MICPC+1
(2)  016702  002700     <MOVE!WRMEM!IMM!<<TBASRV-INIT&777/2>>>
016704                  ALWAYS  20$
(1)     000171          MICPC=MICPC+1
(1)  016704  100575     <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
016706          15$:    PSTATE  CTLSRV
(1)  016706             MEM     IMM,<<CTLSRV-INIT&777/2>>
(2)     000172          MICPC=MICPC+1
(2)  016706  002657     <MOVE!WRMEM!IMM!<<CTLSRV-INIT&777/2>>>
016710                  ALWAYS  20$
(1)     000173          MICPC=MICPC+1
(1)  016710  100575     <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
016712          15$:    PSTATE  RBASRV
(1)  016712             MEM     IMM,<<RBASRV-INIT&777/2>>
(2)     000174          MICPC=MICPC+1
(2)  016712  002721     <MOVE!WRMEM!IMM!<<RBASRV-INIT&777/2>>>
016714          20$:    BRWRTE  BR,SELA!SP1             ;INIT MODE
(1)     000175          MICPC=MICPC+1
(1)  016714  062601     <MOVE!WRTEBR!BR!<SELA!SP1>>
016716                  BR0     PROCER                  ;IF INIT MODE--ERROR
(1)     000176          MICPC=MICPC+1
(1)  016716  102201     <JUMP!BR0CON!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
016720                  ALWAYS  IDLE
(1)     000177          MICPC=MICPC+1
(1)  016720  100451     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
016722          30$:    BR0     INSRV1                  ;IF BASE---PROCESS
(1)     000200          MICPC=MICPC+1
(1)  016722  102211     <JUMP!BR0CON!<INSRV1-INIT&3000*4>!<INSRV1-INIT&777/2>>
016724          PPOCER: PSTATE  NIDLE2                  ;RESET PORT STATUS
(1)  016724             MEM     IMM,<<NIDLE2-INIT&777/2>>
(2)     000201          MICPC=MICPC+1
(2)  016724  002533     <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>
016726                  BRWRTE  IMM,100                 ;CLEAR INPUT CONTROL CSR
(1)     000202          MICPC=MICPC+1
(1)  016726  000500     <MOVE!WRTEBR!IMM!<100>>
016730                  OUT     BR,AANDB!OINCON         ;)
(1)     000203          MICPC=MICPC+1
(1)  016730  061260     <MOVE!WROUTX!BR!<AANDB!OINCON>>
016732                  LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
(1)     000204          MICPC=MICPC+1
(1)  016732  010177     <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
```

```
685  016734                          MEMINC  IMM,2
(1)       000205                     MICPC=MICPC+1
(1)  016734 016402                   <MOVE!WRMEM!INCMAR!IMM!<2>>
686  016736                          MEM     IMM,0
(1)       000206                     MICPC=MICPC+1
(1)  016736 002400                   <MOVE!WRMEM!IMM!<0>>
687  016740                          OUTPUT  MEMX,SELB!OMODEM        ;CLEAR DATA TERMINAL READY
(1)       000207                     MICPC=MICPC+1
(1)  016740 042233                   <MOVE!WROUT!MEMX!<SELB!OMODEM>>
688  016742                          ALWAYS  RCEXX                   ;POST THE ERROR - FATAL
(1)       000210                     MICPC=MICPC+1
(1)  016742 114524                   <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
689  016744                     INSRV1: BRWRTE  BR,SELA!SP1             ;INIT MODE?
(1)       000211                     MICPC=MICPC+1
(1)  016744 062601                   <MOVE!WRTEBR!BR!<SELA!SP1>>
690  016746                          BR0     BASSRV
(1)       000212                     MICPC=MICPC+1
(1)  016746 132072                   <JUMP!BR0CON!<BASSRV-INIT&3000*4>!<BASSRV-INIT&777/2>>
691  016750                          ALWAYS  PROCER                  ;NO - PROCEDURE ERROR
(1)       000213                     MICPC=MICPC+1
(1)  016750 100601                   <JUMP!ALCOND!<PROCER-INIT&3000*4>!<PROCER-INIT&777/2>>
```



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693                               .SBTTL  OUTINT---SET UP OUTPUT INTERRUPT (RDYO)
694  016752                     OUTINT:
696  016752                          PSTATE  PINT2
(1)  016752                          MEM     IMM,<<PINT2-INIT&777/2>>
(2)       000214                     MICPC=MICPC+1
(2)  016752 002631                   <MOVE!WRMEM!IMM!<<PINT2-INIT&777/2>>>
701                                                 ;COMPLETION
702  016754                          LDMA    IMM,NXTINT              ;ADDRESS OF NEXT INTERRUPT POINTER
(1)       000215                     MICPC=MICPC+1
(1)  016754 010240                   <MOVE!LDMAR!IMM!<NXTINT&377>>
703  016756                          LDMA    MEMX,SELB               ;NEXT INTERRUPT
(1)       000216                     MICPC=MICPC+1
(1)  016756 050220                   <MOVE!LDMAR!MEMX!<SELB>>
704  016760                          SP      IBUS,OCON,SP0           ;READ THE OUTPUT CONTROL CSR
(1)       000217                     MICPC=MICPC+1
(1)  016760 123040                   <MOVE!SPX!IBUS!OCON!SP0>
705  016762                          OUT     <MEMX!INCMAR>,<AORB!OOCON>      ;WRITE THE OUT CONTROL CSR
(1)       000220                     MICPC=MICPC+1
(1)  016762 055302                   <MOVE!WROUTX!MEMX!INCMAR!<AORB!OOCON>>
706  016764                          LDMA    MEMX,SELB               ;ADDRESS LINK
(1)       000221                     MICPC=MICPC+1
(1)  016764 050220                   <MOVE!LDMAR!MEMX!<SELB>>
707  016766                          BRWRTE  <BR!INCMAR>,<AA!SP0>            ;KICK PAST LINK STATUS BYTE
(1)       000222                     MICPC=MICPC+1
(1)  016766 074520                   <MOVE!WRTEBR!BR!INCMAR!<AA!SP0>>
708                                                 ;SHIFT CSR0 IMAGE LEFT
709                                                 ;***DO NOT CHANGE BR UNTIL BR7***
710  016770                          OUT     <MEMX!INCMAR>,<SELB!OPORT1>     ;WRITE LOW BYTE OF BA TO CSR
(1)       000223                     MICPC=MICPC+1
(1)  016770 055224                   <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT1>>
711  016772                          OUT     <MEMX!INCMAR>,<SELB!OPORT2>     ;WRITE HIGH BYTE OF BA TO CSR
(1)       000224                     MICPC=MICPC+1
(1)  016772 055225                   <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT2>>
712  016774                          OUT     <MEMX!INCMAR>,<SELB!OPORT4>     ;WRITE HIGH BYTE OF COUNT TO CSR
(1)       000225                     MICPC=MICPC+1
(1)  016774 055227                   <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT4>>
713  016776                          OUT     <MEMX!INCMAR>,<SELB!OPORT3>     ;WRITE THE LOW BYTE OF COUNT
(1)       000226                     MICPC=MICPC+1
(1)  016776 055226                   <MOVE!WROUTX!MEMX!INCMAR!<SELB!OPORT3>>
714                                                 ;***HERE IS BR7***
715  017000                          BP7     PE1                     ;INTERRUPT ENABLE IS SET
(1)       000227                     MICPC=MICPC+1
(1)  017000 103757                   <JUMP!BR7CON!<PE1-INIT&3000*4>!<PE1-INIT&777/2>>
716                                                 ;GENERATE AN INTERRUPT
718  017002                          ALWAYS  IDLE
(1)       000230                     MICPC=MICPC+1
(1)  017002 100451                   <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
719  017004                     PINT2:  PSTATE  OUTWAIT
(1)  017004                          MEM     IMM,<<OUTWAIT-INIT&777/2>>
(2)       000231                     MICPC=MICPC+1
(2)  017004 002652                   <MOVE!WRMEM!IMM!<<OUTWAIT-INIT&777/2>>>
724  017006                          LDMA    IMM,NXTINT              ;ADDRESS NEXT INTERRUPT QUEUE
(1)       000232                     MICPC=MICPC+1
(1)  017006 010240                   <MOVE!LDMAR!IMM!<NXTINT&377>>
725  017010                          SP      MEMX,SELB,SP0           ;COPY ADDRESS FOR NEXT INT TO SP0
(1)       000233                     MICPC=MICPC+1
```

```
(1)  017010  043220                  <MOVE!SPX!MEMX!SELB!SP0>
726  017012                          MEM     IMM,INTSTK              ;ASSUME WRAP AROUND CASE
(1)          000234                  MICPC=MICPC+1
(1)  017012  002642                  <MOVE!WRMEM!IMM!<INTSTK>>
727  017014                          BRWRTE  IMM,<<MMEND-2>>         ;ADDRESS OF LAST INT IN STACK
(1)          000235                  MICPC=MICPC+1
(1)  017014  000776                  <MOVE!WRTEBR!IMM!<<MMEND-2>>>
728  017016                          CMP     BR,SP0                  ;SHOULD WE WRAP
(1)          000236                  MICPC=MICPC+1
(1)  017016  060360                  <SUBTC!BR!SP0>
729  017020                          Z       5$                      ;YES--BRANCH
(1)          000237                  MICPC=MICPC+1
(1)  017020  101642                  <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
730  017022                          BRWRTE  IMM,2                   ;OFFSET FOR NEXT POINTER
(1)          000240                  MICPC=MICPC+1
(1)  017022  000402                  <MOVE!WRTEBR!IMM!<2>>
731  017024                          MEM     BR,ADD!SP0              ;UPDATE POINTER
(1)          000241                  MICPC=MICPC+1
(1)  017024  062400                  <MOVE!WRMEM!BR!<ADD!SP0>>
732  017026                  5$:     SP      MEMX,SELB,SP0           ;COPY POINTER TO SP0
(1)          000242                  MICPC=MICPC+1
(1)  017026  043220                  <MOVE!SPX!MEMX!SELB!SP0>
733  017030                          LDMA    IMM,NXTSP               ;PICK UP START OF IN QUEUE
(1)          000243                  MICPC=MICPC+1
(1)  017030  010241                  <MOVE!LDMAR!IMM!<NXTSP&377>>
734  017032                          CMP     MEMX,SP0                ;COMPARE TO END
(1)          000244                  MICPC=MICPC+1
(1)  017032  040360                  <SUBTC!MEMX!SP0>
735  017034                          Z       10$                     ;IF EQUAL--CLEAR INT PENDING
(1)          000245                  MICPC=MICPC+1
(1)  017034  101647                  <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
736  017036                          ALWAYS  IDLE
(1)          000246                  MICPC=MICPC+1
(1)  017036  100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
737  017040                  10$:    BRWRTE  IMM,357                 ;MASK TO CLEAR INT PENDING
(1)          000247                  MICPC=MICPC+1
(1)  017040  000757                  <MOVE!WRTEBR!IMM!<357>>
738  017042                  CLRIDL: SP      BR,AANDB,SP1
(1)          000250                  MICPC=MICPC+1
(1)  017042  063261                  <MOVE!SPX!BR!AANDB!SP1>
739  017044                          ALWAYS  IDLE
(1)          000251                  MICPC=MICPC+1
(1)  017044  100451                  <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
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741                                  .SBTTL  OUTWAI--WAIT FOR RDYO TO GO AWAY
742  017046                  OUTWAI: SPBR    IBUS,OCON,SP0           ;READ OUTPUT CONTROL CSR
(1)          000252                  MICPC=MICPC+1
(1)  017046  123440                  <MOVE!SPBRX!IBUS!OCON!SP0>
747  017050                          BR7     IDLE
(1)          000253                  MICPC=MICPC+1
(1)  017050  103451                  <JUMP!BR7COND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
749  017052                          BRWRTE  IMM,100                 ;CLEAR CONTROL BITS
(1)          000254                  MICPC=MICPC+1
(1)  017052  000500                  <MOVE!WRTEBR!IMM!<100>>
750  017054                          OUT     BR,OOCON!AANDB
(1)          000255                  MICPC=MICPC+1
(1)  017054  061262                  <MOVE!WROUTX!BR!<OOCON!AANDB>>
751  017056                          ALWAYS  INS13
(1)          000256                  MICPC=MICPC+1
(1)  017056  100671                  <JUMP!ALCOND!<INS13-INIT&3000*4>!<INS13-INIT&777/2>>
```

```
                                .SBTTL  CTLSRV--CNTL I SERVICE
017060                  CTLSRV: SPBR    IBUS,PORT4,SP0                  ;TO SP0
(1)             000257          MICPC=MICPC+1
(1)     017060  123560          <MOVE!SPBRX!IBUS!PORT4!SP0>
017062                          BRSHFT
(1)             000260          MICPC=MICPC+1
(1)     017062  001620          <MOVE!SHFTBR!WRTEBR!SELB>
017064                          BRI     HDSEL                           ;IF SET IS HALF DUPLEX
(1)             000261          MICPC=MICPC+1
(1)     017064  102754          <JUMP!BRICON!<HDSEL-INIT&3000*4>!<HDSEL-INIT&777/2>>
017066                          OUTPUT  IMM,<100!OMODEM>                ;MASK DTR, TURN OFF HDX
(1)             000262          MICPC=MICPC+1
(1)     017066  002113          <MOVE!WROUTI!IMM!<100!OMODEM>>
017070                  INS11:  BRWRTE  DP,<SELA!SP0>                   ;RESTORE THE CNTL WORD
(1)             000263          MICPC=MICPC+1
(1)     017070  060600          <MOVE!WRTEBR!DP!<SELA!SP0>>
017072                          BR0     CBOOT                           ;IF SET IS BOOT
(1)             000264          MICPC=MICPC+1
(1)     017072  102273          <JUMP!BR0CON!<CBOOT-INIT&3000*4>!<CBOOT-INIT&777/2>>
017074                  INS12:  SP      IBUS,INCON,SP0                  ;READ THE INPUT CONTROL CSR
(1)             000265          MICPC=MICPC+1
(1)     017074  123000          <MOVE!SPX!IBUS!INCON!SP0>
017076                          BRWRTE  IMM,100                 ;ZERO THE BR REGISTER EXCEPT INT ENABLE
(1)             000266          MICPC=MICPC+1
(1)     017076  000500          <MOVE!WRTEBR!IMM!<100>>
017100                          OUT     BR,<AANDB!OINCON>               ;CLEAR IN CONTROL CSR
(1)             000267          MICPC=MICPC+1
(1)     017100  061260          <MOVE!WROUTX!BRI<AANDB!OINCON>>
017102                          LDMA    IMM,PRTST                       ;ADDRESS PORT STATE
(1)             000270          MICPC=MICPC+1
(1)     017102  010211          <MOVE!LDMAR!IMM!<PRTST&377>>
017104                  INS13:  PSTATE  NIDLE2
(1)     017104                  MEM     IMM,<<NIDLE2-INIT&777/2>>
(2)             000271          MICPC=MICPC+1
(2)     017104  002533          <MOVE!WRMEM!IMM!<<NIDLE2-INIT&777/2>>>
017106                          ALWAYS  IDLE
(1)             000272          MICPC=MICPC+1
(1)     017106  100451          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
                                ;
017110                  CBOOT:  BRWRTE  IMM,200                 ;MASK FOR BOOT MODE
(1)             000273          MICPC=MICPC+1
(1)     017110  000600          <MOVE!WRTEBR!IMM!<200>>
017112                          SP      BR,AORB,SP1             ;IN PORT STATUS WORD
(1)             000274          MICPC=MICPC+1
(1)     017112  063301          <MOVE!SPX!BR!AORB!SP1>
017114                          BRWRTE  IMM,204                 ;MASK FOR OK TO SEND AND LINE IDLE
(1)             000275          MICPC=MICPC+1
(1)     017114  000604          <MOVE!WRTEBR!IMM!<204>>
017116                          SP      BR,SELB,SP10            ;IN LINE STATUS
(1)             000276          MICPC=MICPC+1
(1)     017116  063230          <MOVE!SPX!BR!SELB!SP10>
017120                          ALWAYS  INS12
(1)             000277          MICPC=MICPC+1
(1)     017120  100665          <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
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                                .SBTTL  TBASRV--TRANSMITTER BUFFER ADDRESS SERVICE
017122                  TBASRV: LDMA    IMM,ETC                         ;GET POINTER TO END OF TMT CHAIN
(1)             000300          MICPC=MICPC+1
(1)     017122  010070          <MOVE!LDMAR!IMM!<ETC&377>>
017124                          LDMA    MEMX,<SELB!SPX!SP0>             ;FIND THE LINK
(1)             000301          MICPC=MICPC+1
(1)     017124  053220          <MOVE!LDMAR!MEMX!<SELB!SPX!SP0>>
017126                          MEMINC  IMM,1                           ;BUFFER ASSIGNED IN IN LINK FLAGS
(1)             000302          MICPC=MICPC+1
(1)     017126  016401          <MOVE!WRMEM!INCMAR!IMM!<1>>
017130                          BRWRTE  <IMM!INCMAR>,TML8                       ;POINT PAST NUMBER FIELD
(1)             000303          MICPC=MICPC+1
(1)     017130  014543          <MOVE!WRTEBR!IMM!INCMAR!<TML8>>
                                                                        ;SET BR FOR ADDITION TO SP0
017132                          MEMINC  IBUS,PORT1
(1)             000304          MICPC=MICPC+1
(1)     017132  136500          <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
017134                          MEMINC  IBUS,PORT2
(1)             000305          MICPC=MICPC+1
(1)     017134  136520          <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
017136                          MEMINC  IBUS,PORT4
(1)             000306          MICPC=MICPC+1
(1)     017136  136560          <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
017140                          MEMINC  IBUS,PORT3
(1)             000307          MICPC=MICPC+1
(1)     017140  136540          <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
017142                          LDMA    IMM,ETC
(1)             000310          MICPC=MICPC+1
(1)     017142  010070          <MOVE!LDMAR!IMM!<ETC&377>>
017144                          MEM     IMM,TML1                        ;ASSUME QUEUE WRAP AROUND
(1)             000311          MICPC=MICPC+1
(1)     017144  002471          <MOVE!WRMEM!IMM!<TML1>>
017146                          CMP     BR,SP0                          ;END OF CHAIN?
(1)             000312          MICPC=MICPC+1
(1)     017146  000360          <SUBTC!BR!SP0>
017150                          Z       10$                             ;IF YES--BRANCH
(1)             000313          MICPC=MICPC+1
(1)     017150  101716          <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
017152                          BRWRTE  IMM,6                           ;QUEUE ENTRY LENGTH
(1)             000314          MICPC=MICPC+1
(1)     017152  000406          <MOVE!WRTEBR!IMM!<6>>
017154                          MEM     BR,ADD!SP0                      ;UPDATE THE END POINTER IN MEMORY
(1)             000315          MICPC=MICPC+1
(1)     017154  062400          <MOVE!WRMEM!BR!<ADD!SP0>>
017156                  10$:    BRWRTE  IMM,2                   ;NUMBERED MSG PENDING MASK
(1)             000316          MICPC=MICPC+1
(1)     017156  000402          <MOVE!WRTEBR!IMM!<2>>
017160                          SP      BR,AORB,SP10            ;UPDATE LINE STATUS
(1)             000317          MICPC=MICPC+1
(1)     017160  063310          <MOVE!SPX!BR!AORB!SP10>
017162                          ALWAYS  INS12
(1)             000320          MICPC=MICPC+1
(1)     017162  100665          <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
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                                .SBTTL  RBASRV--RECEIVE BUFFER ADDRESS SERVICE
017164                  RBASRV: LDMA    IMM,ERC                 ;ADDRES END OF RECEIVE CHAIN
(1)     000321                  MICPC=MICPC+1
(1)     017164 010023           <MOVE!LDMAR!IMM!<ERC&377>>
017166                          LDMA    MEMX,<SELB!SPX!SP0>     ;GET THE POINTER TO LINK
(1)     000322                  MICPC=MICPC+1
(1)     017166 053220           <MOVE!LDMAR!MEMX!<SELB!SPX!SP0>>
017170                          MEMINC  IMM,1
(1)     000323                  MICPC=MICPC+1
(1)     017170 016401           <MOVE!WRMEM!INCMAR!IMM!<1>>
017172                          MEMINC  IBUS,PORT1
(1)     000324                  MICPC=MICPC+1
(1)     017172 136500           <MOVE!WRMEM!INCMAR!IBUS!<PORT1>>
017174                          MEMINC  IBUS,PORT2
(1)     000325                  MICPC=MICPC+1
(1)     017174 136520           <MOVE!WRMEM!INCMAR!IBUS!<PORT2>>
017176                          MEMINC  IBUS,PORT4
(1)     000326                  MICPC=MICPC+1
(1)     017176 136560           <MOVE!WRMEM!INCMAR!IBUS!<PORT4>>
017200                          MEMINC  IBUS,PORT3
(1)     000327                  MICPC=MICPC+1
(1)     017200 136540           <MOVE!WRMEM!INCMAR!IBUS!<PORT3>>
                                ;;;;NOTE INVERTED ORDER OF PORT 3 AND PORT4
017202                          LDMA    IMM,ERC
(1)     000330                  MICPC=MICPC+1
(1)     017202 010023           <MOVE!LDMAR!IMM!<ERC&377>>
017204                          MEM     IMM,RCL1                ;ASSUME WRAP AROUND CASE
(1)     000331                  MICPC=MICPC+1
(1)     017204 002424           <MOVE!WRMEM!IMM!<RCL1>>
017206                          BRWRTE  IMM,RCL7                ;GET ADDRESS OF END OF CAHIN AREA
(1)     000332                  MICPC=MICPC+1
(1)     017206 000462           <MOVE!WRTEBR!IMM!<RCL7>>
017210                          CMP     BR,SP0                  ;CHECK FOR END
(1)     000333                  MICPC=MICPC+1
(1)     017210 060360           <SUBTC!BR!SP0>
017212                          Z       INS12                   ;IF EQUAL BRANCH
(1)     000334                  MICPC=MICPC+1
(1)     017212 101665           <JUMP!ZCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
017214                          BRWRTE  IMM,5                   ;CALCULATE ADDRESS OF NEXT LINK
(1)     000335                  MICPC=MICPC+1
(1)     017214 000405           <MOVE!WRTEBR!IMM!<5>>
017216                          MEM     BR,ADD!SP0              ;..
(1)     000336                  MICPC=MICPC+1
(1)     017216 062400           <MOVE!WRMEM!BR!<ADD!SP0>>
017220                          ALWAYS  INS12                   ;EXIT
(1)     000337                  MICPC=MICPC+1
(1)     017220 100665           <JUMP!ALCOND!<INS12-INIT&3000*4>!<INS12-INIT&777/2>>
017222                  RA1:    BRWRTE  IMM,317                 ;MASK TO CLEAR START MODE AND CLR ACTIVE
(1)     000340                  MICPC=MICPC+1
(1)     017222 000717           <MOVE!WRTEBR!IMM!<317>>
017224                          SPBR    BR,AANDB,SP10           ;CLEAR BIT IN LINE STATUS WORD
(1)     000341                  MICPC=MICPC+1
(1)     017224 063670           <MOVE!SPBRX!BR!AANDB!SP10>
017226                  RA3:    BRWRTE  IMM,0                   ;CLEAR BR
(1)     000342                  MICPC=MICPC+1
(1)     017226 000400           <MOVE!WRTEBR!IMM!<0>>
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017230                          SP      BR,SELB,SP13            ;SET NUMB MESSAGE TYPE IN SP13
(1)     000343                  MICPC=MICPC+1
(1)     017230 063233           <MOVE!SPX!BR!SELB!SP13>
017232                          STATE   RCVB                    ;CHANGE RECEIVE STATE POINTER TO STATE B
(1)     000344                  MICPC=MICPC+1
(1)     017232 000424           <MOVE!WRTEBR!IMM!<RCVB-INIT&777/2>>
017234                          ALWAYS  REXIT
(1)     000345                  MICPC=MICPC+1
(1)     017234 100450           <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
                                ;
017236                  ACK:    BRWRTE  BR,AA!SP10              ;READ LINE STATUS SHIFTING LEFT
(1)     000346                  MICPC=MICPC+1
(1)     017236 060530           <MOVE!WRTEBR!BR!<AA!SP10>>
017240                          BR4     5$                      ;IF START RECD--CLEAR START MODE
(1)     000347                  MICPC=MICPC+1
(1)     017240 103351           <JUMP!BR4CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
017242                          ALWAYS  IDLE
(1)     000350                  MICPC=MICPC+1
(1)     017242 100451           <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
017244                  5$:     BRWRTE  IMM,327                 ;CLEAR START MODE
(1)     000351                  MICPC=MICPC+1
(1)     017244 000727           <MOVE!WRTEBR!IMM!<327>>
017246                          SP      BR,AANDB,SP10           ;IN LINE STATUS
(1)     000352                  MICPC=MICPC+1
(1)     017246 063270           <MOVE!SPX!BR!AANDB!SP10>
017250                          ALWAYS  RD5
(1)     000353                  MICPC=MICPC+1
(1)     017250 104507           <JUMP!ALCOND!<RD5-INIT&3000*4>!<RD5-INIT&777/2>>
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826  017252                    HDSEL:  BRWRTE  IMM,100                 ;HD MASK TO BR
(1)        000354                      MICPC=MICPC+1
(1)  017252  000500                    <MOVE!WRTEBR!IMM!<100>>
827  017254                            SP      BR,AORB,SP10             ;UPDATE PORT STATUS WORD
(1)        000355                      MICPC=MICPC+1
(1)  017254  063310                    <MOVE!SPX!BR!AORB!SP10>
828  017256                            ALWAYS  INS11
(1)        000356                      MICPC=MICPC+1
(1)  017256  103563                    <JUMP!ALCOND!<INS11-INIT&3000*4>!<INS11-INIT&777/2>>
829                                    ;
830  017260                    PE1:    BRWRTE  IMM,300                  ;MASK FOR INTERUPT AND VECTOR THROUGH X04
(1)        000357                      MICPC=MICPC+1
(1)  017260  000700                    <MOVE!WRTEBR!IMM!<300>>
831  017262                            SP      IBUS,UBBR,SP0            ;READ BR CONTROL REG
(1)        000360                      MICPC=MICPC+1
(1)  017262  123220                    <MOVE!SPX!IBUS!UBBR!SP0>
832  017264                            OUT     BR,<AORB!OBR>            ;INTERRUPT
(1)        000361                      MICPC=MICPC+1
(1)  017264  061311                    <MOVE!WROUTX!BR!<AORB!OBR>>
834  017266                            ALWAYS  IDLE
(1)        000362                      MICPC=MICPC+1
(1)  017266  100451                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
839                                    ;
840  017270                    HALTED: MEMADR  EM6
(1)        000363                      MICPC=MICPC+1
(1)  017270  002722                    <MOVE!WRMEM!<EM6-INIT&777/2>>
841                                                                     ;FALL INTO ACLOW
842  017272                    ACLOW:  BRWRTE  IMM,2                    ;CAUSE AN AC LOW
(1)        000364                      MICPC=MICPC+1
(1)  017272  000402                    <MOVE!WRTEBR!IMM!<2>>
843  017274                            OUT     BR,<SELB!OBR>
(1)        000365                      MICPC=MICPC+1
(1)  017274  061231                    <MOVE!WROUTX!BR!<SELB!OBR>>
844  017276                    5$:     BRWRTE  IBUS,UBBR                ;WAIT FOR IT TO COMPLETE
(1)        000366                      MICPC=MICPC+1
(1)  017276  120620                    <MOVE!WRTEBR!IBUS!<UBBR>>
845  017300                            BR1     5$
(1)        000367                      MICPC=MICPC+1
(1)  017300  102766                    <JUMP!BR1CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
846  017302                            .ALWAY  MEMX,SELB,PAGE3
(1)        000370                      MICPC=MICPC+1
(1)  017302  154620                    <JUMP!ALCOND!MEMX!SELB!PAGE3>
847  017304                    CKTIME: BRWRTE  IBUS,UBBR                ;READ BR CONTROL REG
(1)        000371                      MICPC=MICPC+1
(1)  017304  120620                    <MOVE!WRTEBR!IBUS!<UBBR>>
848  017306                            BR4     HALTED
(1)        000372                      MICPC=MICPC+1
(1)  017306  103363                    <JUMP!BR4CON!<HALTED-INIT&3000*4>!<HALTED-INIT&777/2>>
849  017310                            ALWAYS  EM1
(1)        000373                      MICPC=MICPC+1
(1)  017310  114725                    <JUMP!ALCOND!<EM1-INIT&3000*4>!<EM1-INIT&777/2>>
850                                    ;
851  017312                    TBU1:   BRWRTE  IBUS,NPR
(1)        000374                      MICPC=MICPC+1
(1)  017312  120600                    <MOVE!WRTEBR!IBUS!<NPR>>
852  017314                            BR0     IDLE
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(1)        000375                      MICPC=MICPC+1
(1)  017314  102051                    <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
853  017316                            ALWAYS  EC2
(1)        000376                      MICPC=MICPC+1
(1)  017316  114752                    <JUMP!ALCOND!<EC2-INIT&3000*4>!<EC2-INIT&777/2>>
854  017320                            $ZERO
(1)        000377                      MICPC=MICPC+1
(1)  017320  000000                    000000
855
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  857           017322                          .=INIT+1000
  858           000377                          MICPC=377
  859                                           .SBTTL  RCVA--ROUTINE TO HANDLE FIRST DDCMP CHARACTER
  860                                           ;ENTERED FROM IDLE LOOP
  861                                           ;DETERMINES IF MESSAGE TYPE IS NUMBERED,UNNUMBERED OR BOOT
  862                                           ;SETS UP APROPRIATE STATES FOR REST OF MESSAGE.
  863  017322                           RCVA:   SP      IBUS,RCVDAT,SP0         ;READ RECEIVE CHARACTER TO SP0
  (1)           000400                          MICPC=MICPC+1
  (1)   017322  023200                          <MOVE!SPX!IBUS!RCVDAT!SP0>
  864  017324                                   BRWRTE  BR,SELA!SP1             ;READ PORT STATUS WORD
  (1)           000401                          MICPC=MICPC+1
  (1)   017324  060601                          <MOVE!WRTEBR!BR!<SELA!SP1>>
  865  017326                                   BR0     5$                      ;IF INIT MODE---ONLY BOOT OK
  (1)           000402                          MICPC=MICPC+1
  (1)   017326  106412                          <JUMP!BR0CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
  866  017330                                   BR7     5$                      ;IF BOOT MODE---ONLY BOOT OK
  (1)           000403                          MICPC=MICPC+1
  (1)   017330  107412                          <JUMP!BR7CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
  867  017332                                   BRWRTE  IMM,201                 ;SOH TO BR
  (1)           000404                          MICPC=MICPC+1
  (1)   017332  000601                          <MOVE!WRTEBR!IMM!<201>>
  868  017334                                   CMP     BR,SP0                  ;COMPARE BR TO SP0
  (1)           000405                          MICPC=MICPC+1
  (1)   017334  060360                          <SUBTC!BR!SP0>
  869  017336                                   Z       RA1                     ;IF EQUAL-IS NUMBERED MESSAGE
  (1)           000406                          MICPC=MICPC+1
  (1)   017336  101740                          <JUMP!ZCOND!<RA1-INIT&3000*4>!<RA1-INIT&777/2>>
  870  017340                                   BRWRTE  IMM,5                   ;ENQ TO BR
  (1)           000407                          MICPC=MICPC+1
  (1)   017340  000405                          <MOVE!WRTEBR!IMM!<5>>
  871  017342                                   CMP     BR,SP0                  ;COMPARE ENQ TO SP0
  (1)           000410                          MICPC=MICPC+1
  (1)   017342  060360                          <SUBTC!BR!SP0>
  872  017344                                   Z       RA2                     ;IF EQUAL-IS UNNUMBERED MESSAGE
  (1)           000411                          MICPC=MICPC+1
  (1)   017344  105422                          <JUMP!ZCOND!<RA2-INIT&3000*4>!<RA2-INIT&777/2>>
  873  017346                           5$:     BRWRTE  IMM,220                 ;DLE TO BR
  (1)           000412                          MICPC=MICPC+1
  (1)   017346  000620                          <MOVE!WRTEBR!IMM!<220>>
  874  017350                                   CMP     BR,SP0                  ;COMPARE DLE TO SP0
  (1)           000413                          MICPC=MICPC+1
  (1)   017350  060360                          <SUBTC!BR!SP0>
  875  017352                                   Z       BOOT                    ;IF EQUAL IS BOOT
  (1)           000414                          MICPC=MICPC+1
  (1)   017352  105756                          <JUMP!ZCOND!<BOOT-INIT&3000*4>!<BOOT-INIT&777/2>>
  876  017354                           FLUSH:  OUTPUT  IMM,<200!ORCVCO>        ;FLUSH INPUT SILO
  (1)           000415                          MICPC=MICPC+1
  (1)   017354  002212                          <MOVE!WROUT!IMM!<200!ORCVCO>>
  877                                                                           ;(LOW ORDER BITS READ ONLY)
  878  017356                                   BRWRTE  IMM,357                 ;MASK TO CLEAR--CLEAR ACTIVE
  (1)           000416                          MICPC=MICPC+1
  (1)   017356  000757                          <MOVE!WRTEBR!IMM!<357>>
  879  017360                                   SP      BR,AANDB,SP10           ;IN LINE STATUS WORD
  (1)           000417                          MICPC=MICPC+1
  (1)   017360  063270                          <MOVE!SPX!BR!AANDB!SP10>
  880  017362                           RM1:    STATE   RCVA
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  (1)           000420                          MICPC=MICPC+1
  (1)   017362  000400                          <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
  885  017364                                   ALWAYS  REXIT
  (1)           000421                          MICPC=MICPC+1
  (1)   017364  100450                          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
  886  017366                           RA2:    STATE   RCVI                    ;CHANGE RECEIVE STATE TO 1
  (1)           000422                          MICPC=MICPC+1
  (1)   017366  000665                          <MOVE!WRTEBR!IMM!<RCVI-INIT&777/2>>
  887  017370                                   ALWAYS  REXIT
  (1)           000423                          MICPC=MICPC+1
  (1)   017370  100450                          <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
```

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                        .SBTTL  RCVB--ROUTINE TO HANDLE FIRST CHARACTER OF COUNT FIELD
                        ;ENTERED FROM IDLE LOOP
                        ;STORES COUNT FIELD AND SETS UP RCVC AS NEXT STATE
                        ;
017372                  RCVB:
017372                          SP      IBUS,RCVDAT,SP4         ;READ CHARACTER TO SP4
(1)     000424                  MICPC=MICPC+1
(1)     017372  023204          <MOVE!SPX!IBUS!RCVDAT!SP4>
017374                          LDMA    BR,<SELA!SP14>                  ;LOAD MAR WITH ADDRESS OF CURRENT BA
(1)     000425                  MICPC=MICPC+1
(1)     017374  070214          <MOVE!LDMAR!BR!<SELA!SP14>>
017376                          BRWRTE  MEMX,INCMAR!SELB                ;READ FLAGS BYTE
(1)     000426                  MICPC=MICPC+1
(1)     017376  054620          <MOVE!WRTEBR!MEMX!<INCMAR!SELB>>
017400                          BR0     RB1                             ;RECV BUFFER ASSIGNED---CONTINUE
(1)     000427                  MICPC=MICPC+1
(1)     017400  106041          <JUMP!BR0CON!<RB1-INIT&3000*4>!<RB1-INIT&777/2>>
017402                          BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
(1)     000430                  MICPC=MICPC+1
(1)     017402  060601          <MOVE!WRTEBR!BR!<SELA!SP1>>
017404                          BR7     RB3                             ;MAINT MODE
(1)     000431                  MICPC=MICPC+1
(1)     017404  107437          <JUMP!BR7CON!<RB3-INIT&3000*4>!<RB3-INIT&777/2>>
017406                          LDMA    IMM,T                   ;ERROR--LOAD TYPE FIELD ADDRESS IN MAR
(1)     000432                  MICPC=MICPC+1
(1)     017406  010151          <MOVE!LDMAR!IMM!<T&377>>
017410                          MEMINC  IMM,2                   ;LOAD NAK TYPE
(1)     000433                  MICPC=MICPC+1
(1)     017410  016402          <MOVE!WRMEM!INCMAR!IMM!<2>>
017412                          MEM     IMM,310                 ;LOAD SUB-TYPE NO BUFFERS
(1)     000434                  MICPC=MICPC+1
(1)     017412  002710          <MOVE!WRMEM!IMM!<310>>
017414                          LDMA    IMM,NTLS
(1)     000435                  MICPC=MICPC+1
(1)     017414  010012          <MOVE!LDMAR!IMM!<NTLS&377>>
017416                          ALWAYS  RH5                     ;BRANCH TO SEND NAK ROUTINE
(1)     000436                  MICPC=MICPC+1
(1)     017416  100552          <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>
017420                  RB3:    BRWRTE  IMM,4                   ;MASK FOR NO BUFFER AVAILABLE
(1)     000437                  MICPC=MICPC+1
(1)     017420  000404          <MOVE!WRTEBR!IMM!<4>>
017422                          SP      BR,AORB,SP1             ;SET THE FLAG
(1)     000440                  MICPC=MICPC+1
(1)     017422  063301          <MOVE!SPX!BR!AORB!SP1>
017424                  RB1:    STATE   RCVC
(1)     000441                  MICPC=MICPC+1
(1)     017424  000461          <MOVE!WRTEBR!IMM!<RCVC-INIT&777/2>>
017426                  RB0:    SP      BR,SELB,SP3
(1)     000442                  MICPC=MICPC+1
(1)     017426  063223          <MOVE!SPX!BR!SELB!SP3>
017430                          OUTPUT  <MEMX!INCMAR>,<SELB!OBA1>       ;OUTPUT LOW ORDER BYTE OF ADDRESS
(1)     000443                  MICPC=MICPC+1
(1)     017430  056226          <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA1>>
017432                          OUTPUT  MEMX!INCMAR,<SELB!OBA2> ;OUTPUT HIGH BYTE OF ADDRESS
(1)     000444                  MICPC=MICPC+1
(1)     017432  056227          <MOVE!WROUT!MEMX!INCMAR!<SELB!OBA2>>
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017434                          SP      IBUS,UBBR,SP0           ;READ THE BUS REQ REGISTER
(1)     000445                  MICPC=MICPC+1
(1)     017434  123220          <MOVE!SPX!IBUS!UBBR!SP0>
017436                          BRWRTE  IMM,101                 ;MASK OFF ALL BUT NXM AND VEC4 BITS
(1)     000446                  MICPC=MICPC+1
(1)     017436  000501          <MOVE!WRTEBR!IMM!<101>>
017440                          SP      BR,AANDB,SP0            ;AND SAVE IN SP0
(1)     000447                  MICPC=MICPC+1
(1)     017440  063260          <MOVE!SPX!BR!AANDB!SP0>
017442                          SP      IMM,300,SP5             ;MASK TO ISOLATE EX. MEM BITS
(1)     000450                  MICPC=MICPC+1
(1)     017442  003305          <MOVE!SPX!IMM!300!SP5>
                                                                ;NOTE THIS REALLY WRITES A 305 BUT THE
                                                                ;5 GETS SHIFTED OUT
017444                          BRWRTE  MEMX,AANDB!SP5          ;MASK ALL BUT EX. MEM BITS
(1)     000451                  MICPC=MICPC+1
(1)     017444  040665          <MOVE!WRTEBR!MEMX!<AANDB!SP5>>
017446                          BRSHFT                          ;SHIFT THEM INTO THE CORRECT POSITION
(1)     000452                  MICPC=MICPC+1
(1)     017446  001620          <MOVE!SHFTBR!WRTEBR!SELB>
017450                          BRSHFT
(1)     000453                  MICPC=MICPC+1
(1)     017450  001620          <MOVE!SHFTBR!WRTEBR!SELB>
017452                          BRSHFT
(1)     000454                  MICPC=MICPC+1
(1)     017452  001620          <MOVE!SHFTBR!WRTEBR!SELB>
017454                          BRSHFT
(1)     000455                  MICPC=MICPC+1
(1)     017454  001620          <MOVE!SHFTBR!WRTEBR!SELB>
017456                          OUT     BR,AORB!OBR                     ;WRITE EX MEM BITS OUT
(1)     000456                  MICPC=MICPC+1
(1)     017456  061311          <MOVE!WPOUTX!BR!<AORB!OBR>>
017460                          ALWAYS  IDLE
(1)     000457                  MICPC=MICPC+1
(1)     017460  100451          <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
017462                  RB2:    ALWAYS  I2
(1)     000460                  MICPC=MICPC+1
(1)     017462  100456          <JUMP!ALCOND!<I2-INIT&3000*4>!<I2-INIT&777/2>>
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                                        .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
                                        ;
017464                          RCVC:
017464                                  SP      IBUS,RCVDAT,SP5         ;GET CHARACTER
(1)             000461                  MICPC=MICPC+1
(1)  017464  023205                     <MOVE!SPX!IBUS!RCVDAT!SP5>
017466                                  BRWRTE  IMM,200                 ;SEPARATE SELECT BIT FROM COUNT
(1)             000462                  MICPC=MICPC+1
(1)  017466  000600                     <MOVE!WRTEBR!IMM!<200>>
017470                                  BRWRTE  BR,AANDB!SP5
(1)             000463                  MICPC=MICPC+1
(1)  017470  060665                     <MOVE!WRTEBR!BR!<AANDB!SP5>>
017472                                  SP      BR,AORB,SP10
(1)             000464                  MICPC=MICPC+1
(1)  017472  063310                     <MOVE!SPX!BR!AORB!SP10>
017474                                  LDMA    IMM,BC                  ;LOAD MAR TO BYTE COUNT
(1)             000465                  MICPC=MICPC+1
(1)  017474  010167                     <MOVE!LDMAR!IMM!<BC&377>>
017476                                  MEMINC  BR,SELA!SP4             ;SAVE LOW BYTE
(1)             000466                  MICPC=MICPC+1
(1)  017476  076604                     <MOVE!WRMEM!INCMAR!BR!<SELA!SP4>>
017500                                  MEMINC  BR,SELA!SP5             ;AND NOW HIGH BYTE
(1)             000467                  MICPC=MICPC+1
(1)  017500  076605                     <MOVE!WRMEM!INCMAR!BR!<SELA!SP5>>
017502                          RC5:    STATE   RCVD                    ;SET NEXT STATE TO D
(1)             000470                  MICPC=MICPC+1
(1)  017502  000472                     <MOVE!WRTEBR!IMM!<RCVD-INIT&777/2>>
017504                                  ALWAYS  REXIT
(1)             000471                  MICPC=MICPC+1
(1)  017504  100450                     <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
```



```
                                        .SBTTL  RCVD--ROUTINE TO HANDLE RESPONSE FIELD FOR NUMBERED MESSAGES
                                        ;
017506                          RCVD:   STATE   RCVE
(1)             000472                  MICPC=MICPC+1
(1)  017506  000513                     <MOVE!WRTEBR!IMM!<RCVE-INIT&777/2>>
017510                          RD2:    SP      BR,SELB,SP3             ;SAVE THE STATE
(1)             000473                  MICPC=MICPC+1
(1)  017510  063223                     <MOVE!SPX!BR!SELB!SP3>
017512                                  SPBR    IBUS,RCVDAT,SP0         ;INPUT THE CHARACTER
(1)             000474                  MICPC=MICPC+1
(1)  017512  023600                     <MOVE!SPBRX!IBUS!RCVDAT!SP0>
017514                                  BRWRTE  BR,SUB!SP17             ;COMPARE NEW R TO LAST R
(1)             000475                  MICPC=MICPC+1
(1)  017516  060757                     <MOVE!WRTEBR!BR!<SUB!SP17>>
017516                                  BR7     10$                     ;IF NEW IS GREATER---PROCESS
(1)             000476                  MICPC=MICPC+1
(1)  017516  107500                     <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
017520                                  ALWAYS  IDLE
(1)             000477                  MICPC=MICPC+1
(1)  017520  100451                     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
017522                          10$:    BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
(1)             000500                  MICPC=MICPC+1
(1)  017522  060601                     <MOVE!WRTEBR!BR!<SELA!SP1>>
017524                                  BR7     IDLE                    ;MAINT. MODE - GET OUT
(1)             000501                  MICPC=MICPC+1
(1)  017524  103451                     <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
017526                                  BRWRTE  BR,SELA!SP10
(1)             000502                  MICPC=MICPC+1
(1)  017526  060610                     <MOVE!WRTEBR!BR!<SELA!SP10>>
017530                                  BRSHFT
(1)             000503                  MICPC=MICPC+1
(1)  017530  061620                     <MOVE!SHFTBR!WRTEBR!SELB>
017532                                  BR4     IDLE
(1)             000504                  MICPC=MICPC+1
(1)  017532  103051                     <JUMP!BR4CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
017534                                  LDMA    IMM,ISP17               ;ADDRESS LAST ACKED IMAGE
(1)             000505                  MICPC=MICPC+1
(1)  017534  010153                     <MOVE!LDMAR!IMM!<ISP17&377>>
017536                                  MEM     BR,SELA!SP0             ;COPY THE CHAR
(1)             000506                  MICPC=MICPC+1
(1)  017536  062600                     <MOVE!WRMEM!BR!<SELA!SP0>>
017540                          RD5:    BRWRTE  IMM!LDMAR,REPST         ;SET UP COUNT FOR TIMER
(1)             000507                  MICPC=MICPC+1
(1)  017540  010403                     <MOVE!WRTEBR!IMM!LDMAR!<REPST>>
                                                                        ;****DEPENDENT ON REPST = 2
017542                                  MEM     IMM,1                   ;RESET REP THRESHOLD
(1)             000510                  MICPC=MICPC+1
(1)  017542  002401                     <MOVE!WRMEM!IMM!<1>>
017544                                  SP      BR,SELB,SP15            ;RESET THE COUNT
(1)             000511                  MICPC=MICPC+1
(1)  017544  063235                     <MOVE!SPX!BR!SELB!SP15>
017546                                  ALWAYS  IDLE
(1)             000512                  MICPC=MICPC+1
(1)  017546  100451                     <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```

```
                                        .SBTTL  RCVE--ROUTINE TO HANDLE N FIELD OF NUMBERED MESSAGE
                                        ;
017550                          RCVE:   BRWRTE  BR,SELA!SP1             ;READ THE STATUS BYTE
(1)     000513                          MICPC=MICPC+1
(1)  017550  060601                     <MOVE!WRTEBR!BR!<SELA!SP1>>
017552                                  BR7     RCVQ
(1)     000514                          MICPC=MICPC+1
(1)  017552  107703                     <JUMP!BP7CON!<RCVQ-INIT&3000*4>!<RCVQ-INIT&777/2>>
017554                                  BRWRTE  IBUS,RCVDAT             ;INPUT THE CHARACTER
(1)     000515                          MICPC=MICPC+1
(1)  017554  020600                     <MOVE!WRTEBR!IBUS!<RCVDAT>>
017556                                  CMP     BR,SP11
(1)     000516                          MICPC=MICPC+1
(1)  017556  060371                     <SUBTC!BR!SP11>
017560                                  Z       5$
(1)     000517                          MICPC=MICPC+1
(1)  017560  105522                     <JUMP!ZCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
017562                                  SP      BR,DECA,SP13            ;FORCE MSG TYPE TO -1
(1)     000520                          MICPC=MICPC+1
(1)  017562  063173                     <MOVE!SPX!BR!DECA!SP13>
017564                                  ALWAYS  RE2
(1)     000521                          MICPC=MICPC+1
(1)  017564  104523                     <JUMP!ALCOND!<RE2-INIT&3000*4>!<RE2-INIT&777/2>>
017566                          5$:     SP      BR,INCA,SP11            ;UPDATE R FIELD
(1)     000522                          MICPC=MICPC+1
(1)  017566  063071                     <MOVE!SPX!BR!INCA!SP11>
017570                          RE2:    STATE   RCVF                    ;NEXT RECEIVE STATE IS F
(1)     000523                          MICPC=MICPC+1
(1)  017570  000525                     <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
017572                                  ALWAYS  REXIT
(1)     000524                          MICPC=MICPC+1
(1)  017572  100450                     <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
```



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                                        .SBTTL  RCVF--ROUTINE TO IGNORE ADDRESS
017574                          RCVF:   SP      BR,DECA,SP4             ;DECREMENTLOW BYTE OF COUNT
(1)     000525                          MICPC=MICPC+1
(1)  017571  063164                     <MOVE!SPX!BR!DECA!SP4>
017576                                  C       RCVF0                   ;NO OVERFLOW
(1)     000526                          MICPC=MICPC+1
(1)  017576  105130                     <JUMP!CCOND!<RCVF0-INIT&3000*4>!<RCVF0-INIT&777/2>>
017600                                  SP      BR,DECA,SP5             ;OVERFLOW - DECREMENT HIGH BYTE
(1)     000527                          MICPC=MICPC+1
(1)  017600  063165                     <MOVE!SPX!BR!DECA!SP5>
017602                          RCVF0:  STATE   RCVG
(1)     000530                          MICPC=MICPC+1
(1)  017602  000533                     <MOVE!WRTEBR!IMM!<RCVG-INIT&777/2>>
017604                          RCVF1:  NOP     IBUS,RCVDAT,0           ;INPUT CHARACTER - AND DISCARD
(1)     000531                          MICPC=MICPC+1
(1)  017604  020200                     <IBUS!RCVDAT!0>
017606                                  ALWAYS  REXIT
(1)     000532                          MICPC=MICPC+1
(1)  017606  100450                     <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
                                        ;
                                        .SBTTL  RCVG--ROUTINE TO IGNORE CRC1
                                        ;
017610                          RCVG:   STATE   RCVH                    ;NEXT STATE IS RCVH
(1)     000533                          MICPC=MICPC+1
(1)  017610  000535                     <MOVE!WRTEBR!IMM!<RCVH-INIT&777/2>>
017612                                  ALWAYS  RCVF1
(1)     000534                          MICPC=MICPC+1
(1)  017612  104531                     <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
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1001                                    .SBTTL  RCVH--ROUTINE TO HANDLE CRC2 AND TO DISPATCH NUMBERED AND UNNUMBERED TYP
1002                                    ;
1003  017614                    RCVH:
1004  017614                            SP      IBUS,RCVDAT,SP0                 ;GET CHAR IN SP0
 (1)          000535                    MICPC=MICPC+1
 (1)  017614  023200                    <MOVE!SPX!IBUS!RCVDAT!SP0>
1005  017616                            BRWRTE  IBUS,RCVCON                     ;READ RECVR CONTROL REGISTER
 (1)          000536                    MICPC=MICPC+1
 (1)  017616  020640                    <MOVE!WRTEBR!IBUS!<RCVCON>>
1006  017620                            BR0     TDON1                           ;IF BCC MATCH SET CRC IS GOOD
 (1)          000537                    MICPC=MICPC+1
 (1)  017620  116165                    <JUMP!BR0CON!<TDON1-INIT&3000*4>!<TDON1-INIT&777/2>>
1007  017622                            BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
 (1)          000540                    MICPC=MICPC+1
 (1)  017622  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1008  017624                            BR7     RHX                             ;MAINT MODE
 (1)          000541                    MICPC=MICPC+1
 (1)  017624  107740                    <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
1009  017626                            BRWRTE  DP,<SELA!SP10>                  ;READ PORT STATUS WORD TO BR
 (1)          000542                    MICPC=MICPC+1
 (1)  017626  060610                    <MOVE!WRTEBR!DP!<SELA!SP10>>
1010  017630                            BRSHFT
 (1)          000543                    MICPC=MICPC+1
 (1)  017630  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1011  017632                            BR4     SNAK1                           ;IF START MODE--PROCEED TO RESEND START
 (1)          000544                    MICPC=MICPC+1
 (1)  017632  117307                    <JUMP!BR4CON!<SNAK1-INIT&3000*4>!<SNAK1-INIT&777/2>>
1012  017634                            LDMA    IMM,T                           ;ELSE BCC ERROR--LOAD ADDRESS OF TYPE FI
 (1)          000545                    MICPC=MICPC+1
 (1)  017634  012151                    <MOVE!LDMAR!IMM!<T&377>>
1013  017636                            MEMINC  IMM,2                           ;WRITE NAK TYPE
 (1)          000546                    MICPC=MICPC+1
 (1)  017636  016402                    <MOVE!WRMEM!INCMAR!IMM!<2>>
1014  017640                            MEMINC  IMM,301                         ;WRITE HEADER BCC ERROR SUBTYPE
 (1)          000547                    MICPC=MICPC+1
 (1)  017640  016701                    <MOVE!WRMEM!INCMAR!IMM!<301>>
1015  017642                            MEM     BR,SELA!SP17            ;RESTORE LAST ACKED  IMAGE
 (1)          000550                    MICPC=MICPC+1
 (1)  017642  062617                    <MOVE!WRMEM!BR!<SELA!SP17>>
1016  017644                            LDMA    IMM,NHDS                ;ADDRESS CUM ERROR COUNTER
 (1)          000551                    MICPC=MICPC+1
 (1)  017644  012013                    <MOVE!LDMAR!IMM!<NHDS&377>>
1017  017646                    RH5:    SP      MEMX,SELB,SP0           ;WRITE IT TO SP0
 (1)          000552                    MICPC=MICPC+1
 (1)  017646  043220                    <MOVE!SPX!MEMX!SELB!SP0>
1018  017650                            MEM     BR,INCA!SP0             ;INCREMENT IT
 (1)          000553                    MICPC=MICPC+1
 (1)  017650  062460                    <MOVE!WRMEM!BR!<INCA!SP0>>
1019  017652                            LDMA    IMM,NAKST               ;ADDRESS NAKS TMTED DYNAMIC
 (1)          000554                    MICPC=MICPC+1
 (1)  017652  012001                    <MOVE!LDMAR!IMM!<NAKST&377>>
1020  017654                            BRWRTE  MEMX,SELB               ;WRITE IT TO BR
 (1)          000555                    MICPC=MICPC+1
 (1)  017654  040620                    <MOVE!WRTEBR!MEMX!<SELB>>
1021  017656                            BSHFTB                          ;SHIFT IT RIGHT
 (1)          000556                    MICPC=MICPC+1
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 (1)  017656  001620                    <MOVE!SHFTBR!SELB!BR>
1022  017660                            MEM     BR,SELB                 ;UPDATE IT
 (1)          000557                    MICPC=MICPC+1
 (1)  017660  062620                    <MOVE!WRMEM!BR!<SELB>>
1023  017662                            BR0     NTHRES                  ;BRANCH IF THRESHOLD EXCEEDED
 (1)          000560                    MICPC=MICPC+1
 (1)  017662  116256                    <JUMP!BR0CON!<NTHRES-INIT&3000*4>!<NTHRES-INIT&777/2>>
1024  017664                            ALWAYS  SNAK
 (1)          000561                    MICPC=MICPC+1
 (1)  017664  114704                    <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>
1025  017666                    RH3:    BRWRTE  DP,<DECA!SP13>                  ;LOAD TYPE RECEIVED--DECREMENTING
 (1)          000562                    MICPC=MICPC+1
 (1)  017666  060573                    <MOVE!WRTEBR!DP!<DECA!SP13>>
1026  017670                            Z       RH1                             ;IF ALUOUT IS ALL ONES IS NUMBERED MSG
 (1)          000563                    MICPC=MICPC+1
 (1)  017670  115467                    <JUMP!ZCOND!<RH1-INIT&3000*4>!<RH1-INIT&777/2>>
1027  017672                            RSTATE  RCVA
 (1)          000564                    MICPC=MICPC+1
 (1)  017672  000400                    <MOVE!WRTEBR!IMM!<RCVA-INIT&777/2>>
 (1)          000565                    MICPC=MICPC+1
 (1)  017674  063223                    <MOVE!SPX!BR!SELB!SP3>
1028  017676                            BRWRTE  DP,<SELA!SP10>                  ;LOAD LINE STATUS WORD IN BR
 (1)          000566                    MICPC=MICPC+1
 (1)  017676  060610                    <MOVE!WRTEBR!DP!<SELA!SP10>>
1034  017700                            OUTPUT  IMM,<200!ORCVCO>
 (1)          000567                    MICPC=MICPC+1
 (1)  017700  002212                    <MOVE!WROUT!IMM!<200!ORCVCO>>
1036  017702                            BRSHFT                                  ;SHIFT RIGHT
 (1)          000570                    MICPC=MICPC+1
 (1)  017702  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1037  017704                            BR4     10$
 (1)          000571                    MICPC=MICPC+1
 (1)  017704  107177                    <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1038  017706                            LDMA    IMM,TYPTAB                      ;ADDRESS TYPE TABLE
 (1)          000572                    MICPC=MICPC+1
 (1)  017706  010162                    <MOVE!LDMAR!IMM!<TYPTAB&377>>
1039  017710                            CMP     <MEMX!INCMAR>,SP13
 (1)          000573                    MICPC=MICPC+1
 (1)  017710  054373                    <SUBTC!MEMX!INCMAR!SP13>
1040  017712                            Z       REP
 (1)          000574                    MICPC=MICPC+1
 (1)  017712  115411                    <JUMP!ZCOND!<REP-INIT&3000*4>!<REP-INIT&777/2>>
1041  017714                            CMP     <MEMX!INCMAR>,SP13
 (1)          000575                    MICPC=MICPC+1
 (1)  017714  054373                    <SUBTC!MEMX!INCMAR!SP13>
1042  017716                            Z       NAK
 (1)          000576                    MICPC=MICPC+1
 (1)  017716  115445                    <JUMP!ZCOND!<NAK-INIT&3000*4>!<NAK-INIT&777/2>>
1043  017720                    10$:    LDMA    IMM,TYPSTT                      ;SET POINTER TO START TYPE
 (1)          000577                    MICPC=MICPC+1
 (1)  017720  010164                    <MOVE!LDMAR!IMM!<TYPSTT&377>>
1044  017722                            CMP     <MEMX!INCMAR>,SP13
 (1)          000600                    MICPC=MICPC+1
 (1)  017722  054373                    <SUBTC!MEMX!INCMAR!SP13>
1045  017724                            Z       START
 (1)          000601                    MICPC=MICPC+1
```

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  (1)  017724  115420                <JUMP!ZCOND!<START-INIT&3000*4>!<START-INIT&777/2>>
1046                                                                ;STACK TYPE
1047  017726                         CMP     <MEMX!INCMAR>,SP13
  (1)          000602                MICPC=MICPC+1
  (1)  017726  054373                <SUBTC!MEMX!INCMAR!SP13>
1048  017730                         Z       STACK
  (1)          000603                MICPC=MICPC+1
  (1)  017730  115432                <JUMP!ZCOND!<STACK-INIT&3000*4>!<STACK-INIT&777/2>>
1049  017732                         CMP     <MEMX!INCMAR>,SP13      ;ACK TYPE
  (1)          000604                MICPC=MICPC+1
  (1)  017732  054373                <SUBTC!MEMX!INCMAR!SP13>
1050  017734                         Z       ACK
  (1)          000605                MICPC=MICPC+1
  (1)  017734  101746                <JUMP!ZCOND!<ACK-INIT&3000*4>!<ACK-INIT&777/2>>
1051  017736                         ALWAYS  IDLE                    ;OTHERWISE IGNORE--MUST BE OBS MSG
  (1)          000606                MICPC=MICPC+1
  (1)  017736  100451                <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
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1065                               ;*****************TIME CRITICAL CODE-- CHANGE WITH GREAT CARE*********************
1066                                       .SBTTL  RCVKO1--ROUTINE TO HANDLE FIRST BYTE ODD RECEIVE
1067  017740                       RCVKO1: SPBR    IBUS,NPR,SP0            ;READ NPR REGISTER
  (1)          000607                MICPC=MICPC+1
  (1)  017740  123600                <MOVE!SPBRX!IBUS!NPR!SP0>
1068  017742                         BR0     IDLE
  (1)          000610                MICPC=MICPC+1
  (1)  017742  102051                <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1069  017744                         BRWRTB  IMM,200                 ;MASK FOR C0(BYTE TRANSFER)
  (1)          000611                MICPC=MICPC+1
  (1)  017744  000600                <MOVE!WRTEBR!IMM!<200>>
1071  017746                         SP      BR,AORB,SP0
  (1)          000612                MICPC=MICPC+1
  (1)  017746  063300                <MOVE!SPX!BR!AORB!SP0>
1076  017750                         STATE   RKE1
  (1)          000613                MICPC=MICPC+1
  (1)  017750  000653                <MOVE!WRTEBR!IMM!<RKE1-INIT&777/2>>
1077  017752                         ALWAYS  RCVKO2
  (1)          000614                MICPC=MICPC+1
  (1)  017752  100620                <JUMP!ALCOND!<RCVKO2-INIT&3000*4>!<RCVKO2-INIT&777/2>>
1078                                       .SBTTL  RCVKO--PROCESS ODD CHARACTER
1079  017754                       RCVKO:  SPBR    IBUS,NPR,SP0            ;IS AN NPR GOING
  (1)          000615                MICPC=MICPC+1
  (1)  017754  123600                <MOVE!SPBRX!IBUS!NPR!SP0>
1081  017756                         BR0     RK66                    ;IF SO, REITERATE ODD AND EXIT
  (1)          000616                MICPC=MICPC+1
  (1)  017756  100247                <JUMP!BR0CON!<RK66-INIT&3000*4>!<RK66-INIT&777/2>>
1086  017760                         STATE   RCVKE
  (1)          000617                MICPC=MICPC+1
  (1)  017760  000625                <MOVE!WRTEBR!IMM!<RCVKE-INIT&777/2>>
1087  017762                       RCVKO2: SP      BR,SELB,SP3             ;SET STATE
  (1)          000620                MICPC=MICPC+1
  (1)  017762  063223                <MOVE!SPX!BR!SELB!SP3>
1088  017764                         OUTPUT  IBUS,RCVDAT!OUTDA2              ;OUTPUT A CHAR
  (1)          000621                MICPC=MICPC+1
  (1)  017764  022203                <MOVE!WROUT!IBUS!<RCVDAT!OUTDA2>>
1089  017766                       RK8:    BRWRTB  IMM,21                  ;SET OUT NPR (C1) AND NPR REQ
  (1)          000622                MICPC=MICPC+1
  (1)  017766  000421                <MOVE!WRTEBR!IMM!<21>>
1093  017770                       RK7:    OUT     BR,<AORB!ONPR>          ;WRITE NPR REGISTER
  (1)          000623                MICPC=MICPC+1
  (1)  017770  061310                <MOVE!WROUTX!BR!<AORB!ONPR>>
1094  017772                         ALWAYS  IDLE
  (1)          000624                MICPC=MICPC+1
  (1)  017772  100451                <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
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1096                                    .SBTTL  RCVKE--HANDLE EVEN BYTES
1097  017774                    RCVKE:  BRWRTE  IBUS,NPR                ;READ NPR CONTROL REGISTER
 (1)          000625                    MICPC=MICPC+1
 (1)  017774  120600                    <MOVE!WRTEBR!IBUS!<NPR>>
1099  017776                            BR4     RK4                     ;IF  RECV NPR--BRANCH
 (1)          000626                    MICPC=MICPC+1
 (1)  017776  107251                    <JUMP!BR4CON!<RK4-INIT&3000*4>!<RK4-INIT&777/2>>
1104  020000                    RK5:    SP      IBUS,IOBA1,SP0          ;READ LOW BYTE OF BA TO SP
 (1)          000627                    MICPC=MICPC+1
 (1)  020000  023140                    <MOVE!SPX!IBUS!IOBA1!SP0>
1105  020002                            OUTPUT  DP,<INCA!OBA1>          ;WRITE INCREMENTED BA
 (1)          000630                    MICPC=MICPC+1
 (1)  020002  062066                    <MOVE!WROUT!DP!<INCA!OBA1>>
1106  020004                    RK50:   SP      BR,DECA,SP4             ;DECREMENT CHARACTER COUNT
 (1)          000631                    MICPC=MICPC+1
 (1)  020004  063164                    <MOVE!SPX!BR!DECA!SP4>
1107  020006                            C       10$                     ;NO OVERFLOW
 (1)          000632                    MICPC=MICPC+1
 (1)  020006  105235                    <JUMP!CCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1108  020010                            SP      BR,DECA,SP5             ;OVERFLOW - DECREMENT HIGH BYTE
 (1)          000633                    MICPC=MICPC+1
 (1)  020010  063165                    <MOVE!SPX!BR!DECA!SP5>
1109  020012                            Z       RL3                     ;BYTE COUNT ZERO
 (1)          000634                    MICPC=MICPC+1
 (1)  020012  105711                    <JUMP!ZCOND!<RL3-INIT&3000*4>!<RL3-INIT&777/2>>
1110  020014                    10$:    OUTPUT  IBUS,<RCVDAT!OUTDA1>    ;READ CHARACTER AND WRITE IT
 (1)          000635                    MICPC=MICPC+1
 (1)  020014  022202                    &MOVE!WROUT!IBUS!<RCVDAT!OUTDA1>>
1111  020016                            SP      IBUS,IOBA1,SP0          ;READ INCREMENTED BA
 (1)          000636                    MICPC=MICPC+1
 (1)  020016  023140                    <MOVE!SPX!IBUS!IOBA1!SP0>
1112  020020                            OUTPUT  DP,<INCA!OBA1>          ;WRITE INCREMENTED BA
 (1)          000637                    MICPC=MICPC+1
 (1)  020020  062066                    <MOVE!WROUT!DP!<INCA!OBA1>>
1113  020022                            C       ICBA22                  ;IF CARRY INC BA HIGH
 (1)          000640                    MICPC=MICPC+1
 (1)  020022  115035                    <JUMP!CCOND!<ICBA22-INIT&3000*4>!<ICBA22-INIT&777/2>>
1114  020024                    RK3:    SP      BR,DECA,SP4             ;DECREMENT THE COUNT OF BYTES
 (1)          000641                    MICPC=MICPC+1
 (1)  020024  063164                    <MOVE!SPX!BR!DECA!SP4>
1115  020026                            C       RK6                     ;NO OVERFLOW
 (1)          000642                    MICPC=MICPC+1
 (1)  020026  105245                    <JUMP!CCOND!<RK6-INIT&3000*4>!<RK6-INIT&777/2>>
1116  020030                            SP      BR,DECA,SP5             ;DECREMENT HIGH BYTE OF COUNT
 (1)          000643                    MICPC=MICPC+1
 (1)  020030  063165                    <MOVE!SPX!BR!DECA!SP5>
1117  020032                            Z       RL4                     ;BYTE COUNT ZERO
 (1)          000644                    MICPC=MICPC+1
 (1)  020032  111772                    <JUMP!ZCOND!<RL4-INIT&3000*4>!<RL4-INIT&777/2>>
1119  020034                    RK6:    BRWRTE  IBUS,RCVCON             ;READ RECEIVER CONTROL REGISTER
 (1)          000645                    MICPC=MICPC+1
 (1)  020034  020640                    <MOVE!WRTEBR!IBUS!<RCVCON>>
1120  020036                            BR4     RCVKO                   ;IF ANOTHER CHARACTER--PROCESS
 (1)          000646                    MICPC=MICPC+1
 (1)  020036  107215                    <JUMP!BR4CON!<RCVKO-INIT&3000*4>!<RCVKO-INIT&777/2>>
1121  020040                    RK66:   STATE   RCVKO
```



```
 (1)          000647                    MICPC=MICPC+1
 (1)  020040  000615                    <MOVE!WRTEBR!IMM!<RCVKO-INIT&777/2>>
1122  020042                            ALWAYS  REXIT
 (1)          000650                    MICPC=MICPC+1
 (1)  020042  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1123  020044                    RK4:    BR0     IDLE
 (1)          000651                    MICPC=MICPC+1
 (1)  020044  102051                    <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1124  020046                            ALWAYS  RK5                     ;IF NO NPR --PROCESS
 (1)          000652                    MICPC=MICPC+1
 (1)  020046  104627                    <JUMP!ALCOND!<RK5-INIT&3000*4>!<RK5-INIT&777/2>>
1130                                    ;
1131  020050                    RKE1:   SP      IBUS,NPR,SP0            ;READ NPR REGISTER
 (1)          000653                    MICPC=MICPC+1
 (1)  020050  123200                    <MOVE!SPX!IBUS!NPR!SP0>
1133  020052                            BR0     IDLE                    ;NPR STILL IN PROGRESS
 (1)          000654                    MICPC=MICPC+1
 (1)  020052  102051                    <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1135  020054                            BRWRTE  IMM,177                 ;MASK FOR ALL BUT C0
 (1)          000655                    MICPC=MICPC+1
 (1)  020054  000577                    <MOVE!WRTEBR!IMM!<177>>
1136  020056                            OUT     BR,<AANDB!ONPR>         ;TURN OFF ALL BUT C0
 (1)          000656                    MICPC=MICPC+1
 (1)  020056  061270                    <MOVE!WROUTX!BR!<AANDB!ONPR>>
1137  020060                            ALWAYS  RK50
 (1)          000657                    MICPC=MICPC+1
 (1)  020060  134631                    <JUMP!ALCOND!<RK50-INIT&3000*4>!<RK50-INIT&777/2>>
1138                                    ;****************END OF TIME CRITICAL PATH************************************
1139
1140  020062                    RCVKE0: SP      IBUS,RCVDAT,SP0         ;READ CHARACTER AND SAVE IN SP0
 (1)          000660                    MICPC=MICPC+1
 (1)  020062  023200                    <MOVE!SPX!IBUS!RCVDAT!SP0>
1141  020064                            OUTPUT  BR,<SELA!OUTDA1>        ;SEND NONSENSE CHARACTER
 (1)          000661                    MICPC=MICPC+1
 (1)  020064  062202                    <MOVE!WROUT!BR!<SELA!OUTDA1>>
1142  020066                            BRWRTE  BR,SELA!SP1             ;READ STATUS BYTE
 (1)          000662                    MICPC=MICPC+1
 (1)  020066  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1143  020070                            BR7     PASWRD                  ;MAINT MODE - SEE IF RLD MESSAGE
 (1)          000663                    MICPC=MICPC+1
 (1)  020070  117576                    <JUMP!BR7CON!<PASWRD-INIT&3000*4>!<PASWRD-INIT&777/2>>
1144  020072                            ALWAYS  RK3                     ;OTHERWISE PROCESS NORMALLY
 (1)          000664                    MICPC=MICPC+1
 (1)  020072  104641                    <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
```

```
                                        .SBTTL  RCVI--STORE UNNUMBERED MESSAGE TYPE
020074                          RCVI:   SP      IBUS,RCVDAT,SP13        ;STORE UNNUMBERED TYPE
(1)     000665                          MICPC=MICPC+1
(1)     020074  073213                  <MOVE!SPX!IBUS!RCVDAT!SP13>
020076                                  STATE   RCVJ                    ;NEXT STATE IS J
(1)     000666                          MICPC=MICPC+1
(1)     020076  000670                  <MOVE!WRTEBR!IMM!<RCVJ-INIT&777/2>>
020100                                  ALWAYS  REXIT
(1)     000667                          MICPC=MICPC+1
(1)     020100  100450                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
                                        ;
```



```
                                        .SBTTL  RCVJ--ROUTINE TO HANDLE SUBTYPE FIELD,SELECT AND FINAL
020102                          RCVJ:
020102                                  SP      IBUS,RCVDAT,SP5         ;GET CHARACTER
(1)     000670                          MICPC=MICPC+1
(1)     020102  023205                  <MOVE!SPX!IBUS!RCVDAT!SP5>
020104                                  BRWRTE  IMM,200                 ;CONDITIONALLY SET BIT
(1)     000671                          MICPC=MICPC+1
(1)     020104  000600                  <MOVE!WRTEBR!IMM!<200>>
020106                                  BRWRTE  BR,AANDB!SP5
(1)     000672                          MICPC=MICPC+1
(1)     020106  060665                  <MOVE!WRTEBR!BR!<AANDB!SP5>>
020110                                  SP      BR,AORB,SP10
(1)     000673                          MICPC=MICPC+1
(1)     020110  063310                  <MOVE!SPX!BR!AORB!SP10>
020112                                  STATE   RCVR                    ;NEXT STATE IS N
(1)     000674                          MICPC=MICPC+1
(1)     020112  000676                  <MOVE!WRTEBR!IMM!<RCVR-INIT&777/2>>
020114                                  ALWAYS  REXIT
(1)     000675                          MICPC=MICPC+1
(1)     020114  100450                  <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
```

```
                                        .SBTTL  RCVR--UNNUMBERED MESSAGE RESPONSE FIELD
                                        ;ENTERED FROM IDLE LOOP
                                        ;
020116                          RCVR:   BRWRTE  IMM,3                   ;REP MESSAGE TYPE TO BR
(1)             000676                  MICPC=MICPC+1
(1)     020116  030403                  <MOVE!WRTEBR!IMM!<3>>
020120                                  NOP     BR,SUB,SP13             ;IS TYPE ACK OR NAK
(1)             000677                  MICPC=MICPC+1
(1)     020120  060353                  <BR!SUB!SP13>
020122                                  STATE   RCVQ                    ;NEXT STATE IS RCVQ
(1)             000700                  MICPC=MICPC+1
(1)     020122  030703                  <MOVE!WRTEBR!IMM!<RCVQ-INIT&777/2>>
                                                                        ;***NOTE THIS INSTR DOES NOT CLOCK "C"
020124                                  C       RCVF1                   ;IF NOT IGNORE
(1)             000701                  MICPC=MICPC+1
(1)     020124  105131                  <JUMP!CCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
020126                                  ALWAYS  RD2                     ;DO RANGE CHECKS
(1)             000702                  MICPC=MICPC+1
(1)     020126  104473                  <JUMP!ALCOND!<RD2-INIT&3000*4>!<RD2-INIT&777/2>>
```



```
                                        .SBTTL  RCVQ--UNNUMBERED MESSAGE--NUMBER FIELD
                                        ;ENTER  FROM IDLE
                                        ;
020130                          RCVQ:   STATE   RCVF                    ;NEXT STATE IS ADDRESS
(1)             000703                  MICPC=MICPC+1
(1)     020130  030525                  <MOVE!WRTEBR!IMM!<RCVF-INIT&777/2>>
020132                                  ALWAYS  RCVF1
(1)             000704                  MICPC=MICPC+1
(1)     020132  104531                  <JUMP!ALCOND!<RCVF1-INIT&3000*4>!<RCVF1-INIT&777/2>>
```

```
1182                                    .SBTTL  RCVL--PROCESS CRC3
1183                                    ;ENTERED FROM  IDLE LOOP
1184  020134                    RCVL:   SPBR    IBUS,NPR,SP0                    ;READ NPR CONTROL
 (1)          000705                    MICPC=MICPC+1
 (1)  020134  123600                    <MOVE!SPBRX!IBUS!NPR!SP0>
1186  020136                            BR4     RL1                             ;RCV NPR BRANCH
 (1)          000706                    MICPC=MICPC+1
 (1)  020136  107314                    <JUMP!BR4CON!<RL1-INIT&3000*4>!<RL1-INIT&777/2>>
1191  020140                    RL2:    BRWRTE  IMM,176                         ;MASK TO TURN OFF C0
 (1)          000707                    MICPC=MICPC+1
 (1)  020140  000576                    <MOVE!WRTEBR!IMM!<176>>
1192  020142                            OUT     BR,AANDB!ONPR
 (1)          000710                    MICPC=MICPC+1
 (1)  020142  061270                    <MOVE!WROUTX!BR!<AANDB!ONPR>>
1193                                    ;
1194  020144                    RL3:    NOP     IBUS,RCVDAT,0           ;INPUT CHARACTER AND DISCARD
 (1)          000711                    MICPC=MICPC+1
 (1)  020144  020200                    <IBUS!RCVDAT!0>
1195  020146                            STATE   RCVM
 (1)          000712                    MICPC=MICPC+1
 (1)  020146  000716                    <MOVE!WRTEBR!IMM!<RCVM-INIT&777/2>>
1196  020150                            ALWAYS  REXIT
 (1)          000713                    MICPC=MICPC+1
 (1)  020150  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1197                                    ;
1199  020152                    RL1:    BR0     IDLE                            ;NPR GOING --GET OUT
 (1)          000714                    MICPC=MICPC+1
 (1)  020152  102051                    <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1200  020154                            ALWAYS  RL2
 (1)          000715                    MICPC=MICPC+1
 (1)  020154  104707                    <JUMP!ALCOND!<RL2-INIT&3000*4>!<RL2-INIT&777/2>>
1202                                    ;
```



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1204                                    .SBTTL  RCVM--PROCESS CRC4--END OF DATA MESSAGE
1205                                    ;ENTERED FROM IDLE LOOP
1206                                    ;IF CRC CORRECT -- QUEUE INTERUPT AND UPDATE RESPONSE
1207                                    ;
1208                                    ;IF CRC WRONG SEND NAK
1209  020156                    RCVM:   BRWRTE  IBUS,UBBR                       ;READ UNIBUS BR REGISTER
 (1)          000716                    MICPC=MICPC+1
 (1)  020156  120620                    <MOVE!WRTEBR!IBUS!<UBBR>>
1210  020160                            BR0     NXMERR                          ;NON-EXISTANT MEMORY
 (1)          000717                    MICPC=MICPC+1
 (1)  020160  106351                    <JUMP!BR0CON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>
1211  020162                            SP      IBUS,RCVDAT,SP0                 ;READ CRC CHARACTER
 (1)          000720                    MICPC=MICPC+1
 (1)  020162  023200                    <MOVE!SPX!IBUS!RCVDAT!SP0>
1212  020164                            BRWRTE  IBUS,RCVCOM                     ;READ RECEIVER CONTROL REGISTER
 (1)          000721                    MICPC=MICPC+1
 (1)  020164  020640                    <MOVE!WRTEBR!IBUS!<RCVCOM>>
1213  020166                            BR0     RCVM1                           ;IF CRC GOOD -- PROCESS
 (1)          000722                    MICPC=MICPC+1
 (1)  020166  116214                    <JUMP!BR0CON!<RCVM1-INIT&3000*4>!<RCVM1-INIT&777/2>>
1214  020170                            BRWRTE  BR,SELA!SP1                     ;READ STATUS BYTE
 (1)          000723                    MICPC=MICPC+1
 (1)  020170  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1215  020172                            BR7     RHX                             ;CRC ERROR IN BOOT MODE - FLUSH
 (1)          000724                    MICPC=MICPC+1
 (1)  020172  107740                    <JUMP!BR7CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
1216  020174                            LDMA    IMM,T                           ;ELSE SEND NAK --DATA ERROR
 (1)          000725                    MICPC=MICPC+1
 (1)  020174  010151                    <MOVE!LDMAR!IMM!<T&377>>
1217  020176                            MEMINC  IMM,2                           ;NAK TYPE
 (1)          000726                    MICPC=MICPC+1
 (1)  020176  016402                    <MOVE!WRMEM!INCMAR!IMM!<2>>
1218  020200                            MEMINC  IMM,302                         ;DATA ERROR SUBTYPE
 (1)          000727                    MICPC=MICPC+1
 (1)  020200  016702                    <MOVE!WRMEM!INCMAR!IMM!<302>>
1219  020202                            LDMA    IMM,NDATS
 (1)          000730                    MICPC=MICPC+1
 (1)  020202  010014                    <MOVE!LDMAR!IMM!<NDATS&377>>
1220  020204                            ALWAYS  RH5                             ;SEND NAK
 (1)          000731                    MICPC=MICPC+1
 (1)  020204  104552                    <JUMP!ALCOND!<RH5-INIT&3000*4>!<RH5-INIT&777/2>>
1221
1222  020206                    RCVM0:  LDMA    IMM,<<RTHRS+3>>                 ;POINT TO ERROR WORD
 (1)          000732                    MICPC=MICPC+1
 (1)  020206  010177                    <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
1223  020210                            BRWRTE  IMM,10                          ;MAINT MESSAGE ERROR
 (1)          000733                    MICPC=MICPC+1
 (1)  020210  000410                    <MOVE!WRTEBR!IMM!<10>>
1224  020212                            ALWAYS RCEXY                            ;GIVE FATAL ERROR
 (1)          000734                    MICPC=MICPC+1
 (1)  020212  111522                    <JUMP!ALCOND!<RCEXY-INIT&3000*4>!<RCEXY-INIT&777/2>>
```

```
1226                                    .SBTTL  EM2--PROCESS RLD MESSAGE
1227                                    ;ENTERED FROM IDLE LOOP
1228                                    ;IF RLD PASSWORD CHECKS TRIGGER THE BOOT ROM
1229
1230  020214                    EM2:    BRWRTB  IBUS,RCVDAT             ;READ THE CHAR
 (1)          000735                    MICPC=MICPC+1
 (1)  020214  020600                    <MOVE!WRTEBR!IBUS!<RCVDAT>>
1231  020216                            CMP     BR,SP13                 ;IS IT A MATCH
 (1)          000736                    MICPC=MICPC+1
 (1)  020216  060373                    <SUBTC!BR!SP13>
1232  020220                            Z       EM3
 (1)          000737                    MICPC=MICPC+1
 (1)  020220  105746                    <JUMP!ZCOND!<EM3-INIT&3000*4>!<EM3-INIT&777/2>>
1233                                                                    ;FALL INTO RHX
1234  020222                    RHX:    BRWRTB  BR,AA!SP1               ;READ STATUS BYTE SHIFTED LEFT
 (1)          000740                    MICPC=MICPC+1
 (1)  020222  060521                    <MOVE!WRTEBR!BR!<AA!SP1>>
1235  020224                            BR4     10$                     ;DLE RECEIVED IN NORMAL MODE
 (1)          000741                    MICPC=MICPC+1
 (1)  020224  107343                    <JUMP!BR4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1236  020226                            ALWAYS  FLUSH                   ;ALREADY IN MAINT MODE
 (1)          000742                    MICPC=MICPC+1
 (1)  020226  104415                    <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1237  020230                    10$:    BRWRTB  IMM,163                 ;MASK TO CLEAR ALL MAINT RELATED BITS
 (1)          000743                    MICPC=MICPC+1
 (1)  020230  000563                    <MOVE!WRTEBR!IMM!<163>>
1238  020232                            SP      BR,AANDB,SP1            ;CLEAR THEM
 (1)          000744                    MICPC=MICPC+1
 (1)  020232  063261                    <MOVE!SPX!BR!AANDB!SP1>
1239  020234                            ALWAYS  FLUSH
 (1)          000745                    MICPC=MICPC+1
 (1)  020234  104415                    <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1240
1241  020236                    EM3:    SP      BR,DECA,SP4             ;DECREMENT CHARACTER COUNT BY ONE
 (1)          000746                    MICPC=MICPC+1
 (1)  020236  063164                    <MOVE!SPX!BR!DECA!SP4>
1242  020240                            Z       EMTRIG                  ;TRIGGER AC LOW
 (1)          000747                    MICPC=MICPC+1
 (1)  020240  115712                    <JUMP!ZCOND!<EMTRIG-INIT&3000*4>!<EMTRIG-INIT&777/2>>
1243  020242                            ALWAYS  IDLE
 (1)          000750                    MICPC=MICPC+1
 (1)  020242  100451                    <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
```



```
1246                                    .SBTTL NXMERR ---NON EXISTANT MEMORY HANDLER
1247  020244                    NXMERR: LDMA    IMM,<<RTHRS+3>>         ;ADDRESS ERROR LINK
 (1)          000751                    MICPC=MICPC+1
 (1)  020244  010177                    <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
1248  020246                            MEMINC  IMM,1
 (1)          000752                    MICPC=MICPC+1
 (1)  020246  016401                    <MOVE!WRMEM!INCMAR!IMM!<1>>
1249  020250                            MEM     IMM,0                   ;NXM ERROR BIT
 (1)          000753                    MICPC=MICPC+1
 (1)  020250  002400                    <MOVE!WRMEM!IMM!<0>>
1250  020252                            SP      MEMX,SELB,SP10          ;CLEAR STATUS
 (1)          000754                    MICPC=MICPC+1
 (1)  020252  043230                    <MOVE!SPX!MEMX!SELB!SP10>
1251  020254                            ALWAYS  RCEXX
 (1)          000755                    MICPC=MICPC+1
 (1)  020254  114524                    <JUMP!ALCOND!<RCEXX-INIT&3000*4>!<RCEXX-INIT&777/2>>
```

```
1273                                    ;
1274  020256                    BOOT:   BRWRTE  BR,SELA!SP1             ;SEE IF IN MAINT. MODE
 (1)        000756                      MICPC=MICPC+1
 (1)  020256 060601                     <MOVE!WRTEBR!BR!<SELA!SP1>>
1275  020260                            BR7     RA3                     ;BRANCH IF SO AND TREAT DLE LIKE NUM. MSG.
 (1)        000757                      MICPC=MICPC+1
 (1)  020260 103742                     <JUMP!BR7CON!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
1276  020262                            BRWRTE  IMM,210                 ;MASK TO SET MAINT MODE AND DLE RECV'D
 (1)        000760                      MICPC=MICPC+1
 (1)  020262 000610                     <MOVE!WRTEBR!IMM!<210>>
1277  020264                            SP      BR,AORB,SP1             ;SET THE BITS
 (1)        000761                      MICPC=MICPC+1
 (1)  020264 063301                     <MOVE!SPX!BR!AORB!SP1>
1278  020266                            ALWAYS  RA3                     ;TREAT LIKE NUMBERED MESSAGE
 (1)        000762                      MICPC=MICPC+1
 (1)  020266 103742                     <JUMP!ALCOND!<RA3-INIT&3000*4>!<RA3-INIT&777/2>>
1279  020270                    RESEXT: BRWRTE  IMM,4                   ;ADD TO MXT BITS
 (1)        000763                      MICPC=MICPC+1
 (1)  020270 000404                     <MOVE!WRTEBR!IMM!<4>>
1280  020272                            SP      BR,ADD,SP0
 (1)        000764                      MICPC=MICPC+1
 (1)  020272 063000                     <MOVE!SPX!BR!ADD!SP0>
1281  020274                            ALWAYS  TH3X
 (1)        000765                      MICPC=MICPC+1
 (1)  020274 110601                     <JUMP!ALCOND!<TH3X-INIT&3000*4>!<TH3X-INIT&777/2>>
1282  020276                    TABMXT: BRWRTE  IMM,4                   ;INCREMENT MXT
 (1)        000766                      MICPC=MICPC+1
 (1)  020276 000404                     <MOVE!WRTEBR!IMM!<4>>
1283  020300                            SP      IBUS,UBBR,SP0           ;READ BR CONTROL
 (1)        000767                      MICPC=MICPC+1
 (1)  020300 123220                     <MOVE!SPX!IBUS!UBBR!SP0>
1284  020302                            OUT     BR,ADD!OBR
 (1)        000770                      MICPC=MICPC+1
 (1)  020302 061011                     <MOVE!WROUTX!BR!<ADD!OBR>>
1285  020304                            ALWAYS  ECX
 (1)        000771                      MICPC=MICPC+1
 (1)  020304 114761                     <JUMP!ALCOND!<ECX-INIT&3000*4>!<ECX-INIT&777/2>>
1286                                    ;
1287  020306                    RTHRES: BRWRTE  IMM,2
 (1)        000772                      MICPC=MICPC+1
 (1)  020306 000402                     <MOVE!WRTEBR!IMM!<2>>
1288  020310                            ALWAYS  ERRXX
 (1)        000773                      MICPC=MICPC+1
 (1)  020310 114663                     <JUMP!ALCOND!<ERRXX-INIT&3000*4>!<ERRXX-INIT&777/2>>
1291  020312                            $ZERO
 (2)        000774                      MICPC=MICPC+1
 (2)  020312 000000                     000000
 (1)  020314                            $ZERO
 (2)        000775                      MICPC=MICPC+1
 (2)  020314 000000                     000000
 (1)  020316                            $ZERO
 (2)        000776                      MICPC=MICPC+1
 (2)  020316 000000                     000000
 (1)  020320                            $ZERO
 (2)        000777                      MICPC=MICPC+1
 (2)  020320 000000                     000000
```



```
1293          020322                    .=INIT+2000
1294          000777                    MICPC=777
1295                                    .SBTTL  TMTDA--TRANSMITTER DISPATCH ROUTINE
1296                                    ;
1297  020322                    TMTDA:  BRWRTE  IBUS,TMTCON                     ;READ TRANMITTER CONTROL REGISTER
 (1)        001000                      MICPC=MICPC+1
 (1)  020322 020020                     <MOVE!WRTEBR!IBUS!<TMTCON>>
1298  020324                            .BR4    DP,SELA,<2!PAGE2>               ;IF READY PROCEED
 (1)        001001                      MICPC=MICPC+1
 (1)  020324 173202                     <JUMP! BR4CON!DP!SELA!2!PAGE2>
1299  020326                            ALWAYS  I1                              ;ELSE IDLE
 (1)        001002                      MICPC=MICPC+1
 (1)  020326 100454                     <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
```

```
1301                                    .SBTTL  TMTA--FIRST CHARACTER OF HEADER
1302                                    ;
1303  020330                    TMTA:
1309  020330                            BRWRTE  BR,SELA!SP10                    ;REREAD STATUS
 (1)          001003                    MICPC=MICPC+1
 (1)  020330  060610                    <MOVE!WRTEBR!BR!<SELA!SP10>>
1310  020332                            BR0     NUMSYN                          ;IF UNNUMBPENDING  -- SEND IT
 (1)          001004                    MICPC=MICPC+1
 (1)  020332  112007                    <JUMP!BR0CON!<NUMSYN-INIT&3000*4>!<NUMSYN-INIT&777/2>>
1311  020334                            BRSHFT
 (1)          001005                    MICPC=MICPC+1
 (1)  020334  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1312  020336                            BR4     IDLE0                           ;IF START MODE--EXIT
 (1)          001006                    MICPC=MICPC+1
 (1)  020336  103063                    <JUMP!BR4CON!<IDLE0-INIT&3000*4>!<IDLE0-INIT&777/2>>
1318  020340                    NUMSYN: BRWRTE  BR,<SELA!SP10>                  ;READ LINE STATUS WORD
 (1)          001007                    MICPC=MICPC+1
 (1)  020340  060610                    <MOVE!WRTEBR!BR!<SELA!SP10>>
1319  020342                            BR7     5$                              ;IF OK TO SEND--PROCEED
 (1)          001010                    MICPC=MICPC+1
 (1)  020342  113412                    <JUMP!BR7CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
1320  020344                            ALWAYS  I1                              ;ELSE--IDLE
 (1)          001011                    MICPC=MICPC+1
 (1)  020344  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1321  020346                    5$:     BRWRTE  IBUS,MODEM                      ;ARE WE STILL SENDING?
 (1)          001012                    MICPC=MICPC+1
 (1)  020346  020660                    <MOVE!WRTEBR!IBUS!<MODEM>>
1322  020350                            BRSHFT
 (1)          001013                    MICPC=MICPC+1
 (1)  020350  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1323  020352                            BR4     I1                              ;RTS SET? IF SO WE ARE--STALL
 (1)          001014                    MICPC=MICPC+1
 (1)  020352  100054                    <JUMP!BR4CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1324  020354                            BRWRTE  IMM,373                         ;MASK TO TURN OFFLINE IDLE
 (1)          001015                    MICPC=MICPC+1
 (1)  020354  000773                    <MOVE!WRTEBR!IMM!<373>>
1325  020356                            SP      BR,AANDB,SP10                   ;IN LINE STATUS WORD
 (1)          001016                    MICPC=MICPC+1
 (1)  020356  063270                    <MOVE!SPX!BR!AANDB!SP10>
1326  020360                            TSTATE  TMTA1
 (1)          001017                    MICPC=MICPC+1
 (1)  020360  000424                    <MOVE!WRTEBR!IMM!<TMTA1-INIT&777/2>>
 (1)          001020                    MICPC=MICPC+1
 (1)  020362  063222                    <MOVE!SPX!BR!SELB!SP2>
1327  020364                            BRWRTE  IMM,12
 (1)          001021                    MICPC=MICPC+1
 (1)  020364  000412                    <MOVE!WRTEBR!IMM!<12>>
1328  020366                            SP      BR,SELB,SP6                     ;STORE IN SP6
 (1)          001022                    MICPC=MICPC+1
 (1)  020366  063226                    <MOVE!SPX!BR!SELB!SP6>
1329  020370                            ALWAYS  I1                              ;BACK TO IDLE LOOP
 (1)          001023                    MICPC=MICPC+1
 (1)  020370  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1330  020372                    TMTA1:  SP      BR,DECA,SP6                     ;DECREMENT SYN COUNT
 (1)          001024                    MICPC=MICPC+1
 (1)  020372  063166                    <MOVE!SPX!BR!DECA!SP6>
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1331  020374                            Z       TMTEXT
 (1)          001025                    MICPC=MICPC+1
 (1)  020374  111432                    <JUMP!ZCOND!<TMTEXT-INIT&3000*4>!<TMTEXT-INIT&777/2>>
1332  020376                            OUTPUT  IMM,<1!OTMTCO>                  ;WRITE SOM TO TMTR CONTRL
 (1)          001026                    MICPC=MICPC+1
 (1)  020376  002011                    <MOVE!WROUT!IMM!<1!OTMTCO>>
1333  020400                            BRWRTE  IMM,226                         ;SYNC CHAR
 (1)          001027                    MICPC=MICPC+1
 (1)  020400  000626                    <MOVE!WRTEBR!IMM!<226>>
1334  020402                            OUTPUT  BR,<SELB!TMTDAT>                ;SEND THE CHARACTER
 (1)          001030                    MICPC=MICPC+1
 (1)  020402  062230                    <MOVE!WROUT!BR!<SELB!TMTDAT>>
1335  020404                            ALWAYS  I1
 (1)          001031                    MICPC=MICPC+1
 (1)  020404  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1337  020406                    TMTEXT: BRWRTE  BR,<SELA!SP10>                  ;UNNUMB MESSGE?
 (1)          001032                    MICPC=MICPC+1
 (1)  020406  060610                    <MOVE!WRTEBR!BR!<SELA!SP10>>
1338  020410                            BR0     TMTUN                           ;IF SO --BRANCH
 (1)          001033                    MICPC=MICPC+1
 (1)  020410  112043                    <JUMP!BR0CON!<TMTUN-INIT&3000*4>!<TMTUN-INIT&777/2>>
1339  020412                            TSTATE  TMTB
 (1)          001034                    MICPC=MICPC+1
 (1)  020412  000451                    <MOVE!WRTEBR!IMM!<TMTB-INIT&777/2>>
 (1)          001035                    MICPC=MICPC+1
 (1)  020414  063222                    <MOVE!SPX!BR!SELB!SP2>
1340  020416                            BRWRTE  BR,SELA!SP1                     ;ARE WE IN BOOT MODE
 (1)          001036                    MICPC=MICPC+1
 (1)  020416  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1341  020420                            BR7     TMTBT                           ;IF SO SEND DLE
 (1)          001037                    MICPC=MICPC+1
 (1)  020420  113447                    <JUMP!BR7CON!<TMTBT-INIT&3000*4>!<TMTBT-INIT&777/2>>
1342  020422                            BRWRTE  IMM,201                         ;ELSE STORE SOH
 (1)          001040                    MICPC=MICPC+1
 (1)  020422  000601                    <MOVE!WRTEBR!IMM!<201>>
1343  020424                    TMTA5:  OUTPUT  BR,<SELB!TMTDAT>                ;IN TMT SILO
 (1)          001041                    MICPC=MICPC+1
 (1)  020424  062230                    <MOVE!WROUT!BR!<SELB!TMTDAT>>
1344  020426                            ALWAYS  I1
 (1)          001042                    MICPC=MICPC+1
 (1)  020426  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1345  020430                    TMTUN:  TSTATE  TMTI
 (1)          001043                    MICPC=MICPC+1
 (1)  020430  000610                    <MOVE!WRTEBR!IMM!<TMTI-INIT&777/2>>
 (1)          001044                    MICPC=MICPC+1
 (1)  020432  063222                    <MOVE!SPX!BR!SELB!SP2>
1346  020434                            BRWRTE  IMM,5                           ;ENQ TO BR
 (1)          001045                    MICPC=MICPC+1
 (1)  020434  000405                    <MOVE!WRTEBR!IMM!<5>>
1347  020436                            ALWAYS  TMTA5
 (1)          001046                    MICPC=MICPC+1
 (1)  020436  111441                    <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
1348  020440                    TMTBT:  BRWRTE  IMM,220                         ;WRITE A DLE TO BR
 (1)          001047                    MICPC=MICPC+1
 (1)  020441  000620                    <MOVE!WRTEBR!IMM!<220>>
1349  020442                            ALWAYS  TMTA5                           ;SEND IT
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 (1)          001050                  MICPC=MICPC+1
 (1)  020442  110441                  <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
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1373                                  .SBTTL  TMTB--OUTPUT FIRST CHAR OF COUNT
1374                                  ;
1375  020444                  TMTB:   LDMA    BR,SELA!SP16                    ;GETPOINTER TO NEXT TMT LINK
 (1)          001051                  MICPC=MICPC+1
 (1)  020444  070216                  <MOVE!LDMAR!BR!<SELA!SP16>>
1376  020446                          MEMINC  IMM,3                           ;WRITE MSG TMTLD TO FLAGS
 (1)          001052                  MICPC=MICPC+1
 (1)  020446  016403                  <MOVE!WRMEM!INCMAR!IMM!<3>>
1377  020450                          MEMINC  BR,SELA!SP12                    ;PICK UP MSGNO
 (1)          001053                  MICPC=MICPC+1
 (1)  020450  076612                  <MOVE!WRMEM!INCMAR!BR!<SELA!SP12>>
1378  020452                          STATE   TMTC                            ;ADDRESS TMTR STATE
 (1)          001054                  MICPC=MICPC+1
 (1)  020452  000476                  <MOVE!WRTEBR!IMM!<TMTC-INIT&777/2>>
1379  020454                  TB0:    SP      BR,SELB,SP2                     ;UPDATE IT
 (1)          001055                  MICPC=MICPC+1
 (1)  020454  063222                  <MOVE!SPX!BR!SELB!SP2>
1380  020456                          OUTPUT  <MEMX!INCMAR>,SELB!IBA1         ;WRITELOWBYTEOFADDRESS
 (1)          001056                  MICPC=MICPC+1
 (1)  020456  056224                  <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA1>>
1381  020460                          OUTPUT  <MEMX!INCMAR>,SELB!IBA2         ;WRITE HIGH BYTE OF ADDRESS
 (1)          001057                  MICPC=MICPC+1
 (1)  020460  056225                  <MOVE!WROUT!MEMX!INCMAR!<SELB!IBA2>>
1382  020462                          SP      MEMX,SELB,SP7   ;HIGH BYTE OF COUNT TO SP7
 (1)          001060                  MICPC=MICPC+1
 (1)  020462  043227                  <MOVE!SPX!MEMX!SELB!SP7>
1383                                                    ;WAIT TO MASK OFF MEM EXT. BITS
1384  020464                          SP      IBUS,NPR,SP0
 (1)          001061                  MICPC=MICPC+1
 (1)  020464  123200                  <MOVE!SPX!IBUS!NPR!SP0>
1385  020466                          BRWRTE  IMM,220
 (1)          001062                  MICPC=MICPC+1
 (1)  020466  000620                  <MOVE!WRTEBR!IMM!<220>>
1386  020470                          SP      BR,AANDR,SP0
 (1)          001063                  MICPC=MICPC+1
 (1)  020470  063260                  <MOVE!SPX!BR!AANDB!SP0>
1387  020472                          SP      IMM,300,SP6                     ;MASK FOR MXT
 (1)          001064                  MICPC=MICPC+1
 (1)  020472  003306                  <MOVE!SPX!IMM!300!SP6>
1388  020474                          BRWRTE  MEMX!INCMAR,AANDB!SP6           ;TURN OFF CC2
 (1)          001065                  MICPC=MICPC+1
 (1)  020474  054666                  <MOVE!WRTEBR!MEMX!INCMAR!<AANDB!SP6>>
1389  020476                          OUTPUT  MEMX,SELB!TMTDAT                ;ALSO WRITE COUNT TO TMTR SILO
 (1)          001066                  MICPC=MICPC+1
 (1)  020476  042230                  <MOVE!WROUT!MEMX!<SELB!TMTDAT>>
1390  020500                          BRSHFT                                  ;SHIFT BITS INTO CORRECT POSITION
 (1)          001067                  MICPC=MICPC+1
 (1)  020500  001620                  <MOVE!SHFTBR!WRTEBR!SELB>
1391  020502                          BRSHFT
 (1)          001070                  MICPC=MICPC+1
 (1)  020502  001620                  <MOVE!SHFTBR!WRTEBR!SELB>
1392  020504                          BRSHFT
 (1)          001071                  MICPC=MICPC+1
 (1)  020504  001620                  <MOVE!SHFTBR!WRTEBR!SELB>
1393  020506                          BRSHFT
 (1)          001072                  MICPC=MICPC+1
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   (1)  020506  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1394    020510                            OUT     BR,AORB!ONPR
   (1)          001073                    MICPC=MICPC+1
   (1)  020510  061310                    <MOVE!WROUTX!BR!<AORB!ONPR>>
1395    020512                            SPBR    MEMX,SELB,SP6           ;LOWBYTE OF COUNT TO SP6
   (1)          001074                    MICPC=MICPC+1
   (1)  020512  043626                    <MOVE!SPBRX!MEMX!SELB!SP6>
1400    020514                            ALWAYS  I1
   (1)          001075                    MICPC=MICPC+1
   (1)  020514  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1402                                      ;
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1404                                      .SBTTL  TMTC--OUTPUT SECOND CHAR OF COUNT
1405                                      ;
1406  020516                    TMTC:     BRWRTE  IMM,77                  ;MASK TO CLEAR MXT BITS
   (1)          001076                    MICPC=MICPC+1
   (1)  020516  000477                    <MOVE!WRTEBR!IMM!<77>>
1407    020520                            SPBR    BR,AANDB,SP7            ;CLEAR THEM
   (1)          001077                    MICPC=MICPC+1
   (1)  020520  063667                    <MOVE!SPBRX!BR!AANDB!SP7>
1408    020522                            OUTPUT  DP,<SELB!TMTDAT>        ;WRITE TO TMT SILO
   (1)          001100                    MICPC=MICPC+1
   (1)  020522  062230                    <MOVE!WROUT!DP!<SELB!TMTDAT>>
1409    020524                            BRWRTE  IMM,TML8                        ;GET WRAPAROUND ADDRESS
   (1)          001101                    MICPC=MICPC+1
   (1)  020524  000543                    <MOVE!WRTEBR!IMM!<TML8>>
1410    020526                            CMP     BR,SP16                 ;WRAPAORUND
   (1)          001102                    MICPC=MICPC+1
   (1)  020526  060376                    <SUBTC!BR!SP16>
1411    020530                            Z       10$
   (1)          001103                    MICPC=MICPC+1
   (1)  020530  111511                    <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1412    020532                            BRWRTE  IMM,6                   ;OFFSET TO NEXT LINK
   (1)          001104                    MICPC=MICPC+1
   (1)  020532  000406                    <MOVE!WRTEBR!IMM!<6>>
1413    020534                            SP      BR,ADD,SP16             ;UPDATE THE POINTER
   (1)          001105                    MICPC=MICPC+1
   (1)  020534  063016                    <MOVE!SPX!BR!ADD!SP16>
1414    020536                    5$:
1420    020536                            TSTATE  TMTD
   (1)          001106                    MICPC=MICPC+1
   (1)  020536  000514                    <MOVE!WRTEBR!IMM!<TMTD-INIT&777/2>>
   (1)          001107                    MICPC=MICPC+1
   (1)  020540  063222                    <MOVE!SPX!BR!SELB!SP2>
1421    020542                            ALWAYS  I1              ;****OCTOBER 29, 1976
   (1)          001110                    MICPC=MICPC+1
   (1)  020542  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1423    020544                    10$:    BRWRTE  IMM,TML1                ;GO BACK TO FIRST LINK
   (1)          001111                    MICPC=MICPC+1
   (1)  020544  000471                    <MOVE!WRTEBR!IMM!<TML1>>
1424    020546                            SP      BR,SELB,SP16
   (1)          001112                    MICPC=MICPC+1
   (1)  020546  063236                    <MOVE!SPX!BR!SELB!SP16>
1425    020550                            ALWAYS  5$
   (1)          001113                    MICPC=MICPC+1
   (1)  020550  110506                    <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
1426                                      ;
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1428                                        .SBTTL  TMTD--RESPONSE FIELD=NUMBERED MESSAGE
1429  020552                        TMTD:   STATE   TMTE
 (1)          001114                       MICPC=MICPC+1
 (1)  020552  000524                       <MOVE!WRTEBR!IMM!<TMTE-INIT&777/2>>
1430  020554                               SP      BR,DECA,SP6                     ;ADJUSRT COUNT FOR  TWO'S  COMPLEMENT
 (1)          001115                       MICPC=MICPC+1
 (1)  020554  063166                       <MOVE!SPX!BR!DECA!SP6>
1431  020556                               C       TD2                             ;NO OVERFLOW
 (1)          001116                       MICPC=MICPC+1
 (1)  020556  111120                       <JUMP!CCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>
1432  020560                               SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF COUNT
 (1)          001117                       MICPC=MICPC+1
 (1)  020560  063167                       <MOVE!SPX!BR!DECA!SP7>
1433  020562                        TD2:    LDMA    IMM,ISP11                       ;RESP FIELD ADDR TO MAR
 (1)          001120                       MICPC=MICPC+1
 (1)  020562  010171                       <MOVE!LDMAR!IMM!<ISP11&377>>
1434  020564                        TD3:    OUTPUT  MEMX,SELB!TMTDAT                ;WRITE IT TO SILO
 (1)          001121                       MICPC=MICPC+1
 (1)  020564  042230                       <MOVE!WROUT!MEMX!<SELB!TMTDAT>>
1435  020566                        XEXIT2: SP      BR,SELB,SP2
 (1)          001122                       MICPC=MICPC+1
 (1)  020566  063222                       <MOVE!SPX!BR!SELB!SP2>
1436  020570                               ALWAYS  I1
 (1)          001123                       MICPC=MICPC+1
 (1)  020570  100454                       <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
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1438                                        .SBTTL  TMTE--NUMBER FIELD--NUMBERED MESSAGE
1439  020572                        TMTE:
1440  020572                               SPBR    IBUS,NPR,SP0                    ;READ NPR CONTROL REGISTER
 (1)          001124                       MICPC=MICPC+1
 (1)  020572  123600                       <MOVE!SPBRX!IBUS!NPR!SP0>
1441  020574                               BR0     I1                              ;BUSY - GET OUT
 (1)          001125                       MICPC=MICPC+1
 (1)  020574  100454                       <JUMP!BR0CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1442  020576                               BRWRTE  BR,SELA!SP12
 (1)          001126                       MICPC=MICPC+1
 (1)  020576  060612                       <MOVE!WRTEBR!BR!<SELA!SP12>>
1443  020600                               OUTPUT  BR,<SELB!TMTDAT>                ;WRITE IT TO THE SILO
 (1)          001127                       MICPC=MICPC+1
 (1)  020600  062230                       <MOVE!WROUT!BR!<SELB!TMTDAT>>
1444  020602                               STATE   TMTF
 (1)          001130                       MICPC=MICPC+1
 (1)  020602  000532                       <MOVE!WRTEBR!IMM!<TMTF-INIT&777/2>>
1445  020604                               ALWAYS  TH3
 (1)          001131                       MICPC=MICPC+1
 (1)  020604  110600                       <JUMP!ALCOND!<TH3-INIT&3000*4>!<TH3-INIT&777/2>>
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1447                                        .SBTTL  TMTF--NUMBERED MSG ADDRESS FIELD
1448                                        ;
1449  020606                        TMTF:   STATE   IF1
 (1)          001132                       MICPC=MICPC+1
 (1)  020606  000537                       <MOVE!WRTEBR!IMM!<TF1-INIT&777/2>>
1450  020610                        TF2:    SP      BR,SELB,SP2
 (1)          001133                       MICPC=MICPC+1
 (1)  020610  063222                       <MOVE!SPX!BR!SELB!SP2>
1451  020612                                BRWRTE  IMM,1                   ;LOAD ADDRESS
 (1)          001134                       MICPC=MICPC+1
 (1)  020612  000401                       <MOVE!WRTEBR!IMM!<1>>
1453  020614                        TF3:    OUTPUT  BR,<SELB!TMTDAT>
 (1)          001135                       MICPC=MICPC+1
 (1)  020614  062230                       <MOVE!WROUT!BR!<SELB!TMTDAT>>
1454  020616                                ALWAYS  I1
 (1)          001136                       MICPC=MICPC+1
 (1)  020616  100454                       <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
```



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1460                                        .SBTTL  TF1-NUMBERED MSG HEADER EOM
1461  020620                        TF1:    BRWRTE  IMM,2                   ;EOM  MASK TO BR
 (1)          001137                       MICPC=MICPC+1
 (1)  020620  000402                       <MOVE!WRTEBR!IMM!<2>>
1462  020622                                OUTPUT  BR,<SELB!OTMTCO>        ;UPDATE TMTR CONTROL REGISTER
 (1)          001140                       MICPC=MICPC+1
 (1)  020622  062231                       <MOVE!WROUT!BR!<SELB!OTMTCO>>
1463  020624                                OUTPUT  BR,<SELB!TMTDAT>        ;OUTPUT A GARBAGE CHAR
 (1)          001141                       MICPC=MICPC+1
 (1)  020624  062230                       <MOVE!WROUT!BR!<SELB!TMTDAT>>
1464  020626                                BRWRTE  IBUS,IIBA1              ;READ LOW ORDER FROM INBA
 (1)          001142                       MICPC=MICPC+1
 (1)  020626  022500                       <MOVE!WRTEBR!IBUS!<IIBA1>>
1465  020630                                BR0     TMTF1                   ;IF ODD BITE--BRANCH
 (1)          001143                       MICPC=MICPC+1
 (1)  020630  112162                       <JUMP!BR0CON!<TMTF1-INIT&3000*4>!<TMTF1-INIT&777/2>>
1466  020632                                STATE   TMTH
 (1)          001144                       MICPC=MICPC+1
 (1)  020632  000546                       <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
1467  020634                                ALWAYS  XEXIT
 (1)          001145                       MICPC=MICPC+1
 (1)  020634  110563                       <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
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1469                                    ;************TIME CRITICAL PATH--MODIFY WITH GREAT CARE
1470                                            .SBTTL  TMTH--ROUTINE TO OUTPUT DATA CHARACTERS
1471                                            ;
1472  020636                    TMTH:   SPBR    IBUS,NPR,SP0                    ;READ NPR CONTROL
 (1)          001146                    MICPC=MICPC+1
 (1)  020636  123600                    <MOVE!SPBRX!IBUS!NPR!SP0>
1474  020640                            BR4     5$                              ;IF RECV NPR --PROCESS
 (1)          001147                    MICPC=MICPC+1
 (1)  020640  113151                    <JUMP!BR4CON!<5$-INIT&3000*4>!<5$-INIT&777/2>>
1476  020642                            BR0     I1                              ;IF NPR IN PROGRESS --BRANCH
 (1)          001150                    MICPC=MICPC+1
 (1)  020642  102054                    <JUMP!BR0CON!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1477  020644                    5$:     OUTPUT  IBUS,<INDAT1!TMTDAT>            ;WRITE THE EVEN CHAR TO TMT SILO
 (1)          001151                    MICPC=MICPC+1
 (1)  020644  022010                    <MOVE!WROUT!IBUS!<INDAT1!TMTDAT>>
1478  020646                            SP      IBUS,IIBA1,SP0                  ;READ LOW BYTE OF BA TO SP
 (1)          001152                    MICPC=MICPC+1
 (1)  020646  023100                    <MOVE!SPX!IBUS!IIBA1!SP0>
1479  020650                            OUTPUT  BR,<INCA!IBA1>                  ;OUTPUT INCREMENTED BA
 (1)          001153                    MICPC=MICPC+1
 (1)  020650  062064                    <MOVE!WROUT!BR!<INCA!IBA1>>
1480  020652                            SP      BR,DECA,SP6                     ;DECREMENT CHARACTER  COUNT
 (1)          001154                    MICPC=MICPC+1
 (1)  020652  063166                    <MOVE!SPX!BR!DECA!SP6>
1481  020654                            C       TH6                             ;NO OVERFLOW
 (1)          001155                    MICPC=MICPC+1
 (1)  020654  111160                    <JUMP!CCOND!<TH6-INIT&3000*4>!<TH6-INIT&777/2>>
1482  020656                            SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF COUNT
 (1)          001156                    MICPC=MICPC+1
 (1)  020656  063167                    <MOVE!SPX!BR!DECA!SP7>
1483  020660                            Z       HEH1                            ;BYTE  COUNT ZERO
 (1)          001157                    MICPC=MICPC+1
 (1)  020660  115407                    <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>
1484  020662                    TH6:
1486  020662                            BRWRTE  IBUS,TMTCON             ;READ TMTR CONTROL CSR
 (1)          001160                    MICPC=MICPC+1
 (1)  020662  020620                    <MOVE!WRTEBR!IBUS!<TMTCON>>
1487  020664                            BR4     TH9                             ;IF MORE ROOM IN SILO--BRANCH
 (1)          001161                    MICPC=MICPC+1
 (1)  020664  113165                    <JUMP!BR4CON!<TH9-INIT&3000*4>!<TH9-INIT&777/2>>
1489  020666                    TMTF1:  STATE   TMTHO
 (1)          001162                    MICPC=MICPC+1
 (1)  020666  000565                    <MOVE!WRTEBR!IMM!<TMTHO-INIT&777/2>>
1494  020670                    XEXIT:  SP      BR,SELB,SP2                     ;STORE NEW TRANSMIT STATE
 (1)          001163                    MICPC=MICPC+1
 (1)  020670  063222                    <MOVE!SPX!BR!SELB!SP2>
1495  020672                            ALWAYS  I1
 (1)          001164                    MICPC=MICPC+1
 (1)  020672  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1497  020674                    TMTHO:
1502  020674                    TH9:    OUTPUT  IBUS,<INDAT2!TMTDAT>            ;ODD CHAR TO SILO
 (1)          001165                    MICPC=MICPC+1
 (1)  020674  022030                    <MOVE!WROUT!IBUS!<INDAT2!TMTDAT>>
1503  020676                            SP      IBUS,IIBA1,SP0                  ;READ LOW BYTE TO BA
 (1)          001166                    MICPC=MICPC+1
 (1)  020676  023100                    <MOVE!SPX!IBUS!IIBA1!SP0>
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1504  020700                            OUTPUT  BR,<INCA!IBA1>                  ;OUTPUT THE INCREMENTED BA
 (1)          001167                    MICPC=MICPC+1
 (1)  020700  062064                    <MOVE!WROUT!BR!<INCA!IBA1>>
1505  020702                            C       HOINCH
 (1)          001170                    MICPC=MICPC+1
 (1)  020702  111377                    <JUMP!CCOND!<HOINCH-INIT&3000*4>!<HOINCH-INIT&777/2>>
1506  020704                    TH8:    SP      BR,DECA,SP6                     ;DECREMENT CHARACTERCOUNT
 (1)          001171                    MICPC=MICPC+1
 (1)  020704  063166                    <MOVE!SPX!BR!DECA!SP6>
1507  020706                            C       TH7                             ;NO OVERFLOW
 (1)          001172                    MICPC=MICPC+1
 (1)  020706  111175                    <JUMP!CCOND!<TH7-INIT&3000*4>!<TH7-INIT&777/2>>
1508  020710                            SP      BR,DECA,SP7                     ;DECREMENT HIGH BYTE OF  COUNT
 (1)          001173                    MICPC=MICPC+1
 (1)  020710  063167                    <MOVE!SPX!BR!DECA!SP7>
1509  020712                            Z       HEH1                            ;BYTE COUNT ZERO
 (1)          001174                    MICPC=MICPC+1
 (1)  020712  115407                    <JUMP!ZCOND!<HEH1-INIT&3000*4>!<HEH1-INIT&777/2>>
1510  020714                    TH7:    SPBR    IBUS,NPR,SP0                    ;READ NPR REGISTER
 (1)          001175                    MICPC=MICPC+1
 (1)  020714  123600                    <MOVE!SPBRX!IBUS!NPR!SP0>
1512  020716                            BR0     TH2                             ;IF NPR BUSY WAIT TO GO
 (1)          001176                    MICPC=MICPC+1
 (1)  020716  112205                    <JUMP!BR0CON!<TH2-INIT&3000*4>!<TH2-INIT&777/2>>
1514  020720                            STATE   TMTH
 (1)          001177                    MICPC=MICPC+1
 (1)  020720  000546                    <MOVE!WRTEBR!IMM!<TMTH-INIT&777/2>>
1515  020722                    TH3:    SP      BR,SELB,SP2                     ;SAVE TSTATE
 (1)          001200                    MICPC=MICPC+1
 (1)  020722  063222                    <MOVE!SPX!BR!SELB!SP2>
1516  020724                    TH3X:   BRWRTE  IMM,156                         ;CLEAR C0 AND C1
 (1)          001201                    MICPC=MICPC+1
 (1)  020724  000556                    <MOVE!WRTEBR!IMM!<156>>
1517  020726                            SP      BR,AANDB,SP0                    ;CLEAR THE BITS
 (1)          001202                    MICPC=MICPC+1
 (1)  020726  063260                    <MOVE!SPX!BR!AANDB!SP0>
1518  020730                            OUT     BR,<INCA!ONPR>
 (1)          001203                    MICPC=MICPC+1
 (1)  020730  061070                    <MOVE!WROUTX!BR!<INCA!ONPR>>
1519  020732                            ALWAYS  I1
 (1)          001204                    MICPC=MICPC+1
 (1)  020732  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1521  020734                    TH2:    TSTATE  TH7
 (1)          001205                    MICPC=MICPC+1
 (1)  020734  002575                    <MOVE!WRTEBR!IMM!<TH7-INIT&777/2>>
 (1)          001206                    MICPC=MICPC+1
 (1)  020736  063222                    <MOVE!SPX!BR!SELB!SP2>
1522  020740                            ALWAYS  I1
 (1)          001207                    MICPC=MICPC+1
 (1)  020740  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1524                                    ;************END TIME CRITICAL PATH*****************************
1525                                    ;
```

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1527                                    .SBTTL  TMTI--SEND UNNUMBERED TYPE FIELD
1528  020742                    TMTI:   LDMA    IMM,T                   ;ADDRESS OF TYPE FIELD TO MAR
 (1)          001210                    MICPC=MICPC+1
 (1)  020742  010151                    <MOVE!LDMAR!IMM!<T&377>>
1529  020744                            SP      MEMX,SELB,SP6           ;COPY IT TO SP6
 (1)          001211                    MICPC=MICPC+1
 (1)  020744  043226                    <MOVE!SPX!MEMX!SELB!SP6>
1530  020746                            STATE   TMTJ
 (1)          001212                    MICPC=MICPC+1
 (1)  020746  002614                    <MOVE!WRTEBR!IMM!<TMTJ-INIT&777/2>>
1531  020750                            ALWAYS  TD3
 (1)          001213                    MICPC=MICPC+1
 (1)  020750  110521                    <JUMP!ALCOND!<TD3-INIT&3000*4>!<TD3-INIT&777/2>>
1532                                    ;
1533                                    .SBTTL  TMTJ--SEND SUB-TYPE FIELD
1534  020752                    TMTJ:   LDMA    IMM,ST                  ;ADDRESS OF SUB-TYPE FIELD TO MAR
 (1)          001214                    MICPC=MICPC+1
 (1)  020752  010152                    <MOVE!LDMAR!IMM!<ST&377>>
1535  020754                            STATE   TMTK
 (1)          001215                    MICPC=MICPC+1
 (1)  020754  000617                    <MOVE!WRTEBR!IMM!<TMTK-INIT&777/2>>
1536  020756                            ALWAYS  TD3
 (1)          001216                    MICPC=MICPC+1
 (1)  020756  110521                    <JUMP!ALCOND!<TD3-INIT&3000*4>!<TD3-INIT&777/2>>
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1538                                    .SBTTL  TMTK--OUTPUT RESPONSE FIELD (UNNUMB MSG)
1539                                    ;
1540  020760                    TMTK:   BRWRTE  IMM,3                   ;WRITE A 3 TO BR
 (1)          001217                    MICPC=MICPC+1
 (1)  020760  000403                    <MOVE!WRTEBR!IMM!<3>>
1541  020762                            NOP     BR,SUB,SP6              ;IF TYPE LESS THAN 3
 (1)          001220                    MICPC=MICPC+1
 (1)  020762  060346                    <BR!SUB!SP6>
1542  020764                            TSTATE  TMTL
 (1)          001221                    MICPC=MICPC+1
 (1)  020764  000625                    <MOVE!WRTEBR!IMM!<TMTL-INIT&777/2>>
 (1)          001222                    MICPC=MICPC+1
 (1)  020766  063222                    <MOVE!SPX!BR!SELB!SP2>
1543  020770                            C       TMTL0
 (1)          001223                    MICPC=MICPC+1
 (1)  020770  111232                    <JUMP!CCOND!<TMTL0-INIT&3000*4>!<TMTL0-INIT&777/2>>
1544  020772                            ALWAYS  TD2
 (1)          001224                    MICPC=MICPC+1
 (1)  020772  110520                    <JUMP!ALCOND!<TD2-INIT&3000*4>!<TD2-INIT&777/2>>
1545                                    ;
1546                                    .SBTTL  TMTL--UNNUMB MSG NUMBER FIELD
1547  020774                    TMTL:   TSTATE  TMTM
 (1)          001225                    MICPC=MICPC+1
 (1)  020774  000637                    <MOVE!WRTEBR!IMM!<TMTM-INIT&777/2>>
 (1)          001226                    MICPC=MICPC+1
 (1)  020776  063222                    <MOVE!SPX!BR!SELB!SP2>
1548  021000                            BRWRTE  IMM,3
 (1)          001227                    MICPC=MICPC+1
 (1)  021000  000403                    <MOVE!WRTEBR!IMM!<3>>
1549  021002                            CMP     BR,SP6                  ;IS MESSAGE REP
 (1)          001230                    MICPC=MICPC+1
 (1)  021002  060366                    <SUBTC!BR!SP6>
1550  021004                            Z       TMTL1                   ;YES
 (1)          001231                    MICPC=MICPC+1
 (1)  021004  111635                    <JUMP!ZCOND!<TMTL1-INIT&3000*4>!<TMTL1-INIT&777/2>>
1551  021006                    TMTL0:  BRWRTE  IMM,0                   ;ADDRESS CONTNAT OF ZERO
 (1)          001232                    MICPC=MICPC+1
 (1)  021006  000400                    <MOVE!WRTEBR!IMM!<0>>
1552  021010                            OUTPUT  BR,<SELB!TMTDAT>        ;SEND IT OUT
 (1)          001233                    MICPC=MICPC+1
 (1)  021010  062230                    <MOVE!WROUT!BR!<SELB!TMTDAT>>
1553  021012                            ALWAYS  I1                      ;BACK TO IDLE LOOP
 (1)          001234                    MICPC=MICPC+1
 (1)  021012  100454                    <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1554                                    ;
1555  021014                    TMTL1:  BRWRTE  BR,DECA!SP12            ;WRITE A RESPONSE
 (1)          001235                    MICPC=MICPC+1
 (1)  021014  060572                    <MOVE!WRTEBR!BR!<DECA!SP12>>
1556  021016                            ALWAYS  TMTA5
 (1)          001236                    MICPC=MICPC+1
 (1)  021016  112441                    <JUMP!ALCOND!<TMTA5-INIT&3000*4>!<TMTA5-INIT&777/2>>
1557                                    ;
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1564                                    .SBTTL  TMTM--UNNUMB MSG--STATION ADDRESS
1565  021020                    TMTM:   STATE   TNEOM
 (1)          001237                   MICPC=MICPC+1
 (1)  021020  000641                   <MOVE!WRTEBR!IMM!<TNEOM-INIT&777/2>>
1566  021022                           ALWAYS  TF2
 (1)          001240                   MICPC=MICPC+1
 (1)  021022  110533                   <JUMP!ALCOND!<TF2-INIT&3000*4>!<TF2-INIT&777/2>>
1567  021024                    TNEOM:  BRWRTE  IMM,2                   ;END OF MESSAGE TO BR
 (1)          001241                   MICPC=MICPC+1
 (1)  021024  000402                   <MOVE!WRTEBR!IMM!<2>>
1568  021026                           OUTPUT  BR,<SELB!OTMTCO>
 (1)          001242                   MICPC=MICPC+1
 (1)  021026  062231                   <MOVE!WROUT!BR!<SELB!OTMTCO>>
1569  021030                           OUTPUT  BR,<SELB!TMTDAT>               ;OUTPUT A GARBAGE CHARACTER
 (1)          001243                   MICPC=MICPC+1
 (1)  021030  062230                   <MOVE!WROUT!BR!<SELB!TMTDAT>>
1570  021032                           BRWRTE  IMM,4                          ;SET UP LINE HAS GONE IDLE MASK
 (1)          001244                   MICPC=MICPC+1
 (1)  021032  000404                   <MOVE!WRTEBR!IMM!<4>>
1571  021034                           SPBR    BR,AORB,SP10                   ;UPDATE LINE STATUS WORD
 (1)          001245                   MICPC=MICPC+1
 (1)  021034  063710                   <MOVE!SPBRX!BR!AORB!SP10>
1572  021036                           BRWRTE  BR,AA!SP10                     ;SHIFT STATUS LEFT
 (1)          001246                   MICPC=MICPC+1
 (1)  021036  060530                   <MOVE!WRTEBR!BR!<AA!SP10>>
1573  021040                           BR7     10$                            ;IF HDX SET---BRANCH TO CLEAR OK TO SEND
 (1)          001247                   MICPC=MICPC+1
 (1)  021040  113653                   <JUMP!BR7CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1574  021042                           BRWRTE  IMM,376                        ;MASK TO TURN OFF UNNUMB PENDDING
 (1)          001250                   MICPC=MICPC+1
 (1)  021042  000776                   <MOVE!WRTEBR!IMM!<376>>
1575  021044                    5$:     SP      BR,AANDB,SP10                  ;MASK TO LINE STATUS WORD
 (1)          001251                   MICPC=MICPC+1
 (1)  021044  063270                   <MOVE!SPX!BR!AANDB!SP10>
1576  021046                           ALWAYS  TEOM2
 (1)          001252                   MICPC=MICPC+1
 (1)  021046  110740                   <JUMP!ALCOND!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
1577  021050                    10$:    BRWRTE  IMM,176                        ;CLEAR OK TO SEND AND UNNUMB PENPENDING
 (1)          001253                   MICPC=MICPC+1
 (1)  021050  000576                   <MOVE!WRTEBR!IMM!<176>>
1578  021052                           ALWAYS  5$
 (1)          001254                   MICPC=MICPC+1
 (1)  021052  110651                   <JUMP!ALCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
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1580                                    .SBTTL  TIMSRV--TIMEOUT ROUTINE--SENDS  REP
1581                                    ;
1582                                    .ENABLE LSB
1583  021054                    TIMSRV: BRWRTE  IMM,177                        ;MASK OFF  BR REQ
 (1)          001255                   MICPC=MICPC+1
 (1)  021054  000577                   <MOVE!WRTEBR!IMM!<177>>
1584                                                                           ;RESET TIMER---SLICK MOVE
1585                                                                           ;SINCE TIMER IS RESET BY WRITING
1586                                                                           ;A 1 AND THE EXPIRATION  LOOKS
1587                                                                           ;LIKE 1--VOILA
1588  021056                           OUT     BR,<AANDB!OBR>                 ;AND THE BIT ON
 (1)          001256                   MICPC=MICPC+1
 (1)  021056  061271                   <MOVE!WROUTX!BR!<AANDB!OBR>>
1589  021060                           BRWRTE  BR,SELA!SP1                    ;READ STATUS BYTE
 (1)          001257                   MICPC=MICPC+1
 (1)  021060  060601                   <MOVE!WRTEBR!BR!<SELA!SP1>>
1590  021062                           BR0     IDLE
 (1)          001260                   MICPC=MICPC+1
 (1)  021062  102051                   <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1591  021064                           BR7     IDLE                           ;IF IN MAINT. MODE DISABLE TIMER
 (1)          001261                   MICPC=MICPC+1
 (1)  021064  103451                   <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1592  021066                           SP      BR,DECA,SP15                   ;DECREMENT THE COUNTER
 (1)          001262                   MICPC=MICPC+1
 (1)  021066  063175                   <MOVE!SPX!BR!DECA!SP15>
1593  021070                           Z       20$                            ;IF ALL ONES HAS EXPIRED
 (1)          001263                   MICPC=MICPC+1
 (1)  021070  111670                   <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
1594  021072                    10$:    BRWRTE  BR,SELA!SP10            ;READ LINE STATUS
 (1)          001264                   MICPC=MICPC+1
 (1)  021072  060610                   <MOVE!WRTEBR!BR!<SELA!SP10>>
1595  021074                           BR1     TABUPD                         ;NUMBERED MESSAGE IN PROGRESS
 (1)          001265                   MICPC=MICPC+1
 (1)  021074  116731                   <JUMP!BR1CON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
1596  021076                           BR0     TABUPD                         ;UNNUMBMSGIN PROGRESS
 (1)          001266                   MICPC=MICPC+1
 (1)  021076  116331                   <JUMP!BR0CON!<TABUPD-INIT&3000*4>!<TABUPD-INIT&777/2>>
1597  021100                           ALWAYS  IDLE                           ;ELSE BACK TO IDLE LOOP
 (1)          001267                   MICPC=MICPC+1
 (1)  021100  100451                   <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1598  021102                    TIME1:
1599  021102                    20$:    BRWRTE  IMM,2                          ;
 (1)          001270                   MICPC=MICPC+1
 (1)  021102  000402                   <MOVE!WRTEBR!IMM!<2>>
1600  021104                           SP      BR,SELB,SP15                   ;RESET THE TIMER TICK COUNT
 (1)          001271                   MICPC=MICPC+1
 (1)  021104  063235                   <MOVE!SPX!BR!SELB!SP15>
1602  021106                           BRWRTE  IMM,201                        ;SET OK TO SEND AND
 (1)          001272                   MICPC=MICPC+1
 (1)  021106  000601                   <MOVE!WRTEBR!IMM!<201>>
1603  021110                           SPBR    BR,AORB,SP10                   ;UNNUM MSG PENDING
 (1)          001273                   MICPC=MICPC+1
 (1)  021110  063710                   <MOVE!SPBRX!BR!AORB!SP10>
1604  021112                           BRSHFT
 (1)          001274                   MICPC=MICPC+1
 (1)  021112  101520                   <MOVE!SHFTBR!WRTEBR!SELB>
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1609  021114                          BR4     BS1                             ;IF IN START MODE--BRANCH
 (1)          001275                 MICPC=MICPC+1
 (1)  021114  103111                 <JUMP!BR4CON!<BS1-INIT&3000*4>!<BS1-INIT&777/2>>
1610  021116                          BRWRTE  BR,DECA!SP12                    ;GET LAST NUMBER SENT
 (1)          001276                 MICPC=MICPC+1
 (1)  021116  060572                 <MOVE!WRTEBR!BR!<DECA!SP12>>
1611  021120                          CMP     BR,SP17                         ;COMPARE TO LAST ACKED
 (1)          001277                 MICPC=MICPC+1
 (1)  021120  060377                 <SUBTC!BR!SP17>
1612  021122                          Z       SNDACK                  ;IF EQ --SEND ACK
 (1)          001300                 MICPC=MICPC+1
 (1)  021122  111733                 <JUMP!ZCOND!<SNDACK-INIT&3000*4>!<SNDACK-INIT&777/2>>
1613  021124                    TIME2: LDMA    IMM,T                           ;LOAD ADDRESS OF TYPE FIELD IN UNNUMB SK
 (1)          001301                 MICPC=MICPC+1
 (1)  021124  010151                 <MOVE!LDMAR!IMM!<T&377>>
1614  021126                          MEMINC  IMM,3                           ;LOAD REP TYPE
 (1)          001302                 MICPC=MICPC+1
 (1)  021126  016403                 <MOVE!WRMEM!INCMAR!IMM!<3>>
1615  021130                          MEMINC  IMM,300                         ;ZERO THE SUB-TYPE
 (1)          001303                 MICPC=MICPC+1
 (1)  021130  016700                 <MOVE!WRMEM!INCMAR!IMM!<300>>
1616  021132                          LDMA    IMM,REPCS                       ;CUMULATIVE REPS RECD
 (1)          001304                 MICPC=MICPC+1
 (1)  021132  010015                 <MOVE!LDMAR!IMM!<REPCS&377>>
1617  021134                          SP      MEMX,SELB,SP0                   ;COPY IT TO SP0
 (1)          001305                 MICPC=MICPC+1
 (1)  021134  043220                 <MOVE!SPX!MEMX!SELB!SP0>
1618  021136                          MEM     BR,INCA!SP0                     ;INCREMENT IT
 (1)          001306                 MICPC=MICPC+1
 (1)  021136  062460                 <MOVE!WRMEM!BR!<INCA!SP0>>
1619  021140                          LDMA    IMM,REPST                       ;ADDRESS DYNAMIC REP COUNTER
 (1)          001307                 MICPC=MICPC+1
 (1)  021140  010003                 <MOVE!LDMAR!IMM!<REPST&377>>
1620  021142                          BRWRTE  MEMX,SELB                       ;COPY IT TO THE BR
 (1)          001310                 MICPC=MICPC+1
 (1)  021142  040620                 <MOVE!WRTEBR!MEMX!<SELB>>
1621  021144                          BSHFTB
 (1)          001311                 MICPC=MICPC+1
 (1)  021144  061620                 <MOVE!SHFTBR!SELB!BR>
1622  021146                          MEM     BR,SELB
 (1)          001312                 MICPC=MICPC+1
 (1)  021146  062620                 <MOVE!WRMEM!BR!<SELB>>
1623  021150                          BR0     RTHRES
 (1)          001313                 MICPC=MICPC+1
 (1)  021150  106372                 <JUMP!BR0CON!<RTHRES-INIT&3000*4>!<RTHRES-INIT&777/2>>
1624  021152                          ALWAYS  IDLE
 (1)          001314                 MICPC=MICPC+1
 (1)  021152  100451                 <JUMP!ALCOND!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1629                                  .DSABLE LSB
1630                                  ;
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1632  021154                    TEOM:   BRWRTE  IBUS,UBBR
 (1)          001315                 MICPC=MICPC+1
 (1)  021154  120620                 <MOVE!WRTEBR!IBUS!<UBBR>>
1633  021156                          BR0     NXMERR                          ;NON-EXISTANT MEMORY
 (1)          001316                 MICPC=MICPC+1
 (1)  021156  106351                 <JUMP!BR0CON!<NXMERR-INIT&3000*4>!<NXMERR-INIT&777/2>>
1634  021160                          BRWRTE  IMM,2                   ;EOM TO BR
 (1)          001317                 MICPC=MICPC+1
 (1)  021160  000402                 <MOVE!WRTEBR!IMM!<2>>
1635  021162                          OUTPUT  BR,<SELB!OTMTCO>        ;WRITE TMTR CONTROL
 (1)          001320                 MICPC=MICPC+1
 (1)  021162  062231                 <MOVE!WROUT!BR!<SELB!OTMTCO>>
1636  021164                          OUTPUT  BR,<SELB!TMTDAT>        ;WRITE GARBAGE DATA
 (1)          001321                 MICPC=MICPC+1
 (1)  021164  062230                 <MOVE!WROUT!BR!<SELB!TMTDAT>>
1637  021166                          BRWRTE  BR,SELA!SP1             ;CKECK FOR BOOT MODE
 (1)          001322                 MICPC=MICPC+1
 (1)  021166  060001                 <MOVE!WRTEBR!BR!<SELA!SP1>>
1638  021170                          BR7     BTEOM                   ;---IF SET IS MAINT MSG
 (1)          001323                 MICPC=MICPC+1
 (1)  021170  113762                 <JUMP!BR7CON!<BTEOM-INIT&3000*4>!<BTEOM-INIT&777/2>>
1639  021172                          SP      BR,INCA,SP12            ;INCREMENT THE MESSAGE NUMBER
 (1)          001324                 MICPC=MICPC+1
 (1)  021172  063072                 <MOVE!SPX!BR!INCA!SP12>
1640  021174                    TEOM1:  LDMA    BR,SELA!SP16                    ;ADDRESS LAST TMT LINK
 (1)          001325                 MICPC=MICPC+1
 (1)  021174  070216                 <MOVE!LDMAR!BR!<SELA!SP16>>
1641  021176                          BRWRTB  MEMX,SELB
 (1)          001326                 MICPC=MICPC+1
 (1)  021176  040620                 <MOVE!WRTEBR!MEMX!<SELB>>
1642  021200                          BR0     TEOM2
 (1)          001327                 MICPC=MICPC+1
 (1)  021200  112340                 <JUMP!BR0CON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
1643  021202                    TEOM3:  BRWRTE  IMM,375                 ;TURN OFF MESSAGE PENDING
 (1)          001330                 MICPC=MICPC+1
 (1)  021202  000775                 <MOVE!WRTEBR!IMM!<375>>
1644  021204                          SPBR    BR,AANDB,SP10           ;
 (1)          001331                 MICPC=MICPC+1
 (1)  021204  063670                 <MOVE!SPBRX!BR!AANDB!SP10>
1645  021206                          BR0     TEOM2                   ;IF UNNUMB PENDING--GO AWAY
 (1)          001332                 MICPC=MICPC+1
 (1)  021206  112340                 <JUMP!BR0CON!<TEOM2-INIT&3000*4>!<TEOM2-INIT&777/2>>
1646                                  .SBTTL  SNDACK--ROUTINE TO SEND AN ACK
1647  021210                    SNDACK: LDMA    IMM,T
 (1)          001333                 MICPC=MICPC+1
 (1)  021210  010151                 <MOVE!LDMAR!IMM!<T&377>>
1648  021212                          MEMINC  IMM,1
 (1)          001334                 MICPC=MICPC+1
 (1)  021212  016401                 <MOVE!WRMEM!INCMAR!IMM!<1>>
1649  021214                          BRWRTB  IMM,5
 (1)          001335                 MICPC=MICPC+1
 (1)  021214  000005                 <MOVE!WRTEBR!IMM!<5>>
1650  021216                    SA2:  MEMINC  IMM,300
 (1)          001336                 MICPC=MICPC+1
 (1)  021216  016700                 <MOVE!WRMEM!INCMAR!IMM!<300>>
1651  021220                    SA3:  SP      BR,AORB,SP10
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  (1)          001337                  MICPC=MICPC+1
  (1)  021220  063310                  <MOVE!SPX!BR!AORB!SP10>
1652                                   ;
1658  021222                           TEOM2:  TSTATE  TMTA
  (1)          001340                  MICPC=MICPC+1
  (1)  021222  000403                  <MOVE!WRTEBR!IMM!<TMTA-INIT&777/2>>
  (1)          001341                  MICPC=MICPC+1
  (1)  021224  063222                  <MOVE!SPX!BR!SELB!SP2>
1659  021226                           ALWAYS  I1
  (1)          001342                  MICPC=MICPC+1
  (1)  021226  120454                  <JUMP!ALCOND!<I1-INIT&3000*4>!<I1-INIT&777/2>>
1661  021230                           FUDGE:  BRWRTE  IBUS,NPR                ;READ NPR CONTROL
  (1)          001343                  MICPC=MICPC+1
  (1)  021230  120600                  <MOVE!WRTEBR!IBUS!<NPR>>
1662  021232                           BR0     IDLE                    ;IF NPR GOING---LEAVE
  (1)          001344                  MICPC=MICPC+1
  (1)  021232  102051                  <JUMP!BR0CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1663  021234                           BRWRTE  BR!LDMAR,SELA!SP4       ;LOAD THE MAR
  (1)          001345                  MICPC=MICPC+1
  (1)  021234  176604                  <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
1664  021236                           BR7     BS2                     ;IF SET - READ BACK ALL 200
  (1)          001346                  MICPC=MICPC+1
  (1)  021236  103520                  <JUMP!BR7CON!<BS2-INIT&3000*4>!<BS2-INIT&777/2>>
1665  021240                           MEMINC  IBUS,INDAT1             ;OTHERWISE RESTORE TWO BYTES
  (1)          001347                  MICPC=MICPC+1
  (1)  021240  036400                  <MOVE!WRMEM!INCMAR!IBUS!<INDAT1>>
1666  021242                           MEMINC  IBUS,INDAT2             ;..
  (1)          001350                  MICPC=MICPC+1
  (1)  021242  036420                  <MOVE!WRMEM!INCMAR!IBUS!<INDAT2>>
1667  021244                           BRWRTE  IMM,2                   ;UPDATE---UNIBUS ADDRESS
  (1)          001351                  MICPC=MICPC+1
  (1)  021244  002402                  <MOVE!WRTEBR!IMM!<2>>
1668  021246                           SP      BR,ADD,SP4              ;UPDATE NPR COUNTER
  (1)          001352                  MICPC=MICPC+1
  (1)  021246  063004                  <MOVE!SPX!BR!ADD!SP4>
1669  021250                           SP      IBUS,IIBA1,SP0          ;UPDATE ADDRESS LOW
  (1)          001353                  MICPC=MICPC+1
  (1)  021250  023100                  <MOVE!SPX!IBUS!IIBA1!SP0>
1670  021252                           OUTPUT  BR,ADD!IBA1
  (1)          001354                  MICPC=MICPC+1
  (1)  021252  062004                  <MOVE!WROUT!BR!<ADD!IBA1>>
1671  021254                           SP      IBUS,IIBA2,SP0          ;READ HIGH ADDRESS
  (1)          001355                  MICPC=MICPC+1
  (1)  021254  023120                  <MOVE!SPX!IBUS!IIBA2!SP0>
1672  021256                           OUTPUT  BR,AC!IBA2              ;UPDATE HIGH
  (1)          001356                  MICPC=MICPC+1
  (1)  021256  062105                  <MOVE!WROUT!BR!<AC!IBA2>>
1673  021260                           SP      IBUS,NPR,SP0            ;READ NPR REGISTER
  (1)          001357                  MICPC=MICPC+1
  (1)  021260  123200                  <MOVE!SPX!IBUS!NPR!SP0>
1674  021262                           C       RESEXT                  ;IF CARRY---UPDATE MXT
  (1)          001360                  MICPC=MICPC+1
  (1)  021262  105363                  <JUMP!CCOND!<RESEXT-INIT&3000*4>!<RESEXT-INIT&777/2>>
1675  021264                           ALWAYS  TH3X                    ;GO DO ANOTHER NPR
  (1)          001361                  MICPC=MICPC+1
  (1)  021264  110601                  <JUMP!ALCOND!<TH3X-INIT&3000*4>!<TH3X-INIT&777/2>>
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1676  021266                           BTEOM:  BRWRTE  IMM,374                 ;MASK FOR CLEAR MSG PENDING
  (1)          001362                  MICPC=MICPC+1
  (1)  021266  000774                  <MOVE!WRTEBR!IMM!<374>>
1677  021270                           SP      BR,AANDB,SP10           ;TURN THEM OFF IN LINE STATUS WORD
  (1)          001363                  MICPC=MICPC+1
  (1)  021270  063270                  <MOVE!SPX!BR!AANDB!SP10>
1678  021272                           SP      BR,SELB,SP13            ;STORE UNRECOGNIZABLE VALUE INTO SP13
  (1)          001364                  MICPC=MICPC+1
  (1)  021272  063233                  <MOVE!SPX!BR!SELB!SP13>
1679                                                                   ;SO "RH3" WILL EXIT BACK TO IDLE LOOP
1680  021274                           LDMA    IMM,STC                 ;ADDRESS START OF TMT  CHAIN
  (1)          001365                  MICPC=MICPC+1
  (1)  021274  010067                  <MOVE!LDMAR!IMM!<STC&377>>
1681  021276                           SP      MEMX,SELB,SP0           ;COPY LINK ADDRESS
  (1)          001366                  MICPC=MICPC+1
  (1)  021276  043220                  <MOVE!SPX!MEMX!SELB!SP0>
1686  021300                           TSTATE  TMTA                    ;CHANGE XMIT STATE TO LINE IS IDLE
  (1)          001367                  MICPC=MICPC+1
  (1)  021300  000403                  <MOVE!WRTEBR!IMM!<TMTA-INIT&777/2>>
  (1)          001370                  MICPC=MICPC+1
  (1)  021302  063222                  <MOVE!SPX!BR!SELB!SP2>
1688  021304                           ALWAYS  TDON2                   ;POST A DONE
  (1)          001371                  MICPC=MICPC+1
  (1)  021304  111532                  <JUMP!ALCOND!<TDON2-INIT&3000*4>!<TDON2-INIT&777/2>>
1689  021306                           RL4:    RSTATE  RCVL
  (1)          001372                  MICPC=MICPC+1
  (1)  021306  000705                  <MOVE!WRTEBR!IMM!<RCVL-INIT&777/2>>
  (1)          001373                  MICPC=MICPC+1
  (1)  021310  063223                  <MOVE!SPX!BR!SELB!SP3>
1690  021312                           SP      IBUS,NPR,SP0            ;READ NPR CONTROL REGISTER
  (1)          001374                  MICPC=MICPC+1
  (1)  021312  123200                  <MOVE!SPX!IBUS!NPR!SP0>
1691  021314                           BRWRTE  IMM,221
  (1)          001375                  MICPC=MICPC+1
  (1)  021314  000621                  <MOVE!WRTEBR!IMM!<221>>
1692  021316                           ALWAYS  RK7
  (1)          001376                  MICPC=MICPC+1
  (1)  021316  104623                  <JUMP!ALCOND!<RK7-INIT&3000*4>!<RK7-INIT&777/2>>
1693  021320                           HOINCH: SP      IBUS,IIBA2,SP0
  (1)          001377                  MICPC=MICPC+1
  (1)  021320  023120                  <MOVE!SPX!IBUS!IIBA2!SP0>
1694  021322                           OUTPUT  BR,INCA!IBA2                    ;OUTPUT INCREMENTED BA
  (1)          001400                  MICPC=MICPC+1
  (1)  021322  062065                  <MOVE!WROUT!BR!<INCA!IBA2>>
1695  021324                           C       5S                      ;INCREMENT BYTEW COUNT
  (1)          001401                  MICPC=MICPC+1
  (1)  021324  115003                  <JUMP!CCOND!<5S-INIT&3000*4>!<5S-INIT&777/2>>
1696  021326                           ALWAYS  TH8
  (1)          001402                  MICPC=MICPC+1
  (1)  021326  110571                  <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
1697                                   ;INCREMENT MXT BITS
1698  021330                           5S:     SP      IBUS,NPR,SP0            ;READ NPR REG WITH CURRENT MXT BITS
  (1)          001403                  MICPC=MICPC+1
  (1)  021330  123200                  <MOVE!SPX!IBUS!NPR!SP0>
1699  021332                           BRWRTE  IMM,4                   ;WRITE BIT TO ADD
  (1)          001404                  MICPC=MICPC+1
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  (1)  021332  000404                    <MOVE!WRTEBR!IMM!<4>>
1700   021334                            OUT     BR,<ADD!ONPR>           ;TURN ON PROPER MXT BITS
  (1)          001405                    MICPC=MICPC+1
  (1)  021334  061010                    <MOVE!WROUTX!BR!<ADD!ONPR>>
1701   021336                            ALWAYS  TH8
  (1)          001406                    MICPC=MICPC+1
  (1)  021336  110571                    <JUMP!ALCOND!<TH8-INIT&3000*4>!<TH8-INIT&777/2>>
1702                                     ;
1704   021340                    HEH1:   STATE   TEOM
  (1)          001407                    MICPC=MICPC+1
  (1)  021340  000715                    <MOVE!WRTEBR!IMM!<TEOM-INIT&777/2>>
1705   021342                            ALWAYS  XEXIT
  (1)          001410                    MICPC=MICPC+1
  (1)  021342  110563                    <JUMP!ALCOND!<XEXIT-INIT&3000*4>!<XEXIT-INIT&777/2>>
1707                                     ;
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1713                                     .SBTTL  REP HANDLER
1714   021344                    REP:    LDMA    IMM,REPCR               ;LOAD MAR ADDRESS WITH POINTER TO REPS RECC
  (1)          001411                    MICPC=MICPC+1
  (1)  021344  010016                    <MOVE!LDMAR!IMM!<REPCR&377>>
1715   021346                            SP      MEMX,SELB,SP0           ;READ NUMBER OF REPS RECD
  (1)          001412                    MICPC=MICPC+1
  (1)  021346  043220                    <MOVE!SPX!MEMX!SELB!SP0>
1716   021350                            MEM     DP,<INCA!SP0>           ;INCREMNT REPS RECD
  (1)          001413                    MICPC=MICPC+1
  (1)  021350  062460                    <MOVE!WRMEM!DP!<INCA!SP0>>
1717   021352                            LDMA    IMM,T                   ;LOAD ADDRESS OF TYPE FIELD
  (1)          001414                    MICPC=MICPC+1
  (1)  021352  010151                    <MOVE!LDMAR!IMM!<T&377>>
1718   021354                            MEMINC  IMM,2                   ; LOAD NAK TYPE
  (1)          001415                    MICPC=MICPC+1
  (1)  021354  016402                    <MOVE!WRMEM!INCMAR!IMM!<2>>
1719   021356                            MEMINC  IMM,303                 ;LOAD REP RESPONSE SUB-TYPE
  (1)          001416                    MICPC=MICPC+1
  (1)  021356  016703                    <MOVE!WRMEM!INCMAR!IMM!<303>>
1720   021360                            ALWAYS  SNAK                    ;SEND AN UNNUMB MSG
  (1)          001417                    MICPC=MICPC+1
  (1)  021360  114704                    <JUMP!ALCOND!<SNAK-INIT&3000*4>!<SNAK-INIT&777/2>>
1721                                     ;
1722                                     .SBTTL  START HANDLER
1723   021362                    START:  BRWRTE  DP,<SELA!SP10>          ;READ LINE STATUS WORD
  (1)          001420                    MICPC=MICPC+1
  (1)  021362  060610                    <MOVE!WRTEBR!DP!<SELA!SP10>>
1724   021364                            BRSHFT                          ;GET START MODE BIT IN TESTABLE POSITION
  (1)          001421                    MICPC=MICPC+1
  (1)  021364  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1725   021366                            BR4     10$                     ;IF IN START MODE SET STACK
  (1)          001422                    MICPC=MICPC+1
  (1)  021366  117026                    <JUMP!BP4CON!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1726                                                                     ;ELSE SET UP START ERROR
1727   021370                            LDMA    IMM,<<RTHRS+3>>
  (1)          001423                    MICPC=MICPC+1
  (1)  021370  010177                    <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
1728   021372                            BRWRTE  IMM,200
  (1)          001424                    MICPC=MICPC+1
  (1)  021372  000200                    <MOVE!WRTEBR!IMM!<200>>
1729   021374                            ALWAYS  RCEXY
  (1)          001425                    MICPC=MICPC+1
  (1)  021374  111522                    <JUMP!ALCOND!<RCEXY-INIT&3000*4>!<RCEXY-INIT&777/2>>
1730   021376                    10$:    LDMA    IMM,T                   ;SET UP ADDRESS OF TYPE FIELD
  (1)          001426                    MICPC=MICPC+1
  (1)  021376  010151                    <MOVE!LDMAR!IMM!<T&377>>
1731   021400                            MEMINC  IMM,7                   ;WRITE STACK TYPE
  (1)          001427                    MICPC=MICPC+1
  (1)  021400  016407                    <MOVE!WRMEM!INCMAR!IMM!<7>>
1732   021402                            BRWRTE  IMM,11                  ;SET START RECD AND UNNUMB PENDING
  (1)          001430                    MICPC=MICPC+1
  (1)  021402  000411                    <MOVE!WRTEBR!IMM!<11>>
1733   021404                            ALWAYS  SA2                     ;SEND THE UNNUMBERED MESSAGE
  (1)          001431                    MICPC=MICPC+1
  (1)  021404  110736                    <JUMP!ALCOND!<SA2-INIT&3000*4>!<SA2-INIT&777/2>>
1734                                     ;
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                                        .SBTTL  STACK HANDLER
021406                          STACK:  BRWRTE  IMM,327                 ;MASK TO CLEAR START MODE
(1)     001432                          MICPC=MICPC+1
(1)     021406  000727                  <MOVE!WRTEBR!IMM!<327>>
021410                                  SP      BR,AANDB,SP10           ;CLEAR START MODE
(1)     001433                          MICPC=MICPC+1
(1)     021410  063270                  <MOVE!SPX!BR!AANDB!SP10>
021412                                  ALWAYS  TIME1                   ;RESET TIMER AND IDLE
(1)     001434                          MICPC=MICPC+1
(1)     021412  110670                  <JUMP!ALCOND!<TIME1-INIT&3000*4>!<TIME1-INIT&777/2>>
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021414                          ICBA22: SP      IBUS,IOBA2,SP0                  ;READTHEHIGH ORDERBITS OF BA TO SP0
(1)     001435                          MICPC=MICPC+1
(1)     021414  023160                  <MOVE!SPX!IBUS!IOBA2!SP0>
021416                                  OUTPUT  DP,<INCA!OBA2>                  ;OUTPUT THE INCREMENTED COUNT
(1)     001436                          MICPC=MICPC+1
(1)     021416  062067                  <MOVE!WROUT!DP!<INCA!OBA2>>
021420                                  C       5$                              ;IF CARRY SET INCREMENT THE MXTBITS
(1)     001437                          MICPC=MICPC+1
(1)     021420  115041                  <JUMP!CCOND!<5$-INIT&3000*4>!<5$-INIT&777/2>>
021422                                  ALWAYS  RK3
(1)     001440                          MICPC=MICPC+1
(1)     021422  104641                  <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
                                        ;
021424                          5$:     SP      IBUS,UBBR,SP0
(1)     001441                          MICPC=MICPC+1
(1)     021424  123220                  <MOVE!SPX!IBUS!UBBR!SP0>
021426                                  BRWRTE  IMM,4
(1)     001442                          MICPC=MICPC+1
(1)     021426  000404                  <MOVE!WRTEBR!IMM!<4>>
021430                                  OUT     BR,<ADD!OBR>
(1)     001443                          MICPC=MICPC+1
(1)     021430  061011                  <MOVE!WROUTX!BR!<ADD!OBR>>
021432                                  ALWAYS  RK3
(1)     001444                          MICPC=MICPC+1
(1)     021432  104641                  <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
021434                          NAK:    LDMA    IMM,NDATR               ;CUMMULATIVE NAK COUNTER
(1)     001445                          MICPC=MICPC+1
(1)     021434  010011                  <MOVE!LDMAR!IMM!<NDATR&377>>
021436                                  SP      MEMX,SELB,SP0           ;READ IT
(1)     001446                          MICPC=MICPC+1
(1)     021436  043220                  <MOVE!SPX!MEMX!SELB!SP0>
021440                                  MEM     MEMX,INCA!SP0           ;INCREMENT THE COUNTER
(1)     001447                          MICPC=MICPC+1
(1)     021440  042460                  <MOVE!WRMEM!MEMX!<INCA!SP0>>
021442                                  LDMA    IMM,STC                 ;ADDRESS START OF IMT CHAIN
(1)     001450                          MICPC=MICPC+1
(1)     021442  010067                  <MOVE!LDMAR!IMM!<STC&377>>
021444                                  SP      MEMX,SELB,SP16          ;COPY START OF CHAIN TO LAST XMIT POINTER
(1)     001451                          MICPC=MICPC+1
(1)     021444  043236                  <MOVE!SPX!MEMX!SELB!SP16>
021446                                  BRWRTE  BR,INCA!SP17                    ;GETLASTMESSAGE ACKED
(1)     001452                          MICPC=MICPC+1
(1)     021446  060477                  <MOVE!WRTEBR!BR!<INCA!SP17>>
021450                                  SP      BR,SELB,SP12                    ;COPY TO CURRENT NUMBER
(1)     001453                          MICPC=MICPC+1
(1)     021450  063232                  <MOVE!SPX!BR!SELB!SP12>
021452                                  BRWRTE  IMM,6                   ;WRITE NUMBERED MSG PENDING
(1)     001454                          MICPC=MICPC+1
(1)     021452  000406                  <MOVE!WRTEBR!IMM!<6>>
                                                                        ; AND LINE HAS GONE IDLE
021454                                  SP      BR,AORB,SP10            ;SET IT IN LINE STATUS WORD
(1)     001455                          MICPC=MICPC+1
(1)     021454  063310                  <MOVE!SPX!BR!AORB!SP10>
021456                                  SP      BR,SELB,SP15            ;RESET TIMER COUNT
(1)     001456                          MICPC=MICPC+1
(1)     021456  063235                  <MOVE!SPX!BR!SELB!SP15>
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1764  021460                        ALWAYS  TEOM1
 (1)          001457                MICPC=MICPC+1
 (1)  021460  110725                <JUMP!ALCOND!<TEOM1-INIT&3000*4>!<TEOM1-INIT&777/2>>
1765  021462                ;ININT: BRWRTE  IMM,15                  ;MASK FOR TURN OFF ALL BUT EXT MEM BITS + NXM
 (1)          001460                MICPC=MICPC+1
 (1)  021462  000415                <MOVE!WRTEBR!IMM!<15>>
1766  021464                        SP      IBUS,UBBR,SP0           ;READ BR  CONTROL REGISTER
 (1)          001461                MICPC=MICPC+1
 (1)  021464  123220                <MOVE!SPX!IBUS!UBBR!SP0>
1767  021466                        SP      BR,AANDB,SP0            ;MASK OFF VECTOR TO X04
 (1)          001462                MICPC=MICPC+1
 (1)  021466  063260                <MOVE!SPX!BR!AANDB!SP0>
1768  021470                        BRWRTE  IMM,200                 ;MASK FOR INTERRUPT
 (1)          001463                MICPC=MICPC+1
 (1)  021470  000600                <MOVE!WRTEBR!IMM!<200>>
1769  021472                        OUT     BR,AORB!OBR             ;INTERRUPT
 (1)          001464                MICPC=MICPC+1
 (1)  021472  061311                <MOVE!WROUTX!BR!<AORB!OBR>>
1770  021474                        SP      IBUS,INCON,SP0          ;RESTORE INPUT CONTROL CSR
 (1)          001465                MICPC=MICPC+1
 (1)  021474  123000                <MOVE!SPX!IBUS!INCON!SP0>
1771  021476                        ALWAYS  NIDLE4
 (1)          001466                MICPC=MICPC+1
 (1)  021476  100554                <JUMP!ALCOND!<NIDLE4-INIT&3000*4>!<NIDLE4-INIT&777/2>>
1772                                ;
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1783                                ;FUGITIVE RECEIVE ROUTINES---DON'T FIT IN PAGE
1784  021500                ;RH1:   BRWRTE  IMM,77
 (1)          001467                MICPC=MICPC+1
 (1)  021500  000477                <MOVE!WRTEBR!IMM!<77>>
1785  021502                        SP      BR,AANDB,SP5
 (1)          001470                MICPC=MICPC+1
 (1)  021502  063265                <MOVE!SPX!BR!AANDB!SP5>
1786  021504                        LDMA    BR,<INCA!SP14>          ;LOAD ADDRESS OF CURRENT COUNT
 (1)          001471                MICPC=MICPC+1
 (1)  021504  070074                <MOVE!LDMAR!BR!<INCA!SP14>>
1787  021506                        SP      BR!INCMAR,SELB,SP0      ;SAVE MASK
 (1)          001472                MICPC=MICPC+1
 (1)  021506  077220                <MOVE!SPX!BR!INCMAR!SELB!SP0>
1788  021510                        BRWRTE  BR!INCMAR,SELA!SP1      ;READ STATUS BYTE
 (1)          001473                MICPC=MICPC+1
 (1)  021510  074601                <MOVE!WRTEBR!BR!INCMAR!<SELA!SP1>>
1789  021512                        BRSHFT                          ;SHIFT IT RIGHT
 (1)          001474                MICPC=MICPC+1
 (1)  021512  001620                <MOVE!SHFTBR!WRTEBR!SELB>
1790  021514                        BR1     RH2                     ;NO BUFFER ASSIGNED IN MAINT MODE
 (1)          001475                MICPC=MICPC+1
 (1)  021514  116502                <JUMP!BR1CON!<RH2-INIT&3000*4>!<RH2-INIT&777/2>>
1791  021516                        BRWRTE  MEMX!INCMAR,AANDB!SP0   ;GET HIGH BYTE COUNT BITS
 (1)          001476                MICPC=MICPC+1
 (1)  021516  054660                <MOVE!WRTEBR!MEMX!INCMAR!<AANDB!SP0>>
1792  021520                        CMP     BR,SP5          ;COMPARE HIGH ORDER BITS OF COUNT
 (1)          001477                MICPC=MICPC+1
 (1)  021520  060365                <SUBTC!BR!SP5>
1793  021522                        C       RCFATL                  ;IF CARRY--TOO BIG ERROR
 (1)          001500                MICPC=MICPC+1
 (1)  021522  115113                <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
1794  021524                        Z       RCLOW                   ;IF EQUAL COMPARE LOW ORDER BITS OF COUNT
 (1)          001501                MICPC=MICPC+1
 (1)  021524  115510                <JUMP!ZCOND!<RCLOW-INIT&3000*4>!<RCLOW-INIT&777/2>>
1795  021526                ;RH2:   BRWRTE  IBUS,IOBA1                      ;READ LOW BYTE OF IN BA
 (1)          001502                MICPC=MICPC+1
 (1)  021526  020540                <MOVE!WRTEBR!IBUS!<IOBA1>>
1796  021530                        BR0     RCVODD                  ;IF SET IS ODD TRANSFER
 (1)          001503                MICPC=MICPC+1
 (1)  021530  116106                <JUMP!BR0CON!<RCVODD-INIT&3000*4>!<RCVODD-INIT&777/2>>
1801  021532                        STATE   RCVKE0
 (1)          001504                MICPC=MICPC+1
 (1)  021532  000660                <MOVE!WRTEBR!IMM!<RCVKE0-INIT&777/2>>
1802  021534                        ALWAYS  REXIT
 (1)          001505                MICPC=MICPC+1
 (1)  021534  100450                <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1803                                ;
1804  021536                ;RCVODD: STATE   RCVKO1
 (1)          001506                MICPC=MICPC+1
 (1)  021536  000637                <MOVE!WRTEBR!IMM!<RCVKO1-INIT&777/2>>
1805  021540                        ALWAYS  REXIT
 (1)          001507                MICPC=MICPC+1
 (1)  021541  100450                <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1806                                ;
1807  021542                ;RCLOW: CMP     MEMX,SP4                        ;COMPARE LOW ORDER BITS OF COUNT
 (1)          001510                MICPC=MICPC+1
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  (1)  021542  040364                    <SUBTC!MEMX!SP4>
1808   021544                            C       RCFATL                  ;CARRY--TOO BIG
  (1)          001511                    MICPC=MICPC+1
  (1)  021544  115113                    <JUMP!CCOND!<RCFATL-INIT&3000*4>!<RCFATL-INIT&777/2>>
1809   021546                            ALWAYS  RH2                     ;ELSE CONTINUE
  (1)          001512                    MICPC=MICPC+1
  (1)  021546  114502                    <JUMP!ALCOND!<RH2-INIT&3000*4>!<RH2-INIT&777/2>>
1810   021550                    RCFATL: LDMA    IMM,T
  (1)          001513                    MICPC=MICPC+1
  (1)  021550  010151                    <MOVE!LDMAR!IMM!<T&377>>
1811   021552                            MEMINC  IMM,2
  (1)          001514                    MICPC=MICPC+1
  (1)  021552  016402                    <MOVE!WRMEM!INCMAR!IMM!<2>>
1812   021554                            MEM     IMM,311
  (1)          001515                    MICPC=MICPC+1
  (1)  021554  002711                    <MOVE!WRMEM!IMM!<311>>
1813   021556                            LDMA    IMM,<<RTHRS+1>>         ;ADDRESS ERROR LINK
  (1)          001516                    MICPC=MICPC+1
  (1)  021556  010175                    <MOVE!LDMAR!IMM!<<RTHRS+1>&377>>
1814   021560                            MEMINC  IBUS,IOBA1
  (1)          001517                    MICPC=MICPC+1
  (1)  021560  036540                    <MOVE!WRMEM!INCMAR!IBUS!<IOBA1>>
1815   021562                            MEMINC  IBUS,IOBA2
  (1)          001520                    MICPC=MICPC+1
  (1)  021562  036560                    <MOVE!WRMEM!INCMAR!IBUS!<IOBA2>>
1816   021564                            BRWRTE  IMM,20
  (1)          001521                    MICPC=MICPC+1
  (1)  021564  000420                    <MOVE!WRTEBR!IMM!<20>>
1817   021566                    RCEXY:  MEMINC  IMM,0
  (1)          001522                    MICPC=MICPC+1
  (1)  021566  016400                    <MOVE!WRMEM!INCMAR!IMM!<0>>
1818   021570                            MEM     BR,SELB
  (1)          001523                    MICPC=MICPC+1
  (1)  021570  062620                    <MOVE!WRMEM!BR!<SELB>>
1819   021572                    RCEXX:  OUTPUT  IMM,<200!ORCVCO>        ;FLUSH INPUT SILO
  (1)          001524                    MICPC=MICPC+1
  (1)  021572  002212                    <MOVE!WROUT!IMM!<200!ORCVCO>>
1820   021574                            SP      IMM,SP2,2               ;INHIBIT FURTHER TRANSMISSIONS
  (1)          001525                    MICPC=MICPC+1
  (1)  021574  003002                    <MOVE!SPX!IMM!SP2!2>
1821   021576                            SP      IMM,1,SP1       ;SET INIT MODE IN PORT STATUS WORD
  (1)          001526                    MICPC=MICPC+1
  (1)  021576  003001                    <MOVE!SPX!IMM!1!SP1>
1822   021600                            ALWAYS  NTRS1
  (1)          001527                    MICPC=MICPC+1
  (1)  021600  114666                    <JUMP!ALCOND!<NTRS1-INIT&3000*4>!<NTRS1-INIT&777/2>>
1823   021602                    TDON3:  BRWRTE  MEMX,SUB!SP17                   ;COMPARE RESPONSE TO MSG NO
  (1)          001530                    MICPC=MICPC+1
  (1)  021602  040757                    <MOVE!WRTEBR!MEMX!<SUB!SP17>>
1824   021604                            BR7     RH3                             ;IF NEGATIVE EXIT
  (1)          001531                    MICPC=MICPC+1
  (1)  021604  107562                    <JUMP!BR7COND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
1825   021606                    TDON2:  LDMA    BR,SELA!SP0                     ;ADDRESS THE TRANSMITLINK
  (1)          001532                    MICPC=MICPC+1
  (1)  021606  070200                    <MOVE!LDMAR!BR!<SELA!SP0>>
1826   021610                            MEM     IMM,0                           ;TURN OF ASSIGNEDAND TMTED BITS IN FLAG
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  (1)          001533                    MICPC=MICPC+1
  (1)  021610  002400                    <MOVE!WRMEM!IMM!<0>>
1827   021612                            LDMA    IMM,STC
  (1)          001534                    MICPC=MICPC+1
  (1)  021612  010067                    <MOVE!LDMAR!IMM!<STC&377>>
1828   021614                            MEM     IMM,TML1                        ;ASSUME WRAPAROUND
  (1)          001535                    MICPC=MICPC+1
  (1)  021614  002471                    <MOVE!WRMEM!IMM!<TML1>>
1829   021616                            BRWRTE  IMM,TML8                        ;WRAPAROUND?
  (1)          001536                    MICPC=MICPC+1
  (1)  021616  000543                    <MOVE!WRTEBR!IMM!<TML8>>
1830   021620                            CMP     BR,SP0
  (1)          001537                    MICPC=MICPC+1
  (1)  021620  060360                    <SUBTC!BR!SP0>
1831   021622                            Z       TDON4                           ;YES
  (1)          001540                    MICPC=MICPC+1
  (1)  021622  115543                    <JUMP!ZCOND!<TDON4-INIT&3000*4>!<TDON4-INIT&777/2>>
1832   021624                            BRWRTE  IMM,6                           ;OFFSET FOR NEXT TMT LINK
  (1)          001541                    MICPC=MICPC+1
  (1)  021624  000406                    <MOVE!WRTEBR!IMM!<6>>
1833   021626                            MEM     BR,ADD!SP0                      ;UPDATE THE POINTER
  (1)          001542                    MICPC=MICPC+1
  (1)  021626  062400                    <MOVE!WRMEM!BR!<ADD!SP0>>
1834   021630                    TDON4:  LDMA    IMM,NXTSP                       ;ADDRESS DONE LINK
  (1)          001543                    MICPC=MICPC+1
  (1)  021630  010241                    <MOVE!LDMAR!IMM!<NXTSP&377>>
1835   021632                            LDMA    MEMX,SELB!SPX!SP3               ;ADDRESS THE LINK,COPYING
  (1)          001544                    MICPC=MICPC+1
  (1)  021632  053223                    <MOVE!LDMAR!MEMX!<SELB!SPX!SP3>>
1836                                                                            ;ITS ADDRESS TO SP0
1837   021634                            MEMINC  IMM,200                         ;WRITE THE INTERRUPT TYPE
  (1)          001545                    MICPC=MICPC+1
  (1)  021634  016000                    <MOVE!WRMEM!INCMAR!IMM!<200>>
1838   021636                            MEM     BR,INCA!SP0                     ;COPY ACTUAL LINK ADDRESS
  (1)          001546                    MICPC=MICPC+1
  (1)  021636  062460                    <MOVE!WRMEM!BR!<INCA!SP0>>
1839   021640                            LDMA    IMM,NXTSP                       ;ADDRESS PTR INT STACK
  (1)          001547                    MICPC=MICPC+1
  (1)  021640  010241                    <MOVE!LDMAR!IMM!<NXTSP&377>>
1840   021642                            MEM     IMM,INTSTK                      ;ASSUME WRAP AROUND
  (1)          001550                    MICPC=MICPC+1
  (1)  021642  002642                    <MOVE!WRMEM!IMM!<INTSTK>>
1841   021644                            BRWRTE  IMM,<<MMEND-2>>                 ;ADDRESS ENDOFINT STACK
  (1)          001551                    MICPC=MICPC+1
  (1)  021644  000776                    <MOVE!WRTEBR!IMM!<<MMEND-2>>>
1842   021646                            CMP     BR,SP3                          ;WRAPAROUND?
  (1)          001552                    MICPC=MICPC+1
  (1)  021646  060363                    <SUBTC!BR!SP3>
1843   021650                            Z       TDON40                          ;YES---BRANCH
  (1)          001553                    MICPC=MICPC+1
  (1)  021650  115556                    <JUMP!ZCOND!<TDON40-INIT&3000*4>!<TDON40-INIT&777/2>>
1844   021652                            BRWRTE  IMM,2                           ;OFFSET TO NEXT PAIR
  (1)          001554                    MICPC=MICPC+1
  (1)  021652  000402                    <MOVE!WRTEBR!IMM!<2>>
1845   021654                            MEM     BR,ADD!SP3                      ;UPDATE POINTER
  (1)          001555                    MICPC=MICPC+1
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  (1)  021654  062403                    <MOVE!WPMEM!BR!<ADD!SP3>>
1846  021656                         TDON40: BRWRTE  IMM,20                  ;WRITE INTERUPT PENDING
  (1)          001556                    MICPC=MICPC+1
  (1)  021656  000420                    <MOVE!WRTEBR!IMM!<20>>
1847  021660                              SP      BR,AORB,SP1               ;IN PORT STATUS WORD
  (1)          001557                    MICPC=MICPC+1
  (1)  021660  063301                    <MOVE!SPX!BR!AORB!SP1>
1848  021662                              LDMA    IMM,ETC                   ;ADDRESS NEXT EMPTY PTR
  (1)          001560                    MICPC=MICPC+1
  (1)  021662  010070                    <MOVE!LDMAR!IMM!<ETC&377>>
1849  021664                              SP      MEMX,SELB,SP0             ;COPY IT TO SP0
  (1)          001561                    MICPC=MICPC+1
  (1)  021664  043220                    <MOVE!SPX!MEMX!SELB!SP0>
1850  021666                              LDMA    IMM,STC                   ;GET NEXT DONE PTR
  (1)          001562                    MICPC=MICPC+1
  (1)  021666  010067                    <MOVE!LDMAR!IMM!<STC&377>>
1851  021670                              CMP     MEMX,SP0                  ;IDENTICAL?
  (1)          001563                    MICPC=MICPC+1
  (1)  021670  040360                    <SUBTC!MEMX!SP0>
1852  021672                              Z       RH3                       ;FINISH PROCESSING HEADER
  (1)          001564                    MICPC=MICPC+1
  (1)  021672  105562                    <JUMP!ZCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
1853
1854  021674                         TDON1:  LDMA    IMM,ISP17                 ;GET LAST ACKED
  (1)          001565                    MICPC=MICPC+1
  (1)  021674  010153                    <MOVE!LDMAR!IMM!<ISP17&377>>
1855  021676                              SP      MEMX,SELB,SP17            ;STORE IT IN SP17
  (1)          001566                    MICPC=MICPC+1
  (1)  021676  043237                    <MOVE!SPX!MEMX!SELB!SP17>
1856  021700                              LDMA    IMM,STC                   ;GET START OF TMT CHAIN
  (1)          001567                    MICPC=MICPC+1
  (1)  021700  010067                    <MOVE!LDMAR!IMM!<STC&377>>
1857  021702                              LDMA    MEMX,SELB!SPBRX!SP0       ;ADDRESS THE LINK
  (1)          001570                    MICPC=MICPC+1
  (1)  021702  053620                    <MOVE!LDMAR!MEMX!<SELB!SPBRX!SP0>>
1858  021704                              BRWRTE  MEMX!INCMAR,SELB          ;GET THE FLAGS
  (1)          001571                    MICPC=MICPC+1
  (1)  021704  054620                    <MOVE!WRTEBR!MEMX!INCMAR!<SELB>>
1859  021706                              BR1     TDON3                     ;IF BUFFER ASSIGNED PROCEED
  (1)          001572                    MICPC=MICPC+1
  (1)  021706  116530                    <JUMP!BR1CON!<TDON3-INIT&3000*4>!<TDON3-INIT&777/2>>
1860  021710                              ALWAYS  RH3                       ;ELSE---EXIT
  (1)          001573                    MICPC=MICPC+1
  (1)  021710  104562                    <JUMP!ALCOND!<RH3-INIT&3000*4>!<RH3-INIT&777/2>>
1861
1862  021712                         OVRRUN: BRWRTE  IMM,4
  (1)          001574                    MICPC=MICPC+1
  (1)  021712  000404                    <MOVE!WRTEBR!IMM!<4>>
1863  021714                              ALWAYS  NTRS0
  (1)          001575                    MICPC=MICPC+1
  (1)  021714  114663                    <JUMP!ALCOND!<NTRS0-INIT&3000*4>!<NTRS0-INIT&777/2>>
1864
1865                                   ; INPUTS:
1866                                   ;       SP0 = RECEIVE CHARACTER
1867
1868  021716                         PASWRD: SP      IBUS,LNOSW,SP13           ;READ PASSWD SWITCH
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  (1)          001576                    MICPC=MICPC+1
  (1)  021716  023333                    <MOVE!SPX!IBUS!LNOSW!SP13>
1869  021720                              Z       10$                       ;IF ALL ONES NO RLD ENABLED
  (1)          001577                    MICPC=MICPC+1
  (1)  021720  115603                    <JUMP!ZCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
1870  021722                              BRWRTE  IMM,6                     ;CHECK FOR ENTER MOP MODE
  (1)          001600                    MICPC=MICPC+1
  (1)  021722  000406                    <MOVE!WRTEBR!IMM!<6>>
1871  021724                              CMP     BR,SP0
  (1)          001601                    MICPC=MICPC+1
  (1)  021724  060360                    <SUBTC!BR!SP0>
1872  021726                              Z       20$                       ;IF EQUAL   ENTER MOP
  (1)          001602                    MICPC=MICPC+1
  (1)  021726  115611                    <JUMP!ZCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
1873  021730                         10$:    BRWRTE  BR,SELA!SP1               ;READ STATUS BYTE
  (1)          001603                    MICPC=MICPC+1
  (1)  021730  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
1874  021732                              BRSHFT                            ;SHIFT IT RIGHT
  (1)          001604                    MICPC=MICPC+1
  (1)  021732  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1875  021734                              BR1     RHX                       ;MESSAGE WITH NO BUFFER ASSIGNED
  (1)          001605                    MICPC=MICPC+1
  (1)  021734  106740                    <JUMP!BR1CON!<RHX-INIT&3000*4>!<RHX-INIT&777/2>>
1876  021736                              BRSHFT                            ;SHIFT RIGHT AGAIN
  (1)          001606                    MICPC=MICPC+1
  (1)  021736  001620                    <MOVE!SHFTBR!WRTEBR!SELB>
1877  021740                              BR1     RCVM0                     ;DLE RECEIVED IN NORMAL MODE
  (1)          001607                    MICPC=MICPC+1
  (1)  021740  106732                    <JUMP!BR1CON!<RCVM0-INIT&3000*4>!<RCVM0-INIT&777/2>>
1878  021742                              ALWAYS  RK3                       ;HANDLE MAINT MODE MESSAGE
  (1)          001610                    MICPC=MICPC+1
  (1)  021742  104641                    <JUMP!ALCOND!<RK3-INIT&3000*4>!<RK3-INIT&777/2>>
1879  021744                         20$:    SP      BR,DECA,SP4               ;COUNT FOR NUMB OF COMPARES
  (1)          001611                    MICPC=MICPC+1
  (1)  021744  063164                    <MOVE!SPX!BR!DECA!SP4>
1880  021746                              STATE   EM2
  (1)          001612                    MICPC=MICPC+1
  (1)  021746  000735                    <MOVE!WRTEBR!IMM!<EM2-INIT&777/2>>
1881  021750                              ALWAYS  REXIT
  (1)          001613                    MICPC=MICPC+1
  (1)  021750  100450                    <JUMP!ALCOND!<REXIT-INIT&3000*4>!<REXIT-INIT&777/2>>
1882                                   ;
1883                                           .ENABL  LSB
1884                                   ;
1885  021752                         RCVM1:  LDMA    IMM,NAKST                 ;RESET NAKS SENT
  (1)          001614                    MICPC=MICPC+1
  (1)  021752  010001                    <MOVE!LDMAR!IMM!<NAKST&377>>
1886  021754                              MEM     IMM,1                     ;..
  (1)          001615                    MICPC=MICPC+1
  (1)  021754  000401                    <MOVE!WPMEM!IMM!<1>>
1887  021756                              LDMA    IMM,BC                    ;ADDRESS ORIGINAL RECV BYTE COUNT
  (1)          001616                    MICPC=MICPC+1
  (1)  021756  010167                    <MOVE!LDMAR!IMM!<BC&377>>
1888  021760                              SP      MEMX!INCMAR,SELB,SP4      ;MOVE BYTE COUNT TO SP4
  (1)          001617                    MICPC=MICPC+1
  (1)  021760  057224                    <MOVE!SPX!MEMX!INCMAR!SELB!SP4>
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1889  021762                  SP      MEMX!INCMAR,SELB,SP5    ;AND SP5
 (1)          001620          MICPC=MICPC+1
 (1)  021762  057225          <MOVE!SPX!MEMX!INCMAR!SELB!SP5>
1890  021764                  MEM     BR,DECA!SP11                    ;COPY SP11 FROM MEMORY
 (1)          001621          MICPC=MICPC+1
 (1)  021764  062571          <MOVE!WRMEM!BR!<DECA!SP11>>
1891  021766                  LDMA    IMM,NXTSP
 (1)          001622          MICPC=MICPC+1
 (1)  021766  010241          <MOVE!LDMAR!IMM!<NXTSP&377>>
1892  021770                  SP      MEMX!LDMAR,SELB,SP3                     ;COPY TO SP3
 (1)          001623          MICPC=MICPC+1
 (1)  021770  053223          <MOVE!SPX!MEMX!LDMAR!SELB!SP3>
1893  021772                  MEMINC  IMM,204                 ;RECEIVE DONE IMAGE
 (1)          001624          MICPC=MICPC+1
 (1)  021772  016004          <MOVE!WRMEM!INCMAR!IMM!<204>>
1894  021774                  MEM     BR!LDMAR,SELA!SP14                      ;COPY LINK ADDRESS TO NEXT INTER
 (1)          001625          MICPC=MICPC+1
 (1)  021774  072614          <MOVE!WRMEM!BR!LDMAR!<SELA!SP14>>
1895  021776                  MEMINC  IMM,0                   ;ZERO THE FLAGS
 (1)          001626          MICPC=MICPC+1
 (1)  021776  016400          <MOVE!WRMEM!INCMAR!IMM!<0>>
1896  022000                  SP      IMM!INCMAR,SP0,300      ;WRITE A 300 TO SP0
 (1)          001627          MICPC=MICPC+1
 (1)  022000  017300          <MOVE!SPX!IMM!INCMAR!SP0!300>
1897  022002                  BRWRTE  IMM!INCMAR,2            ;PREPAPE TO ADDRESS NEXT
 (1)          001630          MICPC=MICPC+1
 (1)  022002  014402          <MOVE!WRTEBR!IMM!INCMAR!<2>>
1898                                                          ;INTERRUPT STACK AND INCREMENT
1899                                                          ;THE MAR
1900  022004                  MEM     MEMX,AANDB!SP0          ;MASK OFF ORIGINAL HIGH BYTE
 (1)          001631          MICPC=MICPC+1
 (1)  022004  042660          <MOVE!WRMEM!MEMX!<AANDB!SP0>>
1901                                                          ;OF COUNT SAVING EXTENDED MEM BITS
1902  022006                  MEMINC  MEMX,AORB!SP5           ;COPY TO MEMORY LINK
 (1)          001632          MICPC=MICPC+1
 (1)  022006  056705          <MOVE!WRMEM!INCMAR!MEMX!<AORB!SP5>>
1903  022010                  MEMINC  BR,SELA!SP4
 (1)          001633          MICPC=MICPC+1
 (1)  022010  076604          <MOVE!WRMEM!INCMAR!BR!<SELA!SP4>>
1904  022012                  LDMA    IMM,NXTSP               ;ADDRESS NEXT INT STACK
 (1)          001634          MICPC=MICPC+1
 (1)  022012  010241          <MOVE!LDMAR!IMM!<NXTSP&377>>
1905  022014                  MEM     BR,ADD!SP3
 (1)          001635          MICPC=MICPC+1
 (1)  022014  062403          <MOVE!WRMEM!BR!<ADD!SP3>>
1906  022016                  BRWRTE  IMM,<<MMEND-2>>         ;ADDRESSEND OF INT STACK
 (1)          001636          MICPC=MICPC+1
 (1)  022016  000776          <MOVE!WRTEBR!IMM!<<MMEND-2>>>
1907  022020                  CMP     BR,SP3                  ;WRAP AROUND
 (1)          001637          MICPC=MICPC+1
 (1)  022020  060363          <SUBTC!BR!SP3>
1908  022022                  Z       40$                     ;IF YES-- BRANCH
 (1)          001640          MICPC=MICPC+1
 (1)  022022  115651          <JUMP!ZCOND!<40$-INIT&3000*4>!<40$-INIT&777/2>>
1909  022024          20$:
1910  022024                  BRWRTE  IMM,5                   ;INDEX TO NEXT BUFFER
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 (1)          001641          MICPC=MICPC+1
 (1)  022024  000405          <MOVE!WRTEBR!IMM!<5>>
1911  022026                  SP      BR,ADD,SP14             ;UPDATE COPY OF POINTER
 (1)          001642          MICPC=MICPC+1
 (1)  022026  063014          <MOVE!SPX!BR!ADD!SP14>
1912  022030                  BRWRTE  IMM,STC                 ;ADDRESS OF WRAP AROUND POINT
 (1)          001643          MICPC=MICPC+1
 (1)  022030  000467          <MOVE!WRTEBR!IMM!<STC>>
1913  022032                  CMP     BR,SP14                 ;WRAPAROUND?
 (1)          001644          MICPC=MICPC+1
 (1)  022032  060374          <SUBTC!BR!SP14>
1914  022034                  Z       50$                     ;IF YES---BRANCH
 (1)          001645          MICPC=MICPC+1
 (1)  022034  115653          <JUMP!ZCOND!<50$-INIT&3000*4>!<50$-INIT&777/2>>
1915  022036          30$:    BRWRTE  IMM,20                  ;MASK FOR INTERUPT PENDING
 (1)          001646          MICPC=MICPC+1
 (1)  022036  000420          <MOVE!WRTEBR!IMM!<20>>
1916  022040                  SP      DP,AORB,SP1             ;UPDATE PORT STATUS WORD
 (1)          001647          MICPC=MICPC+1
 (1)  022040  063301          <MOVE!SPX!DP!AORB!SP1>
1924  022042                  ALWAYS  FLUSH
 (1)          001650          MICPC=MICPC+1
 (1)  022042  104415          <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1926  022044          40$:    MEM     IMM,INTSTK              ;POINT TO START OF INTERRUPT STACK
 (1)          001651          MICPC=MICPC+1
 (1)  022044  002642          <MOVE!WRMEM!IMM!<INTSTK>>
1927  022046                  ALWAYS  20$
 (1)          001652          MICPC=MICPC+1
 (1)  022046  114641          <JUMP!ALCOND!<20$-INIT&3000*4>!<20$-INIT&777/2>>
1928  022050          50$:    BRWRTE  IMM,RCL1                ;POINT TO START OF RECEIVE QUEUE
 (1)          001653          MICPC=MICPC+1
 (1)  022050  000424          <MOVE!WRTEBR!IMM!<RCL1>>
1929  022052                  SP      BR,SELB,SP14
 (1)          001654          MICPC=MICPC+1
 (1)  022052  063234          <MOVE!SPX!BR!SELB!SP14>
1930  022054                  ALWAYS  30$
 (1)          001655          MICPC=MICPC+1
 (1)  022054  114646          <JUMP!ALCOND!<30$-INIT&3000*4>!<30$-INIT&777/2>>
1931                          .DSABL  LSB
1932  022056          NTHRES: LDMA    IMM,ST
 (1)          001656          MICPC=MICPC+1
 (1)  022056  010152          <MOVE!LDMAR!IMM!<ST&377>>
1933  022060                  SPBR    MEMX,SELB,SP0
 (1)          001657          MICPC=MICPC+1
 (1)  022060  043620          <MOVE!SPBRX!MEMX!SELB!SP0>
1934  022062                  BRWRTE  BR,ADD!SP0              ;SHIFT LEFT
 (1)          001660          MICPC=MICPC+1
 (1)  022062  060400          <MOVE!WRTEBR!BR!<ADD!SP0>>
1935  022064                  BR4     OVRRUN
 (1)          001661          MICPC=MICPC+1
 (1)  022064  117174          <JUMP!BR4CON!<OVRRUN-INIT&3000*4>!<OVRRUN-INIT&777/2>>
1936  022066                  BRWRTE  IMM,1
 (1)          001662          MICPC=MICPC+1
 (1)  022066  000401          <MOVE!WRTEBR!IMM!<1>>
1937  022070          ERRXX:
1938  022070          NTHS0:  LDMA    IMM,<<RTHRS+3>>
```

```
  (1)          001663                          MICPC=MICPC+1
  (1)  022074  010177                          <MOVE!LDMAR!IMM!<<RTHRS+3>&377>>
1939   022072                                  MEMINC  IMM,0
  (1)          001664                          MICPC=MICPC+1
  (1)  022072  016400                          <MOVE!WRMEM!INCMAR!IMM!<0>>
1940   022074                                  MEM     BR,SELB
  (1)          001665                          MICPC=MICPC+1
  (1)  022074  062620                          <MOVE!WRMEM!BR!<SELB>>
1941   022076                          NTRS1:  LDMA    IMM,NXTSP
  (1)          001666                          MICPC=MICPC+1
  (1)  022076  010241                          <MOVE!LDMAR!IMM!<NXTSP&377>>
1942   022100                                  LDMA    MEMX,SELB!SPX!SP0
  (1)          001667                          MICPC=MICPC+1
  (1)  022100  053220                          <MOVE!LDMAR!MEMX!<SELB!SPX!SP0>>
1943   022102                                  MEMINC  IMM,201
  (1)          001670                          MICPC=MICPC+1
  (1)  022102  016601                          <MOVE!WRMEM!INCMAR!IMM!<201>>
1944   022104                                  MEM     IMM,<<RTHRS>>
  (1)          001671                          MICPC=MICPC+1
  (1)  022104  002574                          <MOVE!WRMEM!IMM!<<RTHRS>>>
1945   022106                                  LDMA    IMM,NXTSP
  (1)          001672                          MICPC=MICPC+1
  (1)  022106  010241                          <MOVE!LDMAR!IMM!<NXTSP&377>>
1946   022110                                  MEM     IMM,INTSTK              ;ASSUME QUEUE WRAP AROUND
  (1)          001673                          MICPC=MICPC+1
  (1)  022110  002642                          <MOVE!WRMEM!IMM!<INTSTK>>
1947   022112                                  BRWRTE  IMM,<<MMEND-2>>
  (1)          001674                          MICPC=MICPC+1
  (1)  022112  000776                          <MOVE!WRTEBR!IMM!<<MMEND-2>>>
1948   022114                                  CMP     BR,SP0
  (1)          001675                          MICPC=MICPC+1
  (1)  022114  060360                          <SUBTC!BR!SP0>
1949   022116                                  Z       NTRS2                   ;IT DID WRAP AROUND
  (1)          001676                          MICPC=MICPC+1
  (1)  022116  115701                          <JUMP!ZCOND!<NTRS2-INIT&3000*4>!<NTRS2-INIT&777/2>>
1950   022120                                  BRWRTE  IMM,2                   ;OFFSET TO NEXT PAIR
  (1)          001677                          MICPC=MICPC+1
  (1)  022120  000402                          <MOVE!WRTEBR!IMM!<2>>
1951   022122                                  MEM     BR,ADD!SP0              ;UPDATE QUEUE POINTER
  (1)          001700                          MICPC=MICPC+1
  (1)  022122  062400                          <MOVE!WRMEM!BR!<ADD!SP0>>
1952   022124                          NTRS2:  BRWRTE  IMM,20
  (1)          001701                          MICPC=MICPC+1
  (1)  022124  000420                          <MOVE!WRTEBR!IMM!<20>>
1953   022126                                  SPBR    BR,AORB,SP1
  (1)          001702                          MICPC=MICPC+1
  (1)  022126  063701                          <MOVE!SPBRX!BR!AORB!SP1>
1954   022130                                  BR0     TAB1                    ;FLAGGED BY ERROR TYPE
  (1)          001703                          MICPC=MICPC+1
  (1)  022130  116334                          <JUMP!BR0CON!<TAB1-INIT&3000*4>!<TAB1-INIT&777/2>>
1955   022132                          SNAK:   LDMA    IMM,ISP11
  (1)          001704                          MICPC=MICPC+1
  (1)  022132  010171                          <MOVE!LDMAR!IMM!<ISP11&377>>
1956   022134                                  SP      MEMX,SELB,SP11
  (1)          001705                          MICPC=MICPC+1
  (1)  022134  043231                          <MOVE!SPX!MEMX!SELB!SP11>
```



```
1957   022136                                  SP      BR,INCA,SP11            ;INCREMENT MSG EXPECTED
  (1)          001706                          MICPC=MICPC+1
  (1)  022136  063071                          <MOVE!SPX!BR!INCA!SP11>
1958   022140                          SNAK1:  BRWRTE  IMM,1                   ;UNNUMB PENING BIT TO BR
  (1)          001707                          MICPC=MICPC+1
  (1)  022140  000401                          <MOVE!WRTEBR!IMM!<1>>
1959   022142                          SNAK2:  SP      BR,AORB,SP10            ;UPDATE LINE STATUS WORD
  (1)          001710                          MICPC=MICPC+1
  (1)  022142  063310                          <MOVE!SPX!BR!AORB!SP10>
1960   022144                                  ALWAYS  FLUSH
  (1)          001711                          MICPC=MICPC+1
  (1)  022144  104415                          <JUMP!ALCOND!<FLUSH-INIT&3000*4>!<FLUSH-INIT&777/2>>
1961                                    ;
1962   022146                          EMTRIG: BRWRTE  IMM,24
  (1)          001712                          MICPC=MICPC+1
  (1)  022146  000424                          <MOVE!WRTEBR!IMM!<24>>
1963   022150                                  OUTPUT  BR,<SELB!OBA1>
  (1)          001713                          MICPC=MICPC+1
  (1)  022150  062226                          <MOVE!WROUT!BR!<SELB!OBA1>>
1964   022152                                  BRWRTE  IMM,0
  (1)          001714                          MICPC=MICPC+1
  (1)  022152  000400                          <MOVE!WRTEBR!IMM!<0>>
1965   022154                                  OUTPUT  BR,<SELB!OBA2>
  (1)          001715                          MICPC=MICPC+1
  (1)  022154  062227                          <MOVE!WROUT!BR!<SELB!OBA2>>
1966   022156                                  SPBR    IBUS,BM873,SP0          ;READ BM873 ADDRESS---
  (1)          001716                          MICPC=MICPC+1
  (1)  022156  023740                          <MOVE!SPBRX!IBUS!BM873!SP0>
1967   022160                                  OUTPUT  BR,SELB!OUTDA1          ;SET UP LOW BYTE OF ADDRESS
  (1)          001717                          MICPC=MICPC+1
  (1)  022160  062222                          <MOVE!WROUT!BR!<SELB!OUTDA1>>
1968   022162                                  BRWRTE  IMM,366                 ;HIGH BYTE BASE FOR ROM BOOT
  (1)          001720                          MICPC=MICPC+1
  (1)  022162  000766                          <MOVE!WRTEBR!IMM!<366>>
1969   022164                                  OUTPUT  BR,SELB!OUTDA2          ;
  (1)          001721                          MICPC=MICPC+1
  (1)  022164  062223                          <MOVE!WROUT!BR!<SELB!OUTDA2>>
1970   022166                          EM6:    BRWRTE  IMM,21                  ;MASK FOR TIMER AND ALSO TO START NPR
  (1)          001722                          MICPC=MICPC+1
  (1)  022166  000421                          <MOVE!WRTEBR!IMM!<21>>
1971   022170                                  OUT     BR,<SELB!OBR>
  (1)          001723                          MICPC=MICPC+1
  (1)  022170  061231                          <MOVE!WROUTX!BR!<SELB!OBR>>
1972   022172                                  OUT     BR,<SELB!ONPR>
  (1)          001724                          MICPC=MICPC+1
  (1)  022172  061230                          <MOVE!WROUTX!BR!<SELB!ONPR>>
1973   022174                          EM1:    BRWRTE  IBUS,NPR                ;READ NPR CONTROL
  (1)          001725                          MICPC=MICPC+1
  (1)  022174  120040                          <MOVE!WRTEBR!IBUS!<NPR>>
1974   022176                                  BR0     CKTIME
  (1)          001726                          MICPC=MICPC+1
  (1)  022176  102371                          <JUMP!BR0CON!<CKTIME-INIT&3000*4>!<CKTIME-INIT&777/2>>
1975   022200                                  MEMADR  EM1                     ;IF NPR DONE
  (1)          001727                          MICPC=MICPC+1
  (1)  022200  002420                          <MOVE!WRMEM!<EM1-INIT&777/2>>
1976   022202                                  ALWAYS  ACLOW
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  (1)          001730                    MICPC=MICPC+1
  (1)  022202  100764                    <JUMP!ALCOND!<ACLOW-INIT&3000*4>!<ACLOW-INIT&777/2>>
1977  022204                    TABUPD: SPBR    IBUS,RCVCON,SP0          ;READ RECEIVER CONTROL REG
  (1)          001731                    MICPC=MICPC+1
  (1)  022204  023640                    <MOVE!SPBRX!IBUS!RCVCON!SP0>
1978  022206                            BRWRTE  BR,ADD!SP0               ;SHIFT LEFT
  (1)          001732                    MICPC=MICPC+1
  (1)  022206  060400                    <MOVE!WRTEBR!BR!<ADD!SP0>>
1979  022210                            BR7     IDLE                     ;RECEIVE ACTIVE--IDLE
  (1)          001733                    MICPC=MICPC+1
  (1)  022210  103451                    <JUMP!BR7CON!<IDLE-INIT&3000*4>!<IDLE-INIT&777/2>>
1980  022212                    TAB1:   LDMA    IMM,IMG10
  (1)          001734                    MICPC=MICPC+1
  (1)  022212  010154                    <MOVE!LDMAR!IMM!<IMG10&377>>
1981  022214                            BRWRTE  IMM,2
  (1)          001735                    MICPC=MICPC+1
  (1)  022214  000402                    <MOVE!WRTEBR!IMM!<2>>
1982  022216                            MEMINC  BR,AANDB!SP10            ;SAVE BIT 1 OF SP10
  (1)          001736                    MICPC=MICPC+1
  (1)  022216  076670                    <MOVE!WRMEM!INCMAR!BR!<AANDB!SP10>>
1983  022220                            MEMINC  BR,SELA!SP11             ;SAVE SP11
  (1)          001737                    MICPC=MICPC+1
  (1)  022220  076611                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP11>>
1984  022222                            MEMINC  BR,SELA!SP12             ;SAVE SP12
  (1)          001740                    MICPC=MICPC+1
  (1)  022222  076612                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP12>>
1985  022224                            MEMINC  BR,SELA!SP14             ;SAVE SP14
  (1)          001741                    MICPC=MICPC+1
  (1)  022224  076614                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP14>>
1986  022226                            MEMINC  BR,SELA!SP16             ;SAVE SP16
  (1)          001742                    MICPC=MICPC+1
  (1)  022226  076616                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP16>>
1987  022230                            MEMINC  BR,SELA!SP17             ;SAVE SP17
  (1)          001743                    MICPC=MICPC+1
  (1)  022230  076617                    <MOVE!WRMEM!INCMAR!BR!<SELA!SP17>>
1988                                                                     ;MAR NOW POINTS TO BASE
1989  022232                            STATE   RB2             ;DO NOT CHANGE BR UNTIL RB0
  (1)          001744                    MICPC=MICPC+1
  (1)  022232  000460                    <MOVE!WRTEBR!IMM!<RB2-INIT&777/2>>
1990  022234                            LDMA    IMM,TABST       ;POINT TO TABLE UPDATE STATE
  (1)          001745                    MICPC=MICPC+1
  (1)  022234  010210                    <MOVE!LDMAR!IMM!<TABST&377>>
1991  022236                            PSTATE  TBU1                     ;NEW PORT STATE ADDRESS
  (1)  022236                            MEM     IMM,<<TBU1-INIT&777/2>>
  (2)          001746                    MICPC=MICPC+1
  (2)  022236  002774                    <MOVE!WRMEM!IMM!<<TBU1-INIT&777/2>>>
1992  022240                            SP      IMM,4,SP4                ;INITIALIZE COUNT
  (1)          001747                    MICPC=MICPC+1
  (1)  022240  003004                    <MOVE!SPX!IMM!4!SP4>
1993                                                                     ;NOTE: FIRST 6 RAM LOCATIONS ARE NOT WRITTEN
1994                                                                     ;TO CORE TABLE.
1995  022242                            LDMA    IMM,BASE
  (1)          001750                    MICPC=MICPC+1
  (1)  022242  010017                    <MOVE!LDMAR!IMM!<BASE&377>>
1996  022244                            ALWAYS  RB0
  (1)          001751                    MICPC=MICPC+1
```



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  (1)  022244  104442                    <JUMP!ALCOND!<RB0-INIT&3000*4>!<RB0-INIT&777/2>>
1997  022246                    EC2:    BRWRTE  IMM,2                     ;INCREMENT COUNT/TEST
  (1)          001752                    MICPC=MICPC+1
  (1)  022246  000402                    <MOVE!WRTEBR!IMM!<2>>
1998  022250                            SP      BR,ADD,SP4
  (1)          001753                    MICPC=MICPC+1
  (1)  022250  063004                    <MOVE!SPX!BR!ADD!SP4>
1999  022252                            SP      IBUS,IOBA1,SP0                   ;POINT TO NEXT ADDRESS
  (1)          001754                    MICPC=MICPC+1
  (1)  022252  023140                    <MOVE!SPX!IBUS!IOBA1!SP0>
2000  022254                            OUTPUT  BR,ADD!OBA1
  (1)          001755                    MICPC=MICPC+1
  (1)  022254  062006                    <MOVE!WROUT!BR!<ADD!OBA1>>
2001  022256                            SP      IBUS,IOBA2,SP0
  (1)          001756                    MICPC=MICPC+1
  (1)  022256  023160                    <MOVE!SPX!IBUS!IOBA2!SP0>
2002  022260                            OUTPUT  BR,AC!OBA2
  (1)          001757                    MICPC=MICPC+1
  (1)  022260  062107                    <MOVE!WROUT!BR!<AC!OBA2>>
2003  022262                            C       TABMXT
  (1)          001760                    MICPC=MICPC+1
  (1)  022262  105366                    <JUMP!CCOND!<TABMXT-INIT&3000*4>!<TABMXT-INIT&777/2>>
2004  022264                    ECX:    BRWRTE  BR,SELA!SP1              ;READ PORT STATUS
  (1)          001761                    MICPC=MICPC+1
  (1)  022264  060601                    <MOVE!WRTEBR!BR!<SELA!SP1>>
2005  022266                            BR0     30$                      ;INIT MODE, WRITE OUT 200 BITES
  (1)          001762                    MICPC=MICPC+1
  (1)  022266  116374                    <JUMP!BR0CON!<30$-INIT&3000*4>!<30$-INIT&777/2>>
2006                                                                     ;OTHERWISE ONLY WRITE OUT ERROR COUNTERS
2007  022270                            BRWRTE  BR!LDMAR,SELA!SP4        ;READ COUNTER
  (1)          001763                    MICPC=MICPC+1
  (1)  022270  070004                    <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
2008  022272                            BR4     20$                      ;ALL DONE
  (1)          001764                    MICPC=MICPC+1
  (1)  022272  117371                    <JUMP!BR4CON!<20$-INIT&3000*4>!<20$-INIT&777/2>>
2009  022274                    10$:    OUTPUT  MEMX!INCMAR,SELB!OUTDA1          ;STORE COUNTS OF ERRORS
  (1)          001765                    MICPC=MICPC+1
  (1)  022274  056222                    <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA1>>
2010  022276                            OUTPUT  MEMX!INCMAR,SELB!OUTDA2
  (1)          001766                    MICPC=MICPC+1
  (1)  022276  056223                    <MOVE!WROUT!MEMX!INCMAR!<SELB!OUTDA2>>
2011  022300                            SP      IBUS,NPR,SP0
  (1)          001767                    MICPC=MICPC+1
  (1)  022300  123200                    <MOVE!SPX!IBUS!NPR!SP0>
2012  022302                            ALWAYS  RK8
  (1)          001770                    MICPC=MICPC+1
  (1)  022302  104622                    <JUMP!ALCOND!<RK8-INIT&3000*4>!<RK8-INIT&777/2>>
2013  022304                    20$:    LDMA    IMM,TABST
  (1)          001771                    MICPC=MICPC+1
  (1)  022304  010210                    <MOVE!LDMAR!IMM!<TABST&377>>
2014  022306                            PSTATE  I3
  (1)  022306                            MEM     IMM,<<I3-INIT&777/2>>
  (2)          001772                    MICPC=MICPC+1
  (2)  022306  002460                    <MOVE!WRMEM!IMM!<<I3-INIT&777/2>>>
2015  022310                            ALWAYS  RM1
  (1)          001773                    MICPC=MICPC+1
```

```
  (1)  022310  104420                    <JUMP!ALCOND!<RM1-INIT&3000*4>!<RM1-INIT&777//2>>
 2018  022312                    30$:    BRWRTE  BR!LDMAR,SELA!SP4       ;READ COUNTER
  (1)         001774                    MICPC=MICPC+1
  (1)  022312  070604                    <MOVE!WRTEBR!BR!LDMAR!<SELA!SP4>>
 2019  022314                            BR7     20$                       ;ALL DONE
  (1)         001775                    MICPC=MICPC+1
  (1)  022314  117771                    <JUMP!BR7CON!<20$-INIT&3000*4>!<20$-INIT&777//2>>
 2020  022316                            ALWAYS  10$                       ;KEEP GOING
  (1)         001776                    MICPC=MICPC+1
  (1)  022316  114765                    <JUMP!ALCOND!<10$-INIT&3000*4>!<10$-INIT&777/2>>
 2021  022320                            $ZERO
  (1)         001777                    MICPC=MICPC+1
  (1)  022320  000000                    000000
 2022                                    ;
 2023         000001                     .END

. ABS.  022322     000

 ERRORS DETECTED:  0

 ,DDCMP/CRF/DS:CRF_DMCHGH,HILOW,DDCHGH
 RUN-TIME: 5 8 0 SECONDS
 RUN-TIME RATIO: 68/13=4.9
 CORE USED:  6K  (11 PAGES)

  1671                              03000
```



```
  1672                              02800
  1673
  1674
  1675                                      ;*************************** TEST 1 *************************
  1676                                      ;*THIS IS A SPECIAL TEST WHICH IS ONLY EXECUTED  ONE TIME,
  1677                                      ;*THE FIRST PASS AFTER THE DIAGNOSTIC IS LOADED. IT TYPES ON
  1678                                      ;*THE CONSOLE THE PART NUMBERS OF THE CROMS WHICH THIS
  1679                                      ;*REVISION SUPPORTS. TO FORCE A TYPE OUT PATCH LOCATION
  1680                                      ;*ROMNUM: TO A ZERO.
  1681                                      ;!***********************************************************
  1682
  1683                                      ;  TEST 1
  1684                                      ;--------------
  1685  022322  012737  000001  001226  TST1:  MOV     #1,TSTNO
  1686  022330  012737  022760  001216          MOV     #TST2,NEXT
  1687                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
  1688  022336  005737  022360                  TST     ROMNUM            ;FIRST TIME HERE?
  1689  022342  001002                          BNE     1$                ;SKIP IF NOT
  1690  022344  104402  022362                  TYPE,   ROM1              ;TYPE PART NUMBERS
  1691  022350  012737  177777  022360  1$:     MOV     #-1,ROMNUM        ;SET FLAG TO ONLY TYPE ONCE
  1692  022356  104400                          SCOPE                     ;
  1693  022360  000000                  ROMNUM: 0
  1694  022362  005377  055104  046504  ROM1:   .ASCII  <377><12>/DZDMG-C SUPPORTS THE FOLLOWING CROM PART NUMBERS:/
  (1)  022445     377  042012  041515          .ASCII  <377><12>/DMC11-AR  (M8200-YA)/
  (1)  022473     377  031462  032055          .ASCII  <377>/23-414A9/<15><12>/23-415A9/<15><12>/23-416A9/
  (1)  022530  005015  031462  032055          .ASCII  <15><12>/23-417A9/<15><12>/23-418A9/<15><12>/23-419A9/
  (1)  022566  005015  031462  032055          .ASCII  <15><12>/23-420A9/<15><12>/23-421A9/
  (1)  022612  005377  046504  030503          .ASCII  <377><12>/DMC11-AL  (M8200-YB)/
  (1)  022640  031377  026463  034463          .ASCII  <377>/23-392A9/<15><12>/23-393A9/<15><12>/23-394A9/
  (1)  022675     015  031012  026463          .ASCII  <15><12>/23-395A9/<15><12>/23-396A9/<15><12>/23-397A9/
  (1)  022733     015  031012  026463          .ASCII  <15><12>/23-398A9/
  (1)  022745     015  031012  026463          .ASCIZ  <15><12>/23-399A9/
  (1)                               ,EVEN
  (3)
  1695
  1696                                      ;*************************** TEST 2 *************************
  1697                                      ;*THIS IS A SPECIAL TEST WHICH WILL RUN ON A KMC (DMC WITH
  1698                                      ;*WRITTABLE CONTROL STORE) TO LOAD THE CRAM WITH THE DDCMP
  1699                                      ;*MICRO-CODE. FIRST BE SURE BIT1 OF STAT3 IS SET UP AS FOLLOWS
  1700                                      ;*1=LOCAL HIGH SPEED CODE,  0=REMOTE LOW SPEED CODE  THE STATUS
  1701                                      ;*OF STAT3 BIT1 DETERMINES WHICH MICRO-CODE WILL
  1702                                      ;*BE LOADED IN THE KMC. LOOP ON THIS TEST FOR A FEW SECONDS
  1703                                      ;*TO LOAD THE KMC.
  1704                                      ;!***********************************************************
  1705
  1706                                      ;  TEST 2
  1707                                      ;--------------
  1708  022760  012737  000002  001226  TST2:  MOV     #2,TSTNO
  1709  022766  012737  023052  001216          MOV     #TST3,NEXT
  1710                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
  1711  022774  004737  027012                  JSR     PC,MAPCK          ;CHECK FOR HI OR LO
  1712  023000  032737  100000  001366          BIT     #BIT15,STAT1      ;BE SURE DMC HAS CRAM
  1713  023006  001420                          BEQ     2$                ;SKIP IF NO CRAM
  1714  023010  005000                          CLR     R0                ;R0=CRAM ADDRESS
  1715  023012  013702  012320                  MOV     ROMMAP,R2         ;R2 POINTS TO ROMMAP
  1716  023016  012711  002000          1$:     MOV     #BIT10,(R1)       ;SET ROMO
```

```
1717  023022  010061  000004                  MOV     R0,4(R1)        ;LOAD CRAM ADDRESS
1718  023026  012261  000006                  MOV     (R2)+,6(R1)     ;LOAD WORD TO BE WRITTEN
1719  023032  052711  020000                  BIS     #BIT13,(R1)     ;WRITE IT!
1720  023036  005200                          INC     R0              ;NEXT ADDRESS
1721  023040  022700  002000                  CMP     #2000,R0        ;DONE YET?
1722  023044  001364                          BNE     1$              ;BR IF NO
1723  023046  005011                          CLR     (R1)            ;CLEAR SEL0
1724  023050  104400                  2$:     SCOPE                   ;SCOPE THIS TEST
1725
1726
1727                                          ;*************************** TEST 3 ***************************
1728                                          ;*TEST OF BR RIGHT SHIFT
1729                                          ;*VERIFY THAT A DEST OF BR RSH (011) OF A MICRO-INSTRUCTION
1730                                          ;*SHIFTS THE RESULTING BR DATA RIGHT ONCE.
1731                                          ;!************************************************************
1732
1733                                          ;  TEST 3
1734                                          ;--------------
1735  023052  012737  000003  001226  TST3:   MOV     #3,TSTNO
1736  023060  012737  023166  001216          MOV     #TST4,NEXT
1737                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
1738  023066  104412                          MSTCLR                  ;MASTER CLEAR DMC11
1739  023070  104412                          MSTCLR                  ;MASTER CLEAR DMC11
1740  023072  013701  001404                  MOV     DMCSR,R1        ;R1 = DMC BASE ADDRESS
1741  023076  005011                          CLR     (R1)            ;CLEAR SEL0
1742  023100  012705  052525                  MOV     #52525,R5       ;START WITH 125
1743  023104  010561  000004                  MOV     R5,4(R1)        ;PORT4_125
1744  023110  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1745  023112  120500                          120500                  ;BR _ PORT4
1746  023114  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1747  023116  061620                          061620                  ;BR RSH_BR, SHIFT BR RIGHT
1748  023120  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1749  023122  061225                          061225                  ;PORT5_BR
1750  023124  006005                          ROR     R5              ;R5 = "EXPECTED"
1751  023126  116104  000005                  MOVB    5(R1),R4        ;R4 = "FOUND"
1752  023132  120504                          CMPB    R5,R4           ;DID BR SHIFT RIGHT ONCE?
1753  023134  001401                          BEQ     1$              ;BR IF YES
1754  023136  104012                          HLT     12              ;BR RIGHT SHIFT ERROR
1755  023140                           1$:
1756  023140  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1757  023142  061620                          061620                  ;BR RSH_BR, SHFT BR RIGHT AGAIN
1758  023144  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1759  023146  061225                          061225                  ;PORT5_BR
1760  023150  006005                          ROR     R5              ;R5 = "EXPECTED"
1761  023152  116104  000005                  MOVB    5(R1),R4        ;R4 = "FOUND"
1762  023156  120504                          CMPB    R5,R4           ;DID BR SHIFT RIGHT?
1763  023160  001401                          BEQ     2$              ;BR IF YES
1764  023162  104012                          HLT     12              ;BR RIGHT SHIFT ERROR
1765  023164  104400                  2$:     SCOPE                   ;SCOPE THIS TEST
1766
1767
1768                                          ;*************************** TEST 4 ***************************
1769                                          ;*CROM READ TEST
1770                                          ;*THIS TEST READS EACH ROM LOCATION AND COMPARES
1771                                          ;*IT TO A SOFTWARE DUPLICATE OF THE CROM. THIS TEST
1772                                          ;*ALSO TESTS THE JUMP(I) MICRO-PROCESSOR INSTRUCTION.
```



```
1773                                          ;*IF THIS TEST FAILS CHECK YOUR CROM PART NUMBERS.
1774                                          ;*DZDMG-C SUPPORTS THE FOLLOWING PART NUMBERS:
1775                                          ;*
1776                                          ;*DMC11-AR  (M8200-YA)
1777                                          ;*      23-414A9
1778                                          ;*      23-415A9
1779                                          ;*      23-416A9
1780                                          ;*      23-417A9
1781                                          ;*      23-418A9
1782                                          ;*      23-419A9
1783                                          ;*      23-420A9
1784                                          ;*      23-421A9
1785                                          ;*
1786                                          ;*DMC11-AL  (M8200-YB)
1787                                          ;*      23-392A9
1788                                          ;*      23-393A9
1789                                          ;*      23-394A9
1790                                          ;*      23-395A9
1791                                          ;*      23-396A9
1792                                          ;*      23-397A9
1793                                          ;*      23-398A9
1794                                          ;*      23-399A9
1795                                          ;!************************************************************
1796
1797                                          ;  TEST 4
1798                                          ;--------------
1799  023166  012737  000004  001226  TST4:   MOV     #4,TSTNO
1800  023174  012737  023362  001216          MOV     #TST5,NEXT
1801  023202  012737  023240  001220          MOV     #1$,LOCK
1802                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
1803  023210  104412                          MSTCLR                  ;MASTER CLEAR DMC11
1804  023212  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT RAM OR ROM
1805  023220  001057                          BNE     4$              ;SKIP TEST IF CRAM
1806  023222  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
1807  023226  005011                          CLR     (R1)            ;CLEAR RUN
1808  023230  013700  012320                  MOV     ROMMAP,R0       ;R0 POINTS TO SOFTWARE ROM MAP
1809  023234  005002                          CLR     R2              ;R2 CONTAINS ROM ADDRESS BITS 0-7
1810  023236  005003                          CLR     R3              ;R3 CONTAINS ROM ADDRESS BITS 8&9 IN BITS 11&12
1811  023240  042737  014377  023260  1$:     BIC     #14377,2$       ;CLEAR ADDRESS FIELDS OF INSTRUCTION
1812  023246  050237  023260                  BIS     R2,2$           ;ADD BITS 0-7 TO INSTRUCTION
1813  023252  050337  023260                  BIS     R3,2$           ;ADD BITS 11&12 TO INSTRUCTION
1814  023256  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1815  023260  100400                  2$:     100400                  ;JUMP(I) TO ROM ADDRESS IN R2 & R3
1816  023262  012711  002000                  MOV     #BIT10,(R1)     ;SET ROM0
1817  023266  011005                          MOV     (R0),R5         ;PUT "EXPECTED" IN R5
1818  023270  116104  000006                  MOV     6(R1),R4        ;PUT "FOUND" IN R4
1819  023274  120504                          CMP     R5,R4           ;COMPARE ROM CONTENTS TO SOFT DUP
1820  023276  001414                          BEQ     3$              ;BR IF OK
1821  023300  010337  001252                  MOV     R3,TEMP3        ;PUT ROM ADDRESS IN TEMP3
1822  023304  000241                          CLC                     ;FOR ERROR TYPEOUT
1823  023306  006037  001252                  ROR     TEMP3
1824  023312  006037  001252                  ROR     TEMP3
1825  023316  006037  001252                  ROR     TEMP3
1826  023322  050237  001252                  BIS     R2,TEMP3        ;TEMP3 NOW CONTAINS CORRECT ADDRESS
1827  023326  104004                          HLT     4               ;ROM READ ERROR
1828  023330  104401                  3$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
```

```
023332  005720                          TST     (R0)+           ;BUMP SOFT POINTER
023334  005202                          INC     R2              ;BUMP ROM ADDRESS
023336  022702  000400                  CMP     #400,R2         ;IS R2 TO MAX YET?
023342  001336                          BNE     1$              ;BR IF NO
023344  005002                          CLR     R2              ;YES, RESET R2 TO 0
023346  062703  004000                  ADD     #4000,R3        ;INC  TO NEXT PAGE OF ROM
023352  022703  020000                  CMP     #20000,R3       ;DONE YET?
023356  001330                          BNE     1$              ;BR IF NO
023360  104100                  4$:     SCOPE                   ;SCOPE THIS TEST


                                        ;************************** TEST 5 *************************
                                        ;*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).
                                        ;;*********************************************************


                                        ;  TEST 5
                                        ;--------------
023362  012737  000005  001226  TST5:   MOV     #5,TSTNO
023370  012737  023556  001216          MOV     #TST6,NEXT
023376  012737  023422  001220          MOV     #1$,LOCK

                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
023404  104412                          MSTCLR                  ;MASTER CLEAR DMC11
023406  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
023414  001057                          BNE     6$+2            ;SKIP TEST IF YES
023416  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
023422                          1$:
023422  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
023426  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023430  100400                          100400                  ;START AT ROM PC=0
023432  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023434  114377                          114377!<400*0>          ;JUMP TO ROM PC OF 1777
023436  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
023442  000002                          2                       ;INDEX
023444  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
023446  001401                          BEQ     2$              ;BR IF YES
023450  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
023452  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
023454  012737  023462  001220          MOV     #3$,LOCK        ;NEW SCOP1
023462                          3$:
023462  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
023466  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023470  100403                          100403                  ;START AT ROM PC=3
023472  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023474  100000                          100000!<400*0>  ;JUMP TO ROM PC OF 0
023476  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
023502  000010                          10                      ;INDEX
023504  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
023506  001401                          BEQ     4$              ;BR IF YES
023510  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
023512  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
023514  012737  023522  001220          MOV     #5$,LOCK        ;NEW SCOP1
023522                          5$:
023522  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
```



```
023526  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023530  100406                          100406                  ;START AT ROM PC=6
023532  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023534  104125                          104125!<400*0>          ;JUMP TO ROM PC OF 525
023536  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
023542  000016                          16                      ;INDEX
023544  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
023546  001401                          BEQ     6$              ;BR IF YES
023550  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
023552  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
023554  104400                          SCOPE                   ;SCOPE THIS TEST


                                        ;************************** TEST 6 *************************
                                        ;*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
                                        ;;*********************************************************


                                        ;  TEST 6
                                        ;--------------
023556  012737  000006  001226  TST6:   MOV     #6,TSTNO
023564  012737  023736  001216          MOV     #TST7,NEXT
023572  012737  023616  001220          MOV     #1$,LOCK

                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
023600  104412                          MSTCLR                  ;MASTER CLEAR DMC11
023602  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
023610  001051                          BNE     6$+2            ;SKIP TEST IF YES
023612  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
023616                          1$:
023616  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023620  100400                          100400                  ;START AT ROM PC=0
023622  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023624  114777                          114377!<400*1>          ;JUMP TO ROM PC OF 1777
023626  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
023632  003776                          3776                    ;INDEX
023634  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
023636  001401                          BEQ     2$              ;BR IF YES
023640  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
023642  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
023644  012737  023652  001220          MOV     #3$,LOCK        ;NEW SCOP1
023652                          3$:
023652  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023654  100403                          100403                  ;START AT ROM PC=3
023656  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023660  100400                          100000!<400*1>  ;JUMP TO ROM PC OF 0
023662  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
023665  000000                          0                       ;INDEX
023670  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
023672  001401                          BEQ     4$              ;BR IF YES
023674  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
023676  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
023700  012737  023706  001220          MOV     #5$,LOCK        ;NEW SCOP1
023706                          5$:
023706  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023710  100406                          100406                  ;START AT ROM PC=6
```

```
023712  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304.
023714  104525                          104125!<400*1>          ;JUMP TO ROM PC OF 525
023716  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
023722  001252                          1252                    ;INDEX
023724  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
023726  001401                          BEQ     6$              ;BR IF YES
023730  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
023732  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
023734  104400                          SCOPE                   ;SCOPE THIS TEST


                                        ;************************** TEST 7 ************************
                                        ;*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 7
                                        ;--------------
023736  012737  000007  001226  TST7:   MOV     #7,TSTNO
023744  012737  024132  001216          MOV     #TST10,NEXT
023752  012737  023776  001220          MOV     #1$,LOCK
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
023760  104412                          MSTCLR                  ;MASTER CLEAR DMC11
023762  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
023770  001057                          BNE     6$+2            ;SKIP TEST IF YES
023772  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
023776                          1$:
023776  004737  026724                  JSR     PC,SETC ;SET THE C BIT'
024002  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024004  100400                          100400                  ;START AT ROM PC=0
024006  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024010  115377                          114377!<400*2>          ;JUMP TO ROM PC OF 1777
024012  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
024016  003776                          3776                    ;INDEX
024020  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
024022  001401                          BEQ     2$              ;BR IF YES
024024  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
024026  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
024030  012737  024036  001220          MOV     #3$,LOCK        ;NEW SCOP1
024036                          3$:
024036  004737  026724                  JSR     PC,SETC ;SET THE C BIT'
024042  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024044  100403                          100403                  ;START AT ROM PC=3
024046  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024050  101000                          100000!<400*2>  ;JUMP TO ROM PC OF 0
024052  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
024056  000000                          0                       ;INDEX
024060  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
024062  001401                          BEQ     4$              ;BR IF YES
024064  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
024066  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
024070  012737  024076  001220          MOV     #5$,LOCK        ;NEW SCOP1
024076                          5$:
024076  004737  026724                  JSR     PC,SETC ;SET THE C BIT'
024102  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```



```
024104  100406                          100406                  ;START AT ROM PC=6
024106  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024110  105125                          104125!<400*2>          ;JUMP TO ROM PC OF 525
024112  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
024116  001252                          1252                    ;INDEX
024120  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
024122  001401                          BEQ     6$              ;BR IF YES
024124  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
024126  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
024130  104400                          SCOPE                   ;SCOPE THIS TEST


                                        ;************************** TEST 10 ***********************
                                        ;*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
                                        ;;*********************************************************


                                        ;  TEST 10
                                        ;--------------
024132  012737  000010  001226  TST10:  MOV     #10,TSTNO
024140  012737  024326  001216          MOV     #TST11,NEXT
024146  012737  024172  001220          MOV     #1$,LOCK
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
024154  104412                          MSTCLR                  ;MASTER CLEAR DMC11
024156  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
024164  001057                          BNE     6$+2            ;SKIP TEST IF YES
024166  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
024172                          1$:
024172  004737  026742                  JSR     PC,SETZ ;SET THE Z BIT'
024176  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024200  100400                          100400                  ;START AT ROM PC=0
024202  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024204  115777                          114377!<400*3>          ;JUMP TO ROM PC OF 1777
024206  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
024212  003776                          3776                    ;INDEX
024214  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
024216  001401                          BEQ     2$              ;BR IF YES
024220  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
024222  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
024224  012737  024232  001220          MOV     #3$,LOCK        ;NEW SCOP1
024232                          3$:
024232  004737  026742                  JSR     PC,SETZ ;SET THE Z BIT'
024236  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024240  100403                          100403                  ;START AT ROM PC=3
024242  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024244  101400                          100000!<400*3>  ;JUMP TO ROM PC OF 0
024246  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
024252  000000                          0                       ;INDEX
024254  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
024256  001401                          BEQ     4$              ;BR IF YES
024260  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
024262  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
024264  012737  024272  001220          MOV     #5$,LOCK        ;NEW SCOP1
024272                          5$:
024272  004737  026742                  JSR     PC,SETZ ;SET THE Z BIT'
```

```
2053  024276  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304.
2054  024300  100406                          100406                  ;START AT ROM PC=6
2055  024302  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2056  024304  105525                          104125!<400*3>          ;JUMP TO ROM PC OF 525
2057  024306  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2058  024312  001252                          1252                    ;INDEX
2059  024314  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2060  024316  001401                          BEQ     6$              ;BR IF YES
2061  024320  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2062  024322  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2063  024324  104400                          SCOPE                   ;SCOPE THIS TEST
2064
2065
2066                                          ;************************** TEST 11 **************************
2067                                          ;*CROM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
2068                                          ;*SET THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
2069                                          ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2070                                          ;!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
2071
2072                                          ;  TEST 11
2073                                          ;--------------
2074  024326  012737  000011  001226  TST11:  MOV     #11,TSTNO
2075  024334  012737  024522  001216          MOV     #TST12,NEXT
2076  024342  012737  024366  001220          MOV     #1$,LOCK
2077                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
2078  024350  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2079  024352  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2080  024360  001057                          BNE     6$+2            ;SKIP TEST IF YES
2081  024362  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
2082  024366                          1$:
2083  024366  004737  026674                  JSR     PC,SETBR0       ;SET THE BR0 BIT'
2084  024372  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2085  024374  100400                          100400                  ;START AT ROM PC=0
2086  024376  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2087  024400  116377                          114377!<400*4>          ;JUMP TO ROM PC OF 1777
2088  024402  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2089  024406  003776                          3776                    ;INDEX
2090  024410  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2091  024412  001401                          BEQ     2$              ;BR IF YES
2092  024414  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2093  024416  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2094  024420  012737  024426  001220          MOV     #3$,LOCK        ;NEW SCOP1
2095  024426                          3$:
2096  024426  004737  026674                  JSR     PC,SETBR0       ;SET THE BR0 BIT'
2097  024432  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2098  024434  100403                          100403                  ;START AT ROM PC=3
2099  024436  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2100  024440  102000                          100000!<400*4>  ;JUMP TO ROM PC OF 0
2101  024442  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2102  024446  000000                          0                       ;INDEX
2103  024450  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2104  024452  001401                          BEQ     4$              ;BR IF YES
2105  024454  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2106  024456  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2107  024460  012737  024466  001220          MOV     #5$,LOCK        ;NEW SCOP1
2108  024466                          5$:
```



```
2109  024466  004737  026674                  JSR     PC,SETBR0       ;SET THE BR0 BIT'
2110  024472  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2111  024474  100406                          100406                  ;START AT ROM PC=6
2112  024476  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2113  024500  106125                          104125!<400*4>          ;JUMP TO ROM PC OF 525
2114  024502  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2115  024506  001252                          1252                    ;INDEX
2116  024510  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2117  024512  001401                          BEQ     6$              ;BR IF YES
2118  024514  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2119  024516  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2120  024520  104400                          SCOPE                   ;SCOPE THIS TEST
2121
2122
2123                                          ;************************** TEST 12 **************************
2124                                          ;*CROM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
2125                                          ;*SET THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
2126                                          ;*VERIFY THE JUMP BY READING THE CONTENTS OF THE NEW ROM PC
2127                                          ;!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
2128
2129                                          ;  TEST 12
2130                                          ;--------------
2131  024522  012737  000012  001226  TST12:  MOV     #12,TSTNO
2132  024530  012737  024716  001216          MOV     #TST13,NEXT
2133  024536  012737  024562  001220          MOV     #1$,LOCK
2134                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
2135  024544  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2136  024546  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2137  024554  001057                          BNE     6$+2            ;SKIP TEST IF YES
2138  024556  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
2139  024562                          1$:
2140  024562  004737  026702                  JSR     PC,SETBR1       ;SET THE BR1 BIT'
2141  024566  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2142  024570  100400                          100400                  ;START AT ROM PC=0
2143  024572  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2144  024574  116777                          114377!<400*5>          ;JUMP TO ROM PC OF 1777
2145  024576  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2146  024602  003776                          3776                    ;INDEX
2147  024604  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2148  024606  001401                          BEQ     2$              ;BR IF YES
2149  024610  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2150  024612  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2151  024614  012737  024622  001220          MOV     #3$,LOCK        ;NEW SCOP1
2152  024622                          3$:
2153  024622  004737  026702                  JSR     PC,SETBR1       ;SET THE BR1 BIT'
2154  024626  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2155  024630  100403                          100403                  ;START AT ROM PC=3
2156  024632  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2157  024634  102000                          100000!<400*5>  ;JUMP TO ROM PC OF 0
2158  024636  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2159  024642  000000                          0                       ;INDEX
2160  024644  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2161  024646  001401                          BEQ     4$              ;BR IF YES
2162  024650  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2163  024652  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2164  024654  012737  024662  001220          MOV     #5$,LOCK        ;NEW SCOP1
```

```
                                5$:
024662 004737 026702                    JSR     PC,SETBR1       ;SET THE BR1 BIT'
024666 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024670 100406                           100406                  ;START AT ROM PC=6
024672 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024674 106525                           104125!<400*5>          ;JUMP TO ROM PC OF 525
024676 004737 026750                    JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
024702 001252                           1252                    ;INDEX
024704 020504                           CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
024706 001401                           BEQ     6$              ;BR IF YES
024710 104006                           HLT     6               ;ERROR, CROM PC IS WRONG
024712 104401                   6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
024714 104400                           SCOPE                   ;SCOPE THIS TEST


                                ;************************** TEST 13 *************************
                                ;*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
                                ;!*********************************************************


                                ;  TEST 13
                                ;--------------
024716 012737 000013 001226     TST13:  MOV     #13,TSTNO
024724 012737 025112 001216             MOV     #TST14,NEXT
024732 012737 024756 001220             MOV     #1$,LOCK
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
024740 104412                           MSTCLR                  ;MASTER CLEAR DMC11
024742 032737 100000 001366             BIT     #BIT15,STAT1    ;IS IT CRAM?
024750 001057                           BNE     6$+2            ;SKIP TEST IF YES
024752 004737 027012                    JSR     PC,MAPCK        ;CHECK FOR HI OR LO
024756                          1$:
024756 004737 026710                    JSR     PC,SETBR4       ;SET THE BR4 BIT'
024762 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024764 100400                           100400                  ;START AT ROM PC=0
024766 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024770 117377                           114377!<400*6>          ;JUMP TO ROM PC OF 1777
024772 004737 026750                    JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
024776 003776                           3776                    ;INDEX
025000 020504                           CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
025002 001401                           BEQ     2$              ;BR IF YES
025004 104006                           HLT     6               ;ERROR, CROM PC IS WRONG
025006 104401                   2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
025010 012737 025016 001220             MOV     #3$,LOCK        ;NEW SCOP1
025016                          3$:
025016 004737 026710                    JSR     PC,SETBR4       ;SET THE BR4 BIT'
025022 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025024 100403                           100403                  ;START AT ROM PC=3
025026 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025030 100000                           100000!<400*6>  ;JUMP TO ROM PC OF 0
025032 004737 026750                    JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
025036 000000                           0                       ;INDEX
025040 020504                           CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
025042 001401                           BEQ     4$              ;BR IF YES
025044 104006                           HLT     6               ;ERROR, CROM PC IS WRONG
025046 104401                   4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
```



```
025050 012737 025056 001220             MOV     #5$,LOCK        ;NEW SCOP1
025056                          5$:
025056 004737 026710                    JSR     PC,SETBR4       ;SET THE BR4 BIT'
025062 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025064 100406                           100406                  ;START AT ROM PC=6
025066 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025070 106525                           104125!<400*6>          ;JUMP TO ROM PC OF 525
025072 004737 026750                    JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
025076 001252                           1252                    ;INDEX
025100 020504                           CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
025102 001401                           BEQ     6$              ;BR IF YES
025104 104006                           HLT     6               ;ERROR, CROM PC IS WRONG
025106 104401                   6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
025110 104400                           SCOPE                   ;SCOPE THIS TEST


                                ;************************** TEST 14 *************************
                                ;*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
                                ;!*********************************************************


                                ;  TEST 14
                                ;--------------
025112 012737 000014 001226     TST14:  MOV     #14,TSTNO
025120 012737 025306 001216             MOV     #TST15,NEXT
025126 012737 025152 001220             MOV     #1$,LOCK
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
025134 104412                           MSTCLR                  ;MASTER CLEAR DMC11
025136 032737 100000 001366             BIT     #BIT15,STAT1    ;IS IT CRAM?
025144 001057                           BNE     6$+2            ;SKIP TEST IF YES
025146 004737 027012                    JSR     PC,MAPCK        ;CHECK FOR HI OR LO
025152                          1$:
025152 004737 026716                    JSR     PC,SETBR7       ;SET THE BR7 BIT'
025156 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025160 100400                           100400                  ;START AT ROM PC=0
025162 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025164 117777                           114377!<400*7>          ;JUMP TO ROM PC OF 1777
025166 004737 026750                    JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
025172 003776                           3776                    ;INDEX
025174 020504                           CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
025176 001401                           BEQ     2$              ;BR IF YES
025200 104006                           HLT     6               ;ERROR, CROM PC IS WRONG
025202 104401                   2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
025204 012737 025212 001220             MOV     #3$,LOCK        ;NEW SCOP1
025212                          3$:
025212 004737 026716                    JSR     PC,SETBR7       ;SET THE BR7 BIT'
025216 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025220 100403                           100403                  ;START AT ROM PC=3
025222 104414                           ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025224 100000                           100000!<400*7>  ;JUMP TO ROM PC OF 0
025226 004737 026750                    JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
025232 000000                           0                       ;INDEX
025234 020504                           CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
025236 001401                           BEQ     4$              ;BR IF YES
025240 104006                           HLT     6               ;ERROR, CROM PC IS WRONG
```

```
2277  025242  104401                    4$:   SCOP1                ;LOOP TO 3$ IF SW09=1
2278  025244  012737  025252  001220          MOV     #5$,LOCK      ;NEW SCOP1
2279  025252                            5$:
2280  025252  004737  026716                  JSR     PC,SETBR7     ;SET THE BR7 BIT
2281  025256  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2282  025260  100406                          100406                ;START AT ROM PC=6
2283  025262  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2284  025264  105525                          104125!<400*7>        ;JUMP TO ROM PC OF 525
2285  025266  004737  026750                  JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2286  025272  001252                          1252                  ;INDEX
2287  025274  020504                          CMP     R5,R4         ;ARE NEW ROM PC CONTENTS CORRECT?
2288  025276  001401                          BEQ     6$            ;BR IF YES
2289  025300  104006                          HLT     6             ;ERROR, CROM PC IS WRONG
2290  025302  104401                    6$:   SCOP1                 ;LOOP TO 5$ IF SW59=1
2291  025304  104400                          SCOPE                 ;SCOPE THIS TEST
2292
2293
2294                                          ;************************** TEST 15 *************************
2295                                          ;*CROM TEST OF JUMP(I) ON C BIT SET MICRO-PROCESSOR INSTRUCTION.
2296                                          ;*CLEAR THE C BIT, PERFORM THE JUMP INSTRUCTION,
2297                                          ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2298                                          ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2299                                          ;!*********************************************************************
2300
2301                                          ;  TEST 15
2302                                          ;--------------
2303  025306  012737  000015  001226    TST15:MOV     #15,TSTNO
2304  025314  012737  025502  001216          MOV     #TST16,NEXT
2305  025322  012737  025346  001220          MOV     #1$,LOCK
2306                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
2307  025330  104412                          MSTCLR                ;MASTER CLEAR DMC11
2308  025332  032737  100000  001366          BIT     #BIT15,STAT1  ;IS IT CRAM?
2309  025340  001057                          BNE     6$+2          ;SKIP TEST IF YES
2310  025342  004737  027012                  JSR     PC,MAPCK      ;CHECK FOR HI OR LO
2311  025346                            1$:
2312  025346  004737  026656                  JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2313  025352  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2314  025354  100400                          100400                ;START AT ROM PC=0
2315  025356  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2316  025360  115377                          114377!<400*2>        ;JUMP TO ROM PC OF 1777
2317  025362  004737  026750                  JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2318  025366  000002                          2                     ;INDEX
2319  025370  020504                          CMP     R5,R4         ;ARE NEW PC CONTENTS CORRECT?
2320  025372  001401                          BEQ     2$            ;BR IF YES
2321  025374  104006                          HLT     6             ;ERROR, CROM PC IS WRONG
2322  025376  104401                    2$:   SCOP1                 ;LOOP TO 1$ IF SW09=1
2323  025400  012737  025406  001220          MOV     #3$,LOCK      ;NEW SCOP1
2324  025406                            3$:
2325  025406  004737  026656                  JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2326  025412  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2327  025414  100403                          100403                ;START AT ROM PC=3
2328  025416  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2329  025420  101000                          100000!<400*2>  ;JUMP TO ROM PC OF 0
2330  025422  004737  026750                  JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2331  025426  000010                          10                    ;INDEX
2332  025430  020504                          CMP     R5,R4         ;ARE NEW PC CONTENTS CORRECT?
```



```
2333  025432  001401                          BEQ     4$            ;BR IF YES
2334  025434  104006                          HLT     6             ;ERROR, CROM PC IS WRONG
2335  025436  104401                    4$:   SCOP1                 ;LOOP TO 3$ IF SW09=1
2336  025440  012737  025446  001220          MOV     #5$,LOCK      ;NEW SCOP1
2337  025446                            5$:
2338  025446  004737  026656                  JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2339  025452  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2340  025454  100406                          100406                ;START AT ROM PC=6
2341  025456  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2342  025460  105125                          104125!<400*2>        ;JUMP TO ROM PC OF 525
2343  025462  004737  026750                  JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2344  025466  000016                          16                    ;INDEX
2345  025470  020504                          CMP     R5,R4         ;ARE NEW ROM PC CONTENTS CORRECT?
2346  025472  001401                          BEQ     6$            ;BR IF YES
2347  025474  104006                          HLT     6             ;ERROR, CROM PC IS WRONG
2348  025476  104401                    6$:   SCOP1                 ;LOOP TO 5$ IF SW59=1
2349  025500  104400                          SCOPE                 ;SCOPE THIS TEST
2350
2351
2352                                          ;************************** TEST 16 *************************
2353                                          ;*CROM TEST OF JUMP(I) ON Z BIT SET MICRO-PROCESSOR INSTRUCTION.
2354                                          ;*CLEAR THE Z BIT, PERFORM THE JUMP INSTRUCTION,
2355                                          ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2356                                          ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2357                                          ;!*********************************************************************
2358
2359                                          ;  TEST 16
2360                                          ;--------------
2361  025502  012737  000016  001226    TST16:MOV     #16,TSTNO
2362  025510  012737  025676  001216          MOV     #TST17,NEXT
2363  025516  012737  025542  001220          MOV     #1$,LOCK
2364                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
2365  025524  104412                          MSTCLR                ;MASTER CLEAR DMC11
2366  025526  032737  100000  001366          BIT     #BIT15,STAT1  ;IS IT CRAM?
2367  025534  001057                          BNE     6$+2          ;SKIP TEST IF YES
2368  025536  004737  027012                  JSR     PC,MAPCK      ;CHECK FOR HI OR LO
2369  025542                            1$:
2370  025542  004737  026656                  JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2371  025546  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2372  025550  100400                          100400                ;START AT ROM PC=0
2373  025552  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2374  025554  115777                          114377!<400*3>        ;JUMP TO ROM PC OF 1777
2375  025556  004737  026750                  JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2376  025562  000002                          2                     ;INDEX
2377  025564  020504                          CMP     R5,R4         ;ARE NEW PC CONTENTS CORRECT?
2378  025566  001401                          BEQ     2$            ;BR IF YES
2379  025570  104006                          HLT     6             ;ERROR, CROM PC IS WRONG
2380  025572  104401                    2$:   SCOP1                 ;LOOP TO 1$ IF SW09=1
2381  025574  012737  025602  001220          MOV     #3$,LOCK      ;NEW SCOP1
2382  025602                            3$:
2383  025602  004737  026656                  JSR     PC,CLRALL     ;CLEAR ALL  CONDITIONS
2384  025606  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2385  025610  100403                          100403                ;START AT ROM PC=3
2386  025612  104414                          ROMCLK                ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2387  025614  101400                          100000!<400*3>  ;JUMP TO ROM PC OF 0
2388  025616  004737  026750                  JSR     PC,ROMDAT     ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
```

```
2389  025622  000010                          10                      ;INDEX
2390  025624  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2391  025626  001401                          BEQ     4$              ;BR IF YES
2392  025630  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2393  025632  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2394  025634  012737  025642  001220          MOV     #5$,LOCK        ;NEW SCOP1
2395  025642                          5$:
2396  025642  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2397  025646  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2398  025650  100406                          100406                  ;START AT ROM PC=6
2399  025652  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2400  025654  105525                          1041251<400*3>          ;JUMP TO ROM PC OF 525
2401  025656  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2402  025662  000016                          16                      ;INDEX
2403  025664  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2404  025666  001401                          BEQ     6$              ;BR IF YES
2405  025670  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2406  025672  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2407  025674  104400                          SCOPE                   ;SCOPE THIS TEST
2408
2409
2410                                          ;************************** TEST 17 ************************
2411                                          ;*CROM TEST OF JUMP(I) ON BR0 SET MICRO-PROCESSOR INSTRUCTION.
2412                                          ;*CLEAR THE BR0 BIT, PERFORM THE JUMP INSTRUCTION,
2413                                          ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2414                                          ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2415                                          ;;*******************************************************
2416
2417                                          ;  TEST 17
2418                                          ;--------------
2419  025676  012737  000017  001226  TST17:  MOV     #17,TSTNO
2420  025704  012737  026072  001216          MOV     #TST20,NEXT
2421  025712  012737  025736  001220          MOV     #1$,LOCK
2422                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
2423  025720  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2424  025722  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2425  025730  001057                          BNE     6$+2            ;SKIP TEST IF YES
2426  025732  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
2427  025736                          1$:
2428  025736  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2429  025742  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2430  025744  100400                          100400                  ;START AT ROM PC=0
2431  025746  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2432  025750  116377                          1143771<400*4>          ;JUMP TO ROM PC OF 1777
2433  025752  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2434  025756  000002                          2                       ;INDEX
2435  025760  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2436  025762  001401                          BEQ     2$              ;BR IF YES
2437  025764  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2438  025766  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2439  025770  012737  025776  001220          MOV     #3$,LOCK        ;NEW SCOP1
2440  025776                          3$:
2441  025776  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2442  026002  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2443  026004  100403                          100403                  ;START AT ROM PC=3
2444  026006  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```



```
2445  026010  102000                          100000!<400*4>  ;JUMP TO ROM PC OF 0
2446  026012  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2447  026016  000010                          10                      ;INDEX
2448  026020  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2449  026022  001401                          BEQ     4$              ;BR IF YES
2450  026024  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2451  026026  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2452  026030  012737  026036  001220          MOV     #5$,LOCK        ;NEW SCOP1
2453  026036                          5$:
2454  026036  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2455  026042  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2456  026044  100406                          100406                  ;START AT ROM PC=6
2457  026046  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2458  026050  106125                          1041251<400*4>          ;JUMP TO ROM PC OF 525
2459  026052  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2460  026056  000016                          16                      ;INDEX
2461  026060  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2462  026062  001401                          BEQ     6$              ;BR IF YES
2463  026064  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2464  026066  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2465  026070  104400                          SCOPE                   ;SCOPE THIS TEST
2466
2467
2468                                          ;************************** TEST 20 ************************
2469                                          ;*CROM TEST OF JUMP(I) ON BR1 SET MICRO-PROCESSOR INSTRUCTION.
2470                                          ;*CLEAR THE BR1 BIT, PERFORM THE JUMP INSTRUCTION,
2471                                          ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2472                                          ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2473                                          ;;*******************************************************
2474
2475                                          ;  TEST 20
2476                                          ;--------------
2477  026072  012737  000020  001226  TST20:  MOV     #20,TSTNO
2478  026100  012737  026266  001216          MOV     #TST21,NEXT
2479  026106  012737  026132  001220          MOV     #1$,LOCK
2480                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
2481  026114  104412                          MSTCLR                  ;MASTER CLEAR DMC11
2482  026116  032737  100000  001366          BIT     #BIT15,STAT1    ;IS IT CRAM?
2483  026124  001057                          BNE     6$+2            ;SKIP TEST IF YES
2484  026126  004737  027012                  JSR     PC,MAPCK        ;CHECK FOR HI OR LO
2485  026132                          1$:
2486  026132  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2487  026136  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2488  026140  100400                          100400                  ;START AT ROM PC=0
2489  026142  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2490  026144  116777                          1143771<400*5>          ;JUMP TO ROM PC OF 1777
2491  026146  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2492  026152  000002                          2                       ;INDEX
2493  026154  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2494  026156  001401                          BEQ     2$              ;BR IF YES
2495  026160  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2496  026162  104401                  2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2497  026164  012737  026172  001220          MOV     #3$,LOCK        ;NEW SCOP1
2498  026172                          3$:
2499  026172  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2500  026176  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
2501  026200  100403                                  100403                  ;START AT ROM PC=3
2502  026202  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2503  026204  100400                                  100000!<400*5>  ;JUMP TO ROM PC OF 0
2504  026206  004737  026750                         JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2505  026212  000010                                  10                      ;INDEX
2506  026214  020504                                  CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2507  026216  001401                                  BEQ     4$              ;BR IF YES
2508  026220  104006                                  HLT     6               ;ERROR, CROM PC IS WRONG
2509  026222  104401                          4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2510  026224  012737  026232  001220                  MOV     #5$,LOCK        ;NEW SCOP1
2511  026232                                  5$:
2512  026232  004737  026656                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2513  026236  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2514  026240  100406                                  100406                  ;START AT ROM PC=6
2515  026242  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2516  026244  106525                                  104125!<400*5>          ;JUMP TO ROM PC OF 525
2517  026246  004737  026750                         JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2518  026252  000016                                  16                      ;INDEX
2519  026254  020504                                  CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2520  026256  001401                                  BEQ     6$              ;BR IF YES
2521  026260  104006                                  HLT     6               ;ERROR, CROM PC IS WRONG
2522  026262  104401                          6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2523  026264  104400                                  SCOPE                   ;SCOPE THIS TEST
2524
2525
2526                                                  ;************************** TEST 21 *************************
2527                                                  ;*CROM TEST OF JUMP(I) ON BR4 SET MICRO-PROCESSOR INSTRUCTION.
2528                                                  ;*CLEAR THE BR4 BIT, PERFORM THE JUMP INSTRUCTION,
2529                                                  ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2530                                                  ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2531                                                  ;************************************************************
2532
2533                                                  ;  TEST 21
2534                                                  ;--------------
2535  026266  012737  000021  001226          TST21:  MOV     #21,TSTNO
2536  026274  012737  026462  001216                  MOV     #TST22,NEXT
2537  026302  012737  026326  001220                  MOV     #1$,LOCK
2538                                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
2539  026310  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
2540  026312  032737  100000  001366                  BIT     #BIT15,STAT1    ;IS IT CRAM?
2541  026320  001057                                  BNE     6$+2            ;SKIP TEST IF YES
2542  026322  004737  027012                         JSR     PC,MAPCK        ;CHECK FOR HI OR LO
2543  026326                                  1$:
2544  026326  004737  026656                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2545  026332  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2546  026334  100400                                  100400                  ;START AT ROM PC=0
2547  026336  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2548  026340  117377                                  114377!<400*6>          ;JUMP TO ROM PC OF 1777
2549  026342  004737  026750                         JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2550  026346  000002                                  2                       ;INDEX
2551  026350  020504                                  CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2552  026352  001401                                  BEQ     2$              ;BR IF YES
2553  026354  104006                                  HLT     6               ;ERROR, CROM PC IS WRONG
2554  026356  104401                          2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
2555  026360  012737  026366  001220                  MOV     #3$,LOCK        ;NEW SCOP1
2556  026366                                  3$:
```



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2557  026366  004737  026656                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2558  026372  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2559  026374  100403                                  100403                  ;START AT ROM PC=3
2560  026376  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2561  026400  100000                                  100000!<400*6>  ;JUMP TO ROM PC OF 0
2562  026402  004737  026750                         JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2563  026406  000010                                  10                      ;INDEX
2564  026410  020504                                  CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2565  026412  001401                                  BEQ     4$              ;BR IF YES
2566  026414  104006                                  HLT     6               ;ERROR, CROM PC IS WRONG
2567  026416  103401                          4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2568  026420  012737  026426  001220                  MOV     #5$,LOCK        ;NEW SCOP1
2569  026426                                  5$:
2570  026426  004737  026656                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2571  026432  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2572  026434  100406                                  100406                  ;START AT ROM PC=6
2573  026436  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2574  026440  107125                                  104125!<400*6>          ;JUMP TO ROM PC OF 525
2575  026442  004737  026750                         JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2576  026446  000016                                  16                      ;INDEX
2577  026450  020504                                  CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2578  026452  001401                                  BEQ     6$              ;BR IF YES
2579  026454  104006                                  HLT     6               ;ERROR, CROM PC IS WRONG
2580  026456  104401                          6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2581  026460  104400                                  SCOPE                   ;SCOPE THIS TEST
2582
2583
2584                                                  ;************************** TEST 22 *************************
2585                                                  ;*CROM TEST OF JUMP(I) ON BR7 SET MICRO-PROCESSOR INSTRUCTION.
2586                                                  ;*CLEAR THE BR7 BIT, PERFORM THE JUMP INSTRUCTION,
2587                                                  ;*VERIFY THAT THE JUMP DID NOT OCCUR BY READING
2588                                                  ;*THE CONTENTS OF THE NEW ROM PC(IT SHOULD INCREMENT BY ONE).
2589                                                  ;************************************************************
2590
2591                                                  ;  TEST 22
2592                                                  ;--------------
2593  026462  012737  000022  001226          TST22:  MOV     #22,TSTNO
2594  026470  012737  003364  001216                  MOV     #.EOP,NEXT
2595  026476  012737  026522  001220                  MOV     #1$,LOCK
2596                                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
2597  026504  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
2598  026506  032737  100000  001366                  BIT     #BIT15,STAT1    ;IS IT CRAM?
2599  026514  001057                                  BNE     6$+2            ;SKIP TEST IF YES
2600  026516  004737  027012                         JSR     PC,MAPCK        ;CHECK FOR HI OR LO
2601  026522                                  1$:
2602  026522  004737  026656                         JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2603  026526  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2604  026530  100400                                  100400                  ;START AT ROM PC=0
2605  026532  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2606  026534  117777                                  114377!<400*7>          ;JUMP TO ROM PC OF 1777
2607  026536  004737  026750                         JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2608  026542  000002                                  2                       ;INDEX
2609  026544  020504                                  CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2610  026546  001401                                  BEQ     2$              ;BR IF YES
2611  026550  104006                                  HLT     6               ;ERROR, CROM PC IS WRONG
2612  026552  104401                          2$:     SCOP1                   ;LOOP TO 1$ IF SW09=1
```

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2613  026554  012737  026562  001220          MOV     #3$,LOCK        ;NEW SCOP1
2614  026562                          3$:
2615  026562  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2616  026566  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2617  026570  100403                          100403                  ;START AT ROM PC=3
2618  026572  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2619  026574  103400                          100000!<400*7>  ;JUMP TO ROM PC OF 0
2620  026576  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2621  026602  000010                          10                      ;INDEX
2622  026604  020504                          CMP     R5,R4           ;ARE NEW PC CONTENTS CORRECT?
2623  026606  001401                          BEQ     4$              ;BR IF YES
2624  026610  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2625  026612  104401                  4$:     SCOP1                   ;LOOP TO 3$ IF SW09=1
2626  026614  012737  026622  001220          MOV     #5$,LOCK        ;NEW SCOP1
2627  026622                          5$:
2628  026622  004737  026656                  JSR     PC,CLRALL       ;CLEAR ALL  CONDITIONS
2629  026626  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2630  026630  100406                          100406                  ;START AT ROM PC=6
2631  026632  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2632  026634  107525                          104125!<400*7>          ;JUMP TO ROM PC OF 525
2633  026636  004737  026750                  JSR     PC,ROMDAT       ;R5=EXPECTED ROM DATA,R4=ACTUAL ROM DATA
2634  026642  000016                          16                      ;INDEX
2635  026644  020504                          CMP     R5,R4           ;ARE NEW ROM PC CONTENTS CORRECT?
2636  026646  001401                          BEQ     6$              ;BR IF YES
2637  026650  104006                          HLT     6               ;ERROR, CROM PC IS WRONG
2638  026652  104401                  6$:     SCOP1                   ;LOOP TO 5$ IF SW59=1
2639  026654  104400                          SCOPE                   ;SCOPE THIS TEST
2640                                  00300
2641                                  00400
2642                                  00500   ;SUBROUTINES
2643                                  00600   ;-----------
2644                                  00700
2645  026656                          00800   CLRALL:
2646                                  00900           ;THIS SUBROUTINE CLEARS THE C&Z BITS AND THE BR
2647                                  01000
2648  026656  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2649  026660  000400                  01200   000400                  ;BR_0
2650  026662  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2651  026664  063220                  01400   063220                  ;SP(0)_BR
2652  026666  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2653  026670  060400                  01600   060400                  ;BR_SP(0)+BR
2654  026672  000207                  01700   RTS     PC
2655                                  01800
2656                                  01900
2657  026674                          02000   SETBR0:
2658                                  02100           ;THIS SUBROUTINE SETS BR0 BIT
2659                                  02200
2660  026674  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2661  026675  000401                  02400   000401                  ;BR_001
2662  026700  000207                  02500   RTS     PC
2663                                  02600
2664                                  02700
2665  026702                          02800   SETBR1:
2666                                  02900           ;THIS SUBROUTINE SETS BR1 BIT
2667                                  03000
2668  026702  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```



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2669  026704  000402                  03200   000402                  ;BR_002
2670  026706  000207                  03300   RTS     PC
2671                                  03400
2672                                  03500
2673  026710                          03600   SETBR4:
2674                                  03700           ;THIS SUBROUTINE SETS BR4 BIT
2675                                  03800
2676  026710  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2677  026712  000420                  04000   000420                  ;BR_020
2678  026714  000207                  04100   RTS     PC
2679                                  04200
2680                                  04300
2681  026716                          04400   SETBR7:
2682                                  04500           ;THIS SUBROUTINE SETS BR7 BIT
2683                                  04600
2684  026716  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2685  026720  000600                  04800   000600                  ;BR_200
2686  026722  000207                  04900   RTS     PC
2687                                  05000
2688                                  05100
2689  026724                          05200   SETC:
2690                                  05300           ;THIS SUBROUTINE SETS THE C BIT
2691                                  05400
2692  026724  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2693  026726  000777                  05600   000777                  ;BR_377
2694  026730  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2695  026732  063220                  05800   063220                  ;SP(0)_BR
2696  026734  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2697  026736  060400                  06000   060400                  ;BR_SP(0)+BR
2698  026740  000207                  06100   RTS     PC
2699                                  06200
2700                                  06300
2701  026742                          06400   SETZ:
2702                                  06500           ;THIS SUBROUTINE SETS THE Z BIT
2703                                  06600
2704  026742  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2705  026744  000777                  06800   000777                  ;BR_377
2706  026746  000207                  06900   RTS     PC
2707                                  07000
2708                                  07100
2709  026750                          07200   ROMDAT:
2710                                  07300           ;THIS SUBROUTINE LOADS R5 WITH EXPECTED ROM CONTENTS
2711                                  07400           ;AND LOADS R4 WITH ACTUAL ROM CONTENTS
2712                                  07500
2713  026750  017600  000000          07600   MOV     @(SP),R0        ;INDEX FOR COMPARE
2714  026754  062716  000002          07700   ADD     #2,(SP)         ;ADJUST STACK
2715  026760  012711  002000          07800   MOV     #BIT10,(R1)     ;SET ROMO
2716  026764  016005  012322          07900   MOV     LOMAP(R0),R5    ;PUT EXPECTED IN R5 (LOSPEED)
2717  026770  032737  000002  001372  08000   BIT     #BIT1,STAT3     ;LOW OR HIGH SPEED?
2718  026776  001402                  08100   BEQ     1$              ;BR IF LOW SPEED
2719  027000  016005  016322          08200   MOV     HIMAP(R0),R5    ;PUT EXPECTED IN R5 (HISPEED)
2720  027004  016104  000006          08300   1$:     MOV     6(R1),R4        ;PUT "FOUND" IN R4
2721  027010  000207                  08400   RTS     PC              ;RETURN
2722                                  08500
2723  027012                          08600   MAPCK:
2724                                  08700           ;THIS SUBROUTINE CHECKS THE STATUS TABLE AND LOADS
```

```
                                        08800           ;THE ROMMAP POINTER TO POINT TO EITHER THE HIGH OR
                                        08900           ;LOW SPEED MICRO-CODE.
                                        09000
027012  012737  012322  012320  09100           MOV     #LOMAP,ROMMAP   ;LOAD POINTER TO LOW SPEED
027020  032737  000002  001372  09200           BIT     #BIT1,STAT3     ;CHECK STATUS TABLE
027026  001403                  09300           BEQ     1$              ;BR IF LOW SPEED
027030  012737  016322  012320  09400           MOV     #HIMAP,ROMMAP   ;LOAD POINTER TO HIGH SPEED
027036  000207                  09500   1$:     RTS     PC              ;RETURN
                                        09600
                                        09300
027040  041777  040522  020115  09400   EM1:    .ASCIZ  <377>/CRAM DATA ERROR/
027061     377  051103  046501  09500   EM2:    .ASCIZ  <377>/CRAM DUAL ADDRESSING ERROR/
027115     377  051103  046517  09600   EM3:    .ASCIZ  <377>/CROM DATA ERROR/
027136  045377  046525  020120  09700   EM4:    .ASCIZ  <377>/JUMP ERROR/
027152  047777  052104  042440  09800   EM5:    .ASCIZ  <377>/ODT ERROR IN IBUS* REG10/
027204  044777  050117  046440  09900   EM7:    .ASCIZ  <377>/IOP MAR TEST/
027222  041377  020122  044522  01000   EM10:   .ASCIZ  <377>/BR RIGHT SHIFT TEST/
027247     377  042522  042503  01100   EM11:   .ASCIZ  <377>/RECEIVE DATA ERROR/
027273     377  051106  042505  01200   EM12:   .ASCIZ  <377>/FREE RUNNING ERROR/
027317     377  047503  052116  01300   EM13:   .ASCIZ  <377>/CONTROL OUT ERROR/
                                        01400
027342  042777  050130  041505  01500   DH1:    .ASCIZ  <377>/EXPECTED  FOUND  ADDRESS/
027374  042777  050130  041505  01600   DH2:    .ASCIZ  <377>/EXPECTED  FOUND/
027415     377  051440  046105  01700   DH3:    .ASCIZ  <377>/ SEL4     SEL6/
                                        01800   .EVEN
                                        01900
027436  000003                  02000   DT1:    3
027440     006     004          02100           .BYTE   6,4
027442  001264                  02200           SAVR2
027444     006     004          02300           .BYTE   6,4
027446  001270                  02400           SAVR4
027450     004     002          02500           .BYTE   4,2
027452  001260                  02600           SAVR0
027454  000003                  02700   DT2:    3
027456     006     004          02800           .BYTE   6,4
027460  001272                  02900           SAVR5
027462     006     004          03000           .BYTE   6,4
027464  001270                  03100           SAVR4
027466     004     002          03200           .BYTE   4,2
027470  001264                  03300           SAVR2
027472  000003                  03400   DT3:    3
027474     006     004          03500           .BYTE   6,4
027476  001272                  03600           SAVR5
027500     006     004          03700           .BYTE   6,4
027502  001270                  03800           SAVR4
027504     004     002          03900           .BYTE   4,2
027506  001252                  04000           TEMP3
027510  000002                  04100   DT4:    2
027512     003     007          04200           .BYTE   3,7
027514  001272                  04300           SAVR5
027516     003     002          04400           .BYTE   3,2
027520  001270                  04500           SAVR4
027522  000002                  04600   DT5:    2
027524     006     004          04700           .BYTE   6,4
027526  001272                  04800           SAVR5
027530     006     002          04900           .BYTE   6,2
```



```
027532  001270                  05000           SAVR4
027534  000003                  05100   DT7:    3
027536     003     010          05200           .BYTE   3,10
027540  001272                  05300           SAVR5
027542     003     004          05400           .BYTE   3,4
027544  001270                  05500           SAVR4
027546     004     002          05600           .BYTE   4,2
027550  001264                  05700           SAVR2
027552  000003                  05800   DT10:   3
027554     003     007          05900           .BYTE   3,7
027556  001272                  06000           SAVR5
027560     003     004          06100           .BYTE   3,4
027562  001270                  06200           SAVR4
027564     006     002          06300           .BYTE   6,2
027566  001252                  06400           TEMP3
027570  000002                  06500   DT11:   2
027572     006     004          06600           .BYTE   6,4
027574  001252                  06700           TEMP3
027576     006     002          06800           .BYTE   6,2
027600  001254                  06900           TEMP4
                                        07000
027602                          07100   .ERRTAB:
027602  000000                  07200           0
027604  000000                  07300           0
027606  000000                  07400           0
027610  027040                  07500   EM1
027612  027342                  07600   DH1     ;HLT    1
027614  027436                  07700   DT1
027616  027061                  07800   EM2
027620  027342                  07900   DH1     ;HLT    2
027622  027436                  08000   DT1
027624  027040                  08100   EM1
027626  027342                  08200   DH1     ;HLT    3
027630  027454                  08300   DT2
027632  027115                  08400   EM3
027634  027342                  08500   DH1     ;HLT    4
027636  027472                  08600   DT3
027640  027136                  08700   EM4
027642  027374                  08800   DH2     ;HLT    5
027644  027510                  08900   DT4
027646  027136                  09000   EM4
027650  027374                  09100   DH2     ;HLT    6
027652  027522                  09200   DT5
027654  027152                  09300   EM5
027656  027374                  09400   DH2     ;HLT    7
027660  027510                  09500   DT4
027662  000000                  09600   0
027664  000000                  09700   0
027666  000000                  09800   0
027670  027204                  09900   EM7
027672  027342                  10000   DH1     ;HLT    11
027674  027534                  10100   DT7
027676  027222                  10200   EM10
027700  027374                  10300   DH2     ;HLT    12
027702  027510                  10400   DT4
027704  027247                  10500   EM11
```

```
        027706  027342                  10600   DH1     ;HLT    13
        027710  027552                  10700   DT10
        027712  027273                  10800   EM12
        027714  000000                  10900   0       ;HLT    14
        027716  000000                  11000   0
        027720  027273                  11100   EM12
        027722  027374                  11200   DH2     ;HLT    15
        027724  027522                  11300   DT5
        027726  027317                  11400   EM13
        027730  027415                  11500   DH3     ;HLT    16
        027732  027570                  11600   DT11
                                        11700
                                        11800
        027734                          11900   CORMAX:
                000001                  12400   .END
```



```
ADRCNT= 004373          879#    915*    924#
AUDONE  003024          569     608     613     659#
AUSTRT  002446          568#    663
AUTO.S  010512          526    1368#
BINWRD  004714          965*    968*    969    1006#
BIT0  = 000001           95#   1155    1156
BIT1  = 000002           94#    531    1149    1155    1156    1449    1532    1545    2717    2729
BIT10 = 002000           85#   1513    1524    1716    1816    2715
BIT11 = 004000           84#
BIT12 = 010000           83#   1464    1543
BIT13 = 020000           82#   1467    1516    1547    1719
BIT14 = 040000           81#    781    1478    1480    1547    1558
BIT15 = 100000           80#    485     572     575     596     599    1451    1519    1712    1804    1854    1911    1965
                        2022   2079    2136    2193    2250    2308    2366    2424    2482    2540    2598
BIT2  = 000004           93#    531     712    1156
BIT3  = 000010           92#   1549    1556
BIT4  = 000020           91#   1139    1162    1164
BIT5  = 000040           90#   1661
BIT6  = 000100           89#   1144    1145    1551
BIT7  = 000200           88#   1145    1265    1661
BIT8  = 000400           87#   1523    1538    1540    1553    1555    1561    1564    1622
BIT9  = 001000           86#   1521    1523    1535    1561    1564    1620    1622
BM      007454          1187#   1492
BRLVL   012252          1617    1627    1635    1647#
BRW     003730           718     804#
BRX     003732           719     805#
CHRCNT  004712           963*    966     970     986*   1004#   1005
CKSWR   007606           512     779     811    1026    1212#
CKSWR1  007666          1225#   1237
CKSWR2  007700          1228#
CKSWR3  007704          1230#
CKSWR4  007710          1231#   1239    1246
CKSWR5  010014          1213    1220    1255#
CLKX    001242           171#
CLRALL  026656          1858    1871    1884    2312    2325    2338    2370    2383    2396    2428    2441    2454    2486
                        2499    2512    2544    2557    2570    2602    2615    2628    2645#
CNEPR   007277           626    1187#
CNT.MA  001702           196     364#    484     486     488    1293
CNVRT = 104411           233#    623     738     740     742     744    1060    1062    1122    1228
CONERR  007223           621    1187#
CONN    007111          1187#   1469
CONTAB  002776           630     643#
CONVRT= 104410           231#    533     629    1076    1391
CORMAX  027734          2734#
CRAM    006606          1187#   1430
CREAM   131320           195#    483*   1289*   1290    1292*   1296
CSR     006510          1187#   1345
CSRMAP  010514          1370#
CYCLE   010060           720     761     762    1280#
DATABP  005216          1049*   1052    1074    1077#
DATACL= 104415           241#
DATAHD  005204          1048*   1070    1073#
DELAY = 104413           237#
DEVADR  001370           877*    912     922#
DEVTAB  003010           583     646#
DH1     027342          2734#
```

```
DH2     027374          2734#
DH3     027415          2734#
DISPLA  001220           142#   498*   504*   735*
DISPRE  000174           128#   504
DMACTV  001306           189#   521    676*   677    1280   1294   1376*  1577*  1583*  1584*  1588   1613
DMCM    007320           634   1187#
DMCR00  001500           279#
DMCR01  001510           284#
DMCR02  001520           289#
DMCR03  001530           294#
DMCR04  001540           299#
DMCR05  001550           304#
DMCR06  001560           309#
DMCR07  001570           314#
DMCR10  001600           319#
DMCR11  001610           324#
DMCR12  001620           329#
DMCR13  001630           334#
DMCR14  001640           339#
DMCR15  001650           344#
DMCR16  001660           349#
DMCR17  001670           354#
DMCSR   001404           262#   568*   602    607*   612*   647    765    802    1094   1117   1163   1298*  1307
                        1356   1740
DMCSRH  001406           263#  1144*  1145*  1149*  1155*  1156*  1162*  1164*  1307*  1308*  1309
DMCTL   001410           264#  1309*  1310*  1311
DMNUM   001310           190#   479    751   1374*  1389*  1568*  1569   1578   1580
DMP04   001412           265#  1133*  1139   1176   1181   1311*  1312*  1313
DMP06   001414           266#  1150*  1313*  1314*
DMRLVL  001376           259#  1316*  1317*  1318
DMRVEC  001374           258#   768   1299*  1300*  1316
DMS100  001502           280#
DMS101  001512           285#
DMS102  001522           290#
DMS103  001532           295#
DMS104  001542           300#
DMS105  001552           305#
DMS106  001562           310#
DMS107  001572           315#
DMS110  001602           320#
DMS111  001612           325#
DMS112  001622           330#
DMS113  001632           335#
DMS114  001642           340#
DMS115  001652           345#
DMS116  001662           350#
DMS117  001672           355#
DMS200  001504           281#
DMS201  001514           286#
DMS202  001524           291#
DMS203  001534           296#
DMS204  001544           301#
DMS205  001554           306#
DMS206  001564           311#
DMS207  001574           316#
DMS210  001604           321#
```



```
DMS211  001614          326#
DMS212  001624          331#
DMS213  001634          336#
DMS214  001644          341#
DMS215  001654          346#
DMS216  001664          351#
DMS217  001674          356#
DMS300  001506          282#
DMS301  001516          287#
DMS302  001526          292#
DMS303  001536          297#
DMS304  001546          302#
DMS305  001556          307#
DMS306  001566          312#
DMS307  001576          317#
DMS310  001606          322#
DMS311  001616          327#
DMS312  001626          332#
DMS313  001636          337#
DMS314  001646          342#
DMS315  001656          347#
DMS316  001666          352#
DMS317  001676          357#
DMTLVL  001402          261#  1320*  1321*
DMTVEC  001400          260#  1318*  1319*  1320
DM.END  001700          359#  1372
DM.MAP  001500          195    278#   483    536    546    662   1290   1292   1370   1375   1605
DONE    003734          784    786*   806#  1216*
DT1     027436         2734#
DT10    027552         2734#
DT11    027570         2734#
DT2     027454         2734#
DT3     027472         2734#
DT4     027510         2734#
DT5     027522         2734#
DT7     027534         2734#
EM1     027040         2734#
EM10    027222         2734#
EM11    027247         2734#
EM12    027273         2734#
EM13    027317         2734#
EM2     027061         2734#
EM3     027115         2734#
EM4     027136         2734#
EM5     027152         2734#
EM7     027204         2734#
ERCT00  001704          366#
ERCT01  001710          369#
ERCT02  001714          372#
ERCT03  001720          375#
ERCT04  001724          378#
ERCT05  001730          381#
ERCT06  001734          384#
ERCT07  001740          387#
ERCT10  001744          390#
ERCT11  001750          393#
```

```
ERCT12  001754  396#
ERCT13  001760  399#
ERCT14  001764  402#
ERCT15  001770  405#
ERCT16  001774  408#
ERCT17  002000  411#
ERR     002700  592   618#  622
ERRCNT  001232  163#  747   774   1087*  1305*
ERRFLG  001325  202#  481*  733*  795*   1037*  1050  1064*  1123*
ERRMSG  005172  1047*  1065  1068#
ERRPC   002770  624   640#
ERTABC  005322  1052  1097#
EXIT  = 000205  96#
EXITER  005252  1082  1087#
FLOAT   002536  585#  591
FY      002566  594#  605   609   615
HALTS   005222  1033  1079#
HILIM   004366  876*  903   921#
HIMAP   016322  1670#  2719  2731
ICOUNT  001222  159#  793   798#
INBUF   007502  846   882   1202#
INCHAR  010020  1231  1259#
INIFLG  001324  201#  507   527   534*
INSTER= 104404  223#  897
INSTR = 104403  221#  1329  1381  1394  1403  1482  1491
INSTR2  004166  853   865#
INTTY   012266  1414  1431  1441  1454  1470  1655#
KMCM    007330  637   1187#
LIMITS  004314  892   903#
LINE    007016  1187#  1483
LOBITS  004372  878*  907   923#  924
LOCK    001220  158#  797*  814   816   1056  1801*  1851*  1869*  1882*  1908*  1925*  1937*  1962*
                1980*  1993*  2019*  2037*  2050*  2076*  2094*  2107*  2133*  2151*  2164*  2190*  2208*
                2221*  2247*  2265*  2278*  2305*  2323*  2336*  2363*  2381*  2394*  2421*  2439*  2452*
                2479*  2497*  2510*  2537*  2555*  2568*  2595*  2613*  2626*
LOKFLG  001326  203#
LOLIM   004364  875*  905   920#
LOMAP   012322  1667#  2716  2728
LPCNT   001224  160#  792*  793   796*
LSTERR  001234  164#  490*  732*  1034  1036*  1124#
MAPCK   027012  1711  1806  1856  1913  1967  2024  2081  2138  2195  2252  2310  2368  2426
                2484  2542  2600  2723#
MASKX   001244  172#
MASTER  006142  1058  1187#
MCRLF   005672  831   954   1054  1055  1063  1187#  1328  1390
MCSRX   026072  737   1187#
MDATA   007544  984   994   1204#
MEMLIM  001304  188#  700*
MEPASS  005733  736   1187#
MERRPC  026217  1061  1187#
MERRX   006117  743   1187#
MERR2   005760  1187#  1590
MERR3   006005  673   1187#
MILK    001322  196#  484*  745   1288*  1293*  1297
MLOCK   006043  714   1187#
MNEW    006144  668   1187#
```



```
MODD    006704  1187#  1453
MPASSX  006106  741   1187#
MPFAIL  005675  1121  1187#
MQM     005666  861   1187#  1352  1427  1437  1447  1462  1476
MR      005755  723   1187#  1346
MRESET= 004000  96#
MSTCLR= 104112  235#  1126  1738  1739  1803  1853  1910  1964  2021  2078  2135  2192  2249
                2307  2365  2423  2481  2539  2597
MTITLE  001004  136#  511
MTSTN   006130  1059  1187#  1330
MTSTPC  026031  1187#
MVECX   006102  739   1187#
NEXT    001216  157#  799   1092  1686*  1709*  1736*  1800*  1850*  1907*  1961*  2018*  2075*  2132*
                2189*  2246*  2304*  2362*  2420*  2478*  2536*  2594*
NOACT   007154  523   1187#  1282
NODEV   002674  577   616#
NUM     006450  1187#  1382
OK      002646  603   610#  639
ONE     023102  187#
PACT00  001702  365#
PACT01  001706  368#
PACT02  001712  371#
PACT03  001716  374#
PACT04  001722  377#
PACT05  001726  380#
PACT06  001732  383#
PACT07  001736  386#
PACT10  001742  389#
PACT11  001746  392#
PACT12  001752  395#
PACT13  001756  398#
PACT14  001762  401#
PACT15  001766  404#
PACT16  001772  407#
PACT17  001776  410#
PARAM = 104405  225#  1331  1383  1396  1405  1484  1493
PARAM1  000234  881#  898
PARBIT= 140000  96#
PARERR  004310  884   896   888   897#  904   906   908
PASCNT  001230  162#  734*  735   746   771   1304*
PERFOR= 003537  96#
PFTAB   005430  1122  1128#
POPP.  = 017600  72#  1096
POP1SP= 005726  70#
POP2SP= 022626  74#  801
PRIO    006517  1187#  1413
PS    = 177776  63#  476*  711*  1617*  1627*
PUSHR0= 010046  71#  1083
PUSH1S= 005746  69#
PUSH2S= 024046  73#
QV.FLG  001327  204#  482*  750*  790
RESFLG  005224  1075  1078#
RESTAR  005350  1108  1114#
RESTRT  003534  749   753   761#
RESW5 = 104407  229#  1078
RETURN  001214  156#  492*  720*  724   761*  799*  803   1092*  1095  1127  1345*  1355*  1357
```

```
ROMCLK= 104414   239#  1134  1137  1174  1179  1744  1746  1748  1756  1758  1814  1859  1861
                1872  1874  1885  1887  1915  1917  1927  1929  1939  1941  1970  1972  1983
                1985  1996  1998  2027  2029  2040  2042  2053  2055  2084  2086  2097  2099
                2110  2112  2141  2143  2154  2156  2167  2169  2198  2200  2211  2213  2224
                2226  2255  2257  2268  2270  2281  2283  2313  2315  2326  2328  2339  2341
                2371  2373  2384  2386  2397  2399  2429  2431  2442  2444  2455  2457  2487
                2489  2500  2502  2513  2515  2545  2547  2558  2560  2571  2573  2603  2605
                2616  2618  2629  2631  2648  2650  2652  2660  2668  2676  2684  2692  2694
                2696  2704
ROMDAT  126750   1863  1876  1889  1919  1931  1943  1974  1987  2000  2031  2044  2057  2088
                2101  2114  2145  2158  2171  2202  2215  2228  2259  2272  2285  2317  2330
                2343  2375  2388  2401  2433  2446  2459  2491  2504  2517  2549  2562  2575
                2607  2620  2633  2709#
ROMMAP  012320   1665#  1715  1808  2728*  2731*
ROMNUM  122360   1688  1691*  1693#
ROM1    022362   1690  1694#
RUN     001316    193#   485*  1286*  1287*  1294
SAVACT  001312    191#   671  1588#
SAVNUM  001314    192#   479*   748*   751*  1581*
SAVPC   001276    185#   622*   642   929*  1099
SAVR0   001260    178#   938*   943  2734
SAVR1   001262    179#   628*   937#   944
SAVR2   001264    180#   936*   945  2734
SAVR3   001266    181#   935*   946
SAVR4   001270    182#   934*   947  2734
SAVR5   001272    183#   933*   948  2734
SAVSP   001274    184#
SAV05 = 104406    227#  1038
SCOPE = 104400    215#  1692  1724  1765  1837  1895  1949  2006  2063  2120  2177  2234  2291
                2349  2407  2465  2523  2581  2639
SCOP1 = 104401    217#  1828  1868  1881  1894  1924  1936  1948  1979  1992  2005  2036  2049
                2062  2093  2106  2119  2150  2163  2176  2207  2220  2233  2264  2277  2290
                2322  2335  2348  2380  2393  2406  2438  2451  2464  2496  2509  2522  2554
                2567  2580  2612  2625  2638
SETBR0  026674   2083  2096  2109  2657#
SETBP1  026702   2140  2153  2166  2665#
SETBR4  026710   2197  2210  2223  2673#
SETBP7  026716   2254  2267  2280  2681#
SETC    026721   1969  1982  1995  2689#
SETZ    026742   2026  2039  2052  2701#
SKIP    002632    573   576   597   600   606#
SOFTSW  010052   1229  1268#
SPACNT= 004713    964*   988   991*  1005#
SPEED   007340   1187#  1440
STACK = 001200     64#   477   690  1093  1116
STAT    001240    170#
STAT1   001366    251#  1301*  1712  1804  1854  1911  1965  2022  2079  2136  2193  2250  2308
                2366  2424  2482  2540  2598
STAT2   001370    252#  1302*
STAT3   001372    253#  1303*  2717  2729
STRTSW  001236    169#   513*   516*   517   519   529   531   666   712   721  1323  1347*  1377
                1601
SV05    004402    933#
SWFLG   210016    480*   825  1224*  1251*  1257#
SWMES   007205   1187#  1227
SWMES1  007215   1187#  1230
```



```
SWR     001202    143#   497*   499   503*   513   671   676   781   786   812   827  1027  1032
                1081  1088  1090  1152  1212  1250*
SWREG   000176    129#   503  1212  1270
SW00 = 000001     45#   517  1377  1601
SW01 = 000002     44#   721  1323  1347
SW02 = 000004     43#
SW03 = 000010     42#   666
SW04 = 000020     41#
SW05 = 000040     40#
SW06 = 000100     39#  1152
SW07 = 000200     38#
SW08 = 000400     37#  1088
SW09 = 001000     36#   812
SW10 = 002000     35#  1090
SW11 = 004000     34#   788
SW12 = 010000     33#   827  1027
SW13 = 020000     32#  1032
SW14 = 040000     31#
SW15 = 100000     30#
TEMP    001416    271#   971  1118*  1119*  1160*  1165*  1171*  1183*
TEMP1   001246    173#   537*  1189  1613*  1614*
TEMP2   001250    174#   538*  1191
TEMP3   001252    175#   540*   566*   618   627*  1193  1386  1389  1501*  1821*  1823*  1824*  1825*
                1826*  2734
TEMP4   001254    176#   541*  1195  1399  1402  1408  1411  1487  1490  1496  1499  2734
TEMP5   001256    177#   542*  1197  1380*  1393*  1599
TIMER = 104416    243#
TKCSR   001204    148#   848  1214  1259  1655
TKDBR   001206    149#   850   856  1217  1219  1261  1657
TLAST = 026462   1350  2640#
TPCSR   001210    150#   832   854  1029  1262  1658
TPDBF   001212    151#   834*   856*  1031*  1264*  1660*
TRPOK   004730   1017#
TSINO   001226    161#   491*  1102  1130  1334  1341  1343  1685*  1708*  1735*  1799*  1849*  1906*
                1960*  2017*  2074*  2131*  2188*  2245*  2303*  2361*  2419*  2477*  2535*  2593*
TST1    022322   1337  1355  1685#
TST10   024132   1961  2017#
TST11   024326   2018  2074#
TST12   024522   2075  2131#
TST13   024716   2132  2188#
TST14   025112   2189  2245#
TST15   025306   2246  2303#
TST16   025502   2304  2361#
TST17   025676   2362  2419#
TST2    022760   1686  1708#
TST20   026072   2420  2477#
TST21   026266   2478  2535#
TST22   026462   2536  2593#  2640
TST23 = ****** U  2594
TST3    023052   1709  1735#
TST4    023160   1736  1799#
TST5    023362   1800  1849#
TST6    023556   1850  1906#
TST7    023736   1907  1960#
TTST    003612    715*   716*   718*   719*   782#
TWOSIN= 010020    961
```

```
TYPDAT  005206          1053   1071   1074#
TYPE  = 103402           219#   511    523    535    620    625    633    636    668    673    714    723    736
                         737    739    741    743    831    844    861    954    994   1054   1055   1058   1059
                        1061   1063   1067   1072   1121   1227   1230   1282   1328   1346   1352   1390   1412
                        1426   1429   1436   1439   1446   1452   1461   1468   1475   1590   1690
TYPMSG  005106          1051   1054#
VEC     106526          1187#  1404
VECMAP  012010          1589   1601#
WHICH   012002          1392   1597#
WRDCNT  004710           962*   995*  1003#
WRKO.F  005174          1066   1069#
XBX     005000          1028   1030   1032#
XCSR    003546           738    763#
XERR    003570           744    772#
XHEAD   006224           535   1187#
XLOC    003022           593*   611*   614    645    658#
XPASS   003562           742    769#
XSTATQ  007454           544   1187#
XTSTN   005330          1060   1100#
XVEC    003554           740    766#
ZERO    001300           186#
$COD  = ****** U           1
$CRAP = 177777             1#   1673#  1676   1681#  1694#  1697   1704#  1725#  1728   1731#  1766#  1769   1795#
                        1838#  1841   1845#  1896#  1899   1902#  1950#  1953   1956#  2007#  2010   2013#  2064#
                        2067   2070#  2121#  2124   2127#  2178#  2181   2184#  2235#  2238   2241#  2292#  2295
                        2299#  2350#  2353   2357#  2408#  2411   2415#  2466#  2469   2473#  2524#  2527   2531#
                        2582#  2585   2589#
$ENDAD  003522           123    509    755#  1079
$N    = 000022             1#   1673   1681   1683   1688#  1694   1704   1706   1711#  1725   1731   1733   1738
                        1739#  1766   1795   1797   1803   1804#  1838   1845   1847   1853   1854#  1896   1902
                        1904   1910   1911#  1950   1956   1958   1964   1965#  2007   2013   2015   2021   2022#
                        2064   2070   2072   2078   2079#  2121   2127   2129   2135   2136#  2178   2184   2186
                        2192   2193#  2235   2241   2243   2249   2250#  2292   2299   2301   2307   2308#  2350
                        2357   2359   2365   2366#  2408   2415   2417   2423   2424#  2466   2473   2475   2481
                        2482#  2524   2531   2533   2539   2540#  2582   2589   2591   2597   2598#  2640#
$S    = 000024             1#   1686   1688#  1709   1711#  1736   1739#  1800   1804#  1850   1854#  1907   1911#
                        1961   1965#  2018   2022#  2075   2079#  2132   2136#  2189   2193#  2246   2250#  2304
                        2308#  2362   2366#  2420   2424#  2478   2482#  2536   2540#  2594   2598#
$Y    = 000017             1#   207#   215    217#   219#   221#   223#   225#   227#   229#   231#   233#   235#
                         237#  239#   241#   243#   245#
.     = 027734           108#   109    112#   119#   124#   127#   131#   135#   137#   189#   190#   191#   192#
                         272#  277#   279#   280#   281#   282#   284#   285#   286#   287#   289#   290#   291#
                         292#  294#   295#   296#   297#   299#   300#   301#   302#   304#   305#   306#   307#
                         309#  310#   311#   312#   314#   315#   316#   317#   319#   320#   321#   322#   324#
                         325#  326#   327#   329#   330#   331#   332#   334#   335#   336#   337#   339#   340#
                         341#  342#   344#   345#   346#   347#   349#   350#   351#   352#   354#   355#   356#
                         357#  515    525    657#   675   1110   1120   1168#  1203#  1205#  1260   1263   1284
                        1378   1422   1542   1546   1593   1624   1656   1659
.BEGIN  003152           690#
.CNVFT  004472           234    955#
.CONVR  004466           232    954#
.DATAC  005552           242   1159#
.DELAY  005436           238   1132#
.EOP    003364           731#  2594
.ERRTA  027602          1046   2734#
.HLT    004750           115   1026#
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.INSTE  004154           224    861#
.INSTR  004050           222    840#
.INST1  004070           844#   864
.MSG    004072           842*   845#
.MSTCL  005466           236   1143#
.PARAM  004174           226    872#
.PFAIL  005336           113    478   1107#  1115
.RES05  004434           230    943#
.ROMCL  005504           240   1148#
.SAV05  004374           228    929#
.SCOPE  003576           216    779#
.SCOP1  003736           218    811#
.START  002002           132    476#   492   1247
.TIMER  005616           244   1170#
.TRPSR  004716           117   1014#
.TRPTA  001330           214#  1019
.TYPE   003766           220    822#
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DMEND        1#    725
DMFRNT       1#
HLT         75#   1754   1764   1827   1867   1880   1893   1923   1935   1947   1978   1991   2004   2035   2048
          2061   2092   2105   2118   2149   2162   2175   2206   2219   2232   2263   2276   2289   2321   2334
          2347   2379   2392   2405   2437   2450   2463   2495   2508   2521   2553   2566   2579   2611   2624
          2637
$AUTO        1#    547
$BRRSH       1#   1725
$BUFFE       1#   1199
$COMF        1#
$CRAM        1#   1694
$CYCLE       1#   1271
$EOF         1#    725
$FINI        1#   2640
$GETPA       1#
$HEADE       1#
$JUMP        1#   1838   1896   1950   2007   2064   2121   2178   2235   2292   2350   2408   2466   2524   2582
$MARHI       1#
$MOCK        1#
$MSG         1#   1187
$PFAIL       1#   1103
$QUEST       1#   1381   1394   1403   1482   1491
$RAMCL       1#   1131
$RCLK        1#   1134   1137   1174   1179   1744   1746   1748   1755   1758   1814   1859   1861   1872   1874
          1885   1887   1915   1917   1927   1929   1939   1941   1970   1972   1983   1985   1996   1998   2027
          2029   2040   2042   2053   2055   2084   2086   2097   2099   2110   2112   2141   2143   2154   2156
          2167   2169   2198   2200   2211   2213   2224   2226   2255   2257   2268   2270   2281   2283   2313
          2315   2326   2328   2339   2341   2371   2373   2384   2386   2397   2399   2429   2431   2442   2444
          2455   2457   2487   2489   2500   2502   2513   2515   2545   2547   2558   2560   2571   2573   2603
          2605   2616   2618   2629   2631   2648   2650   2652   2660   2668   2676   2684   2692   2694   2696
          2704
$ROMNU       1#   1673
$ROMRD       1#   1766
$SCOPE       1#    775
$SIMBC       1#
$SOFTC       1#   1207
$TRPDE       1#    215    217    219    221    223    225    227    229    231    233    235    237    239    241
           243
$TSTN        1#   1683   1706   1733   1797   1847   1904   1958   2015   2072   2129   2186   2243   2301   2359
          2417   2475   2533   2591
$VARIA       1#    134
$XZ          1#   1673   1681   1694   1704   1725   1731   1766   1795   1838   1845   1896   1902   1950   1956
          2007   2013   2064   2070   2121   2127   2178   2184   2235   2241   2292   2299   2350   2357   2408
          2415   2466   2473   2524   2531   2582   2589

. ABS.  027734     000

 ERRORS DETECTED:  0

 DZDMG,DZDMG/SOL/CRF_IPLUTL,DZDMG
 RUN-TIME:  10 13  1 SECONDS
 RUN-TIME RATIO:  167/24=6.8
 CORE USED:  21K  (41 PAGES)
```