DMC11

DDCMP LINE UNIT TESTS

MD-11-DZDME-A

EP-DZDME-A-DL-A

FICHE 1 OF 1

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MADE IN U.S.A.

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZDME-A-D
PRODUCT NAME:	DDCMP MODE LINE UNIT TESTS
DATE:	APRIL 1976
MAINTAINER:	DIAGNOSTICS
AUTHOR:	FAY BASHAW

1. ABSTRACT

THE FUNCTION OF THE DMC11 DIAGNOSTICS IS TO VERIFY THAT THE OPTION OPERATES ACCORDING TO SPECIFICATIONS. THE DIAGNOSTICS VERFIY THAT THERE ARE NO MALFUNCTIONS AND THE ALL OPERATIONS OF THE DMC11 ARE CORRECT IN ITS ENVIRONMENT.

PARAMETERS MUST BE SET UP TO ALERT THE DIAGNOSTICS TO THE DMC11 CONFIGURATION. THESE PARAMETERS ARE CONTAINED IN THE STATUS TABLE AND ARE GENERATED IN TWO WAYS: 1) MANUAL INPUT - THE OPERATOR ANSWERS QUESTIONS. 2) AUTOSIZING - THE PROGRAM DETERMINES THE PARAMETERS AUTOMATICALLY.

DZDME TESTS THE DMC-11 LINE UNIT (M8201 OR M8202). IT PERFORMS WRITE/READ TESTS ON THE DMC LINE UNIT REGISTERS. IT CHECKS FOR PROPER TRANSMITTER, RECEIVER, AND BCC OPERATION IN DDCMP MODE. THE MODEM SIGNALS ARE ALSO CHECKED. DZDME REQUIRES A DMC MICRO-PROCESSOR (M8200 OR M8204) TO RUN. FOR BEST DIAGNOSIS A TURN-AROUND CONNECTOR SHOULD BE INSTALLED, HOWEVER THE DIAGNOSTIC WILL RUN WITHOUT IT (SOME TESTS ARE SKIPPED).

CURRENTLY THERE ARE FOUR OFF LINE DIAGNOSTICS THAT ARE TO BE RUN IN SEQUENCE TO INSURE THAT IF AN ERROR SHOULD OCCUR IT WILL BE DETECTED AT AN EARLY STAGE.

NOTE: ADDITIONAL DIAGNOSTICS MAY BE ADDED IN THE FUTURE.

THE FOUR DIAGNOSTICS ARE:

1. DZDMC [REV] BASIC W/R AND MICRO-PROCESSOR TESTS
2. DZDME [REV] DDCMP LINE UNIT TESTS
3. DZDMF [REV] BITS OFF LINE UNIT TESTS
4. DZDMG [REV] JUMP AND 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 EQUILIVALENT)
DMC11-AD (M8200) OR AN IOP (M8204)
DMC11-DA OR DMC11-MD OR DMC11-MA

2.2 STORAGE

PROGRAM WILL USE ALL 8K OF MEMORY EXCEPT WHERE ABL AND BOOTSTRAP LOADER RESIDE. LOCATIONS 1500 THRU 1640; CONTAIN THE "STATUS TABLE" INFORMATION WHICH IS GENERATED AT START OF DIAGNOSTICS BY MANUAL INPUT (QUESTIONS) OR AUTOMATICALLY (AUTO-SIZING). THIS AREA IS AN OVERLAY AREA AND SHOULD NOT BE ALTERED BY THE OPERATOR.

3. LOADING PROCEEDURE

3.1 METHOD

ALL PROGRAMS ARE IN ABSOLUTE FORMAT AND ARE LOADED USING THE ABSOLUTE LOADER. NOTE: IF THE DIAGNOSTICS ARE ON A MEDIA SUCH AS DISK ,MAGTAPE,DECTAPE, OR CASSETTE; FOLLOW INSTRUCTIONS FOR THE MONITOR WHICH HAS BEEN PROVIDED ON THAT SPECIFIC MEDIA.

ABSOLUTE LOADER STARTING ADDRESS *500

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

3.1.1 PLACE ADDRESS OF ABS LOADER INTO SWITCH REGISTER.
(ALSO PLACE 'HALT' SW UP)

3.1.2 DEPRESS 'LOAD ADDRESS' KEY ON CONSOLE AND RELEASE.

3.1.3 DEPRESS 'START KEY' ON CONSOLE AND RELEASE (PROGRAM SHOULD NOW BE LOADING INTO CPU)

4. STARTING PROCEEDURE

A. SET SWITCH REGISTER TO 000200
B. DEPRESS 'LOAD ADDRESS' KEY AND RELEASE
C. SET SWR TO ZERO FOR 'AUTO SIZING' OR SWR BIT0=1 FOR MANUAL INPUT (QUESTIONS) OR SWR BIT7=1 TO USE EXISTING PARAMETERS SET UP BY A PREVIOUS START OR A PREVIOUSLY RUN DMC11 DIAGNOSTIC.
D. DEPRESS 'START KEY' AND RELEASE. THE PROGRAM WILL TYPE MAINDEC NAME AND PROGRAM NAME (IF THIS WAS THE FIRST START UP OF THE PROGRAM) AND ALSO THE FOLLOWING:

MAP OF DMC11 STATUS

PC	CSR	STAT1	STAT2	STAT3
001500	160010	145310	177777	000000
001510	160020	145320	177777	000000

THE PROGRAM WILL TYPE 'R' AND PROCEED TO RUN THE DIAGNOSTIC. THE ABOVE IS ONLY AN EXAMPLE. THIS WOULD INDICATE THE STATUS TABLE STARTING AT ADD. 1500 IN THE PROGRAM. IN THIS EXAMPLE THE TABLE CONTAINS THE INFORMATION AND STATUS OF TWO DMC11'S. THE STATUS TABLE MUST BE VERIFIED BY THE USER IF AUTO SIZING IS DONE. FOR INFORMATION OF STATUS TABLE SEE SECTION 8.4 FOR HELP.

IF THE DIAGNOSTIC WAS STARTED WITH SW00=1 INDICATING MANUAL PARAMETER INPUT THEN THE FOLLOWING SHOWS AN EXAMPLE OF THE QUESTIONS ASKED AND SOME EXAMPLE ANSWERS:

```
HOW MANY DMC11'S TO BE TESTED?1

01
CSR ADDRESS?160010
VECTOR ADDRESS?310
BR PRIORITY LEVEL? (4,5,6,7)?5
DOES MICRO-PROCESSOR HAVE CRAM? (Y OR N)N
WHICH LINE UNIT? IF NONE TYPE "N". IF M9201 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

F01


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   191                                          DIAGNOSTIC  MUST  BE  RESTARTED  WITH SWOO=1 AND THE QUESTIONS
   192                                          ANSWERED.
```

4.1 CONTROL SWITCH SETTINGS

SW 15 SET: HALT ON ERROR
SW 14 SET: LOOP ON CURRENT TEST
SW 13 SET: INHIBIT ERROR PRINT OUT
SW 12 SET: INHIBIT TYPE OUT/ABELL ON ERROR.
SW 11 SET: INHIBIT ITERATIONS. (QUICK PASS)
SW 10 SET: ESCAPE TO NEXT TEST ON ERROR
SW 09 SET: LOOP WITH CURRENT DATA
SW 08 SET: CATCH ERROR AND LOOP ON IT
SW 07 SET: USE PREVIOUS STATUS TABLE.
SW 06 SET: HALT IN ROMCLK ROUTINE BEFORE CLOCKING MICRO-PROCESSOR
SW 05 SET: RESERVED
SW 04 SET: RESERVED
SW 03 SET: RESELECT DMC11'S DESIRED ACTIVE
SW 02 SET: LOCK ON SELECTED TEST
SW 01 SET: RESTART PROGRAM AT SELECTED TEST
SW 00 SET: BUILD NEW STATUS TABLE FROM QUESTIONS. (IF SW07=0 AND SW00=0 A NEW STATUS TABLE IS BUILT BY AUTO-SIZING)

SWITCH 06 AND 08-15 ARE DYNAMIC AND CAN BE CHANGED AS NEEDED WHILE THE DIAGNOSTIC IS RUNNING. SWITCHES 00-03 AND SWITCH 07 ARE STATIC, AND ARE USED ONLY ON STARTING OR RESTARTING THE DIAGNOSTIC.

4.1.2 SWITCH REGISTER OPTIONS (AT START UP)

SW 01 RESTART PROGRAM AT SELECTED TEST. IT IS STRONGLY SUGGESTED THAT AT LEAST ONE PASS HAS BEEN MADE BEFORE TRYING TO SELECT A TEST, THE REASON BEING IS THAT THE PROGRAM HAS TO CLEAR AREAS AND SET UP PARAMETERS. WHEN THIS SWITCH IS USED THE DIAGNOSTIC WILL ASK TEST NO.? ANSWER BY TYPING THE NUMBER OF THE TEST DESIRED AND CARRIGE RETURN TO BEGIN EXECUTION AT THE SELECTED TEST.

SW 02 LOCK ON SELECTED TEST. THIS SWITCH WHEN USED WITH SW01 WILL CAUSE THE PROGRAM TO CONSTANTLY LOOP ON THE SELECTED TEST. HITTING ANY KEY ON THE CONSOLE WILL LET IT ADVANCE TO THE NEXT TEST AND LOOP UNTIL A KEY IS HIT AGAIN. IF SW02=0 WHEN SW01 IS USED. THE PROGRAM WILL BEGIN AT THE SELECTED TEST AND CONTINUE NORMAL OPERATIONS.

SW 03 RESELECT DMC11'S DESIRED ACTIVE. PLEASE NOTE THAT A MESSAGE IS TYPED OUT FOR SETTING THE SWITCH REGISTER EQUAL TO DMC11'S ACTIVE. THIS MEANS IF THE SYSTEM HAS FOUR DMC11S; BITS 00,01,02,03 WILL BE SET IN LOC 'DMACTV' FROM THE SWITCH REGISTER. USING THIS SWITCH(SW00) ALTERS THAT LOCATION;THEREFORE IF FOUR DMC11S ARE IN THE SYSTEM ***DO NOT*** SET SWITCHS GREATER THAN SW 03 IN THE UP POSITION. THIS WOULD BE A FATAL ERROR. DO NOT SELECT MORE ACTIVE DMC11S THAN THERE IS INFORMATION ON IN THE STATUS TABLE.

METHOD:
A: LOAD ADDRESS 200
B: START WITH SW 00=1
C: PROGRAM WILL TYPE MESSAGE
D: SET A SWITCH FOR EACH DMC DESIRED ACTIVE. EXAMPLE: IF YOU HAVE 4 DMC'S BUT ONLY WANT TO RUN THE FIRST AND THE LAST SET SWR BITS 0 AND 3 = 1. PRESS CONTINUE
E: NUMBER (IF VALID) WILL BE IN DATA LIGHTS (EXCLUDING 11/05)
F: SET WITH ANY OTHER SWITCH SETTINGS DESIRED. PRESS CONTINUE.

4.1.3 DYNAMIC SWITCHES

ERROR SWITCHES

1. SW 12 DELETE PRINT OUT/BELL ON ERROR.
2. SW 13 DELETE ERROR PRINTOUT.
3. SW 15 HALT ON THE ERROR.
4. SW 08 GOTO BEGINNING OF THE TEST(ON ERROR).
5. SW 10 GOTO NEXT TEST(ON ERROR).

SCOPE SWITCHES

1. SW05 HALT IN ROMCLK ROUTINE BEFORE CLOCKING MICRO-PROCESSOR INSTRUCTION. THIS ALLOWS THE OPERATOR TO SCOPE A MICRO-PROCESSOR INSTRUCTION IN THE STATIC STATE BEFORE IT IS CLOCKED. HIT CONTINUE TO RESUME RUNNING.
2. SW09 (IF ENABLED BY 'SCOP1') ON AN ERROR; IF AN '*' IS PRINTED IN FRONT OF THE TEST NO. (EX. *TEST NO. 10) SW09 IS INCORPORATED IN THAT TEST AND THEREFORE SW09 IS USUALLY THE BEST SWITCH FOR THE SCOPE LOOP (SW14=0, SW10=0, SW09=1, SW08=0). IF SW09 IS NOT ENABELED: AND THERE IS A HARD ERROR (CONSTANT); SW08 IS BEST. (SW14=1,0, SW10=0, SW09=0, SW08=1). FOR INTERMITTEMT ERRORS; SW14=1 WILL LOOP ON TEST REGUARDLESS OF ERROR OR NOT ERROR. (SW14=1, SW10=0, SW09=0, SW08=1.0)
3. SW11 INHIBIT INTERATIONS.
4. SW14 LOOP ON CURRENT TEST.

4.2 STARTING ADDRESS

STARTING ADDRESS IS AT 000200 THERE ARE NO OTHER STARTING ADDRESSES FOR THE DMC11 DIAGNOSTICS. (SEE SECTION 4.0)

NOTE: IF ADDRESS 000042 IS NON-ZERO THE PROGRAM ASSUMES IT IS UNDER ACT11 OR XXDP CONTROL AND WILL ACT ACCORDINGLY AFTER ALL AVAILABLE DMC11'S ARE TESTED THE PROGRAM WILL RETURN TO 'XXDP' OR 'ACT-11'.

5. OPERATING PROCEDURE

WHEN PROGRAM IS INITIALLY STARTED MESSAGES AS DESCRIBED IN SECTION 4.0 WILL BE PRINTED, AND PROGRAM WILL BEGIN RUNNING THE DIAGNOSTIC

5.2 PROGRAM AND/OR OPERATOR ACTION

THE TYPICAL APPROACH SHOULD BE

1. HALT ON ERROR (VIA SW 15=1) WHEN EVER AN ERROR OCCURS.
2. CLEAR SW 15.
3. SET SW 14: (LOOP ON THIS TEST)
4. SET SW 13: (INHIBIT ERROR PRINT OUT)

THE TEST NUMBER AND PC WILL BE TYPED OUT AND POSSIBILY AN ERROR MESSAGE (THIS DEPENDS ON THE TEST) TO GIVE THE OPERATOR AN IDEA AS TO THE SOURCE OF THE PROBLEM. IF IT IS NECESSARY TO KNOW MORE INFORMATION CONCERNING THE ERROR REPORT; LOOK IN THE LISTING FOR THAT TEST NUMBER WHICH WAS TYPED OUT AND THEN NOTE THE PC OF THE ERROR REPORT THIS WAY THE EXACT FUNCTION OF THE TEST CAN BE DETERMINED.

6. ERRORS

AS DESCRIBED PREVIOUSLY THERE WILL ALWAYS BE A TEST NUMBER AND PC TYPED OUT AT THE TIME OF AN ERROR (PROVIDING SW 13=0 AND SW 12=0). IN MOST CASES ADDITIONAL INFORMATION WILL BE SUPPLIED IN THE THE ERROR MESSAGE TO GIVE THE OPERATOR AN INDICATION OF THE ERROR.

6.2 ERROR RECOVERY

IF FOR SOME REASON THE DMC11 SHOULD 'HANG THE BUS' (GAIN CONTROL OF BUS SO THAT CONSOLE MANUAL FUNCTIONS ARE INHIBITED) AN INIT OR POWER DOWN/UP IS NECESSARY FOR OPERATOR TO REGAIN CONTROL OF CPU. IF THIS SHOULD HAPPEN; LOOK IN LOCATION 'TSTNO' (ADDRESS 1226)FOR THE NUMBER OF THE TEST THAT WAS RUNNING AT THE TIME OF THE CATASTROPHIC ERROR. IN THIS WAY THE OPERATOR WILL HAVE AN IDEA AS TO WHAT THE DMC11 WAS DOING AT THE TIME OF THE ERROR.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

SEE SECTION 4. (PLEASE)
STATUS TABLE SHOULD BE VERIFIED REGUARDLESS OF HOW PROGRAM WAS STARTED.. ALSO IT IS IMPORTANT TO USE THIS LISTING ALONG WITH THE INFORMATION PRINTED ON THE TTY TO COMPLETLY ISOLATE PROBLEMS.

7.2 OPERATING RESTRICTIONS

THE FIRST TIME A DMC11 DIAGNOSTIC IS LOADED INTO CORE AND RUN THE STATUS TABLE MUST BE SET UP. THIS IS DONE BY MANUAL INPUT (SW00=1) OR BY AUTOSIZING (SW00=0 AND SW07=0). THEREAFTER HOWEVER THE STATUS TABLE NEED NOT BE SETUP BY SUBSEQUENT RESTARTS OR EVEN LOADING THE NEXT DMC DIAGNOSTIC BECAUSE THE STATUS TABLE IS OVERLAYED. THE CURRENT PARAMETERS IN THE STATUS TABLE ARE USED WHEN SW07=1 ON START UP.

7.3 HARDWARE CONFIGURATION RESTRICTIONS

DMC11(M8200)- JUMPER W1 MUST BE IN, AND SWITCH 7 OF E76 MUST BE IN THE OFF POSITION.

IOP(M8204)- JUMPER W1 MUST BE IN.

LINE UNIT(M8201)- JUMPERS W1, W2, AND W4 MUST BE IN. JUMPERS W3, AND W5 MUST BE OUT. SW8 OF E26 MUST BE IN THE ON POSITION.

LINE UNIT (M8202)- JUMPER W1 MUST BE IN. SW8 OF E26 MUST BE IN THE OFF POSITION.

8. MISCELLANEOUS

8.1 EXECUTION TIME

ALL 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 DZDMC CSR:  175000 VEC:  0300 PASSES:  000001
ERRORS:  000000
```

NOTE: THE PASS COUNT AND ERROR COUNTS ARE CUMMULITIVE FOR EACH DMC11 THAT IS RUNNING, AND ARE SET TO ZERO ONLY WHEN THE DIAGNOSTIC IS STARTED. THEREFORE AFTER AN OVERNIGHT RUN FOR EXAMPLE, THE TOTAL PASSES AND ERRORS FOR EACH DMC11 SINCE THE DIAGNOSTIC WAS STARTED ARE

420

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) 1276/0000000C0001C001 MEANS THAT DMC11 NO. 00,04 WILL BE TESTED.

DMCSR (1402) 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

```
   477                                                  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-C8 IS DMC11 VECTOR ADDRESS
BIT15=1 MICRO-PROCESSOR HAS CRAM
BIT15=0 MICRO-PROCESSOR HAS CROM
BIT14=1 TURNAROUND CONNECTOR IS CN
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 PRICRITY LEVEL

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

STAT3: NOT USED

3.5 METHOD OF AUTO SIZING

3.5.1 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 A DMC11 HAS BEEN FOUND, IF NOT, THE ADDRESS IS UPDATED BY 10 AND THE SEARCH CONTINUES. A -1 INDICATES A DMC11 WITH NO CROM OR CRAM, A 125252 INDICATES A DMC11 WITH CROM AND A 626 INDICATES A DMC11 WITH THE DDCMP CROM. FURTHER TESTS ARE PERFORMED AT THIS POINT TO DETERMINE WHICH LINE UNIT, IF ANY, IS INSTALLED, IF A LOOP-BACK CONNECTOR IS INSTALLED AND VARIOUS SWITCH SETTINGS ON THE LINE UNIT. THIS IS WHY THE STATUS TABLE MUST BE VERIFIED BY THE USER AND IF ANY OF THE INFORMATION DOES NOT AGREE WITH THE HARDWARE THE DIAGNOSTIC MUST BE RESTARTED AND THE QUESTIONS MUST BE ANSWERED. ALL DMC11'S IN THE SYSTEM WILL BE FOUND BY THE AUTO-SIZER. IF IT DOES NOT FIND A DMC11 THE DIAGNOSTIC MUST BE RESTARTED AND THE QUESTIONS ANSWERED.

3.5.2 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.

3.6 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 C ON THE CONSOLE TERMINAL KEYBOARD. AS SOON AS THE CTRL C IS RECOGNIZED, BY

562 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.
%



:*MAINDEC-11-DZDME-A   DMC11 DDCMP LINE UNIT 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-DZDME-A   DMC11 DDCMP LINE UNIT TESTS"
;PROGRAM WILL TYPE STATUS MAP
;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
;AT THE END OF A PASS, PROGRAM WILL TYPE PASS COMPLETE MESSAGE
```

F02


```
                                        ;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,ALTSIZE DMC11
  000100                                SW06=100              ;=1, HALT BEFORE CLOCKING MICRO-PROCESSOR INSTRUCTION
  000040                                SW05=40
  000020                                SW04=20
  000010                                SW03=10               ;RESELECT DMC11'S TO BE TESTED (ACTIVE)
  000004                                SW02=4                ;LOCK ON TEST SELECT
  000002                                SW01=2                ;RESTART PROGRAM AT SELECTED TEST
  000001                                SW00=1                ;INPUT DMC11 PARAMETERS
```

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

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

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

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

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

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

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

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

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

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

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

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

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

                 001000                 .=1000
 001000  005377  040515  047111         MTITLE: .ASCII  <377><12>/MAINDEC-11-DZDME-A/<377>
(2) 001025     104  041515  030461                .ASCIZ  /DMC11 DDCMP LINE UNIT TESTS/<377>

                 001200                 .=1200

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

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

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

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

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

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

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

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

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

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


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

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

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

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

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

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

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

                                        ;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
```

```
                902
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
                907
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
                912
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
                917
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
                922
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
                927
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
                932
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
                937
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
                942
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
                947
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
                952
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

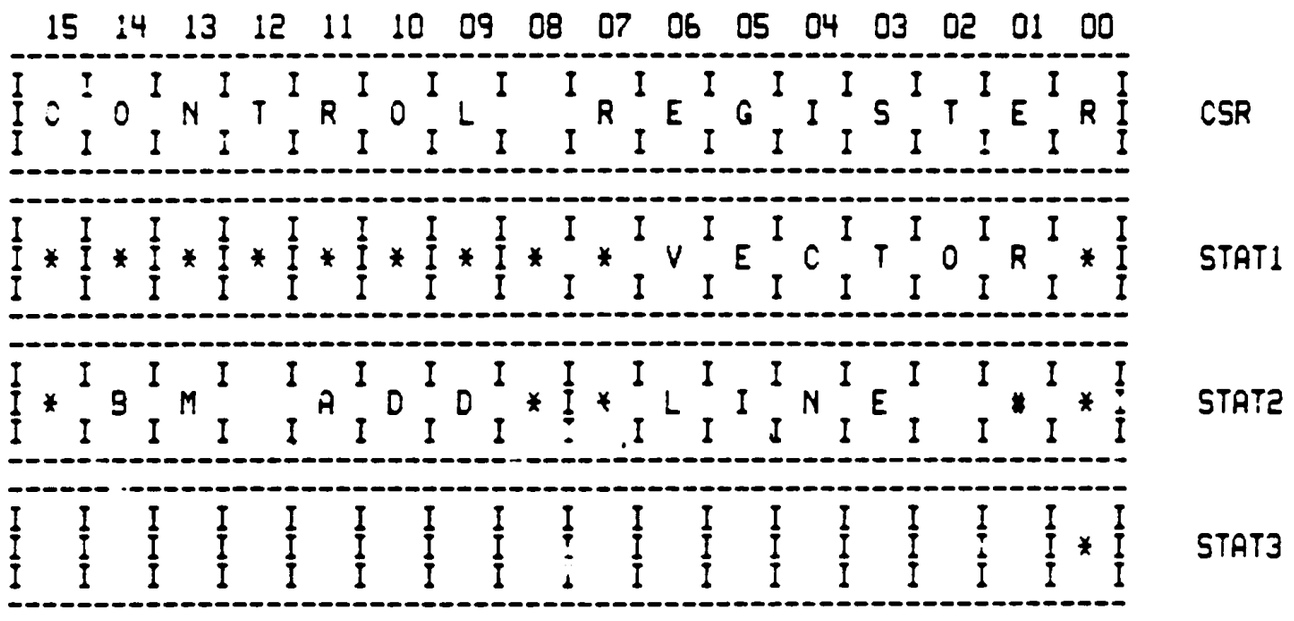
001766  000000                          PACT15: 0               ;PASS COUNT FOR DMC11 NUMBER 15
001770  000000                          ERCT15: 0               ;ERROR COUNT FOR DMC11 NUMBER 15

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
```

```
1007
1008
1009
1010
1011
1012
```

FORMAT OF STATUS TABLE



DEFINITION OF FORMAT

CSR: CONTAINS DMC11 CSR ADDRESS

STAT1: BITS 00-08 IS DMC11 VECTOR ADDRESS
BIT15=1 MICRO-PROCESSOR HAS CRAM
BIT15=0 MICRO-PROCESSOR HAS CROM
BIT14=1 ???? TURNAROUND CONNECTOR IS ON
BIT14=0 NO TURNAROUND CONNECTOR
BIT13=0 LINE UNIT IS AN M8201
BIT13=1 LINE UNIT IS AN M8202
BIT12=1 NO LINE UNIT
BITS 09-11 IS DMC11 BR PRIORITY LEVEL

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

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

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

[illegible]  [illegible]  012737  000340  177776      .START: MOV     #340,PS         ;LOCK OUT INTERRUPTS
[illegible]  [illegible]  012706  001200                  MOV     #STACK,SP       ;SET UP STACK
[illegible]  [illegible]  013737  005240  000024          MOV     #.PFAIL,@#24    ;SET UP POWER FAIL VECTOR
[illegible]  [illegible]  013737  001310  001314          MOV     DMNUM,SAVNUM    ;SAVE NUMBER OF DEVICES IN SYSTEM.
[illegible]  [illegible]  005037  007664                  CLR     SWFLG           ;CLEAR SOFT TYPEOUT FLAG
[illegible]  [illegible]  105037  001325                  CLRB    ERRFLG          ;CLEAR ERROR FLAG
[illegible]  [illegible]  105037  001326                  CLRB    QV.FLG          ;ZERO QUICK VERIFY FLAG
[illegible]  [illegible]  012737  001470  001320          MOV     #DM.MAP-10,CREAM ;GET MAP POINTER.
[illegible]  [illegible]  012737  001676  001322          MOV     #CNT.MAP-4,MILK ;GET PASS COUNT MAP POINTER
[illegible]  [illegible]  012737  100000  001316          MOV     #BIT15,RUN      ;POINT POINTER TO FIRST DEVICE.
[illegible]  [illegible]  012700  001702                  MOV     #CNT.MAP,R0     ;PASS COUNT POINTER TO R0
[illegible]  [illegible]  005020                  23$:    CLR     (R0)+           ;CLEAR TABLE
[illegible]  [illegible]  022700  002002                  CMP     #CNT.MAP+100,R0 ;DONE YET?
[illegible]  [illegible]  001374                          BNE     23$             ;KEEP GOING
[illegible]  [illegible]  005037  001234                  CLR     LSTERR          ;CLEAR LAST ERROR POINTER
[illegible]  [illegible]  012737  000001  001226          MOV     #1,TSTNO        ;SET UP FOR TEST 1
[illegible]  [illegible]  012737  002002  001214          MOV     #.START,RETURN  ;SET UP FOR POWER FAIL BEFORE
                                                                                  ;TESTING STARTS
[illegible]  [illegible]  013746  000006                  MOV     @#6,-(SP)       ;SAVE CURRENT VECTORS
[illegible]  [illegible]  013746  000004                  MOV     @#4,-(SP)       ;
[illegible]  [illegible]  012737  002166  000004          MOV     #6$,@#4         ;SET UP FOR TIMEOUT
[illegible]  [illegible]  012737  177570  001202          MOV     #177570,SWR     ;SET SWR TO HARD SWR ADDRESS
[illegible]  [illegible]  012737  177570  001200          MOV     #177570,DISPLAY ;SET DISPLAY TO HARD SWR ADDRESS
[illegible]  [illegible]  022777  177777  177520          CMP     #-1,@SWR        ;REFERENCE HARDWARE SWITCH REGISTER
[illegible]  [illegible]  001402                          BEQ     6$+2            ;IF = -1 USE SOFT SWR ANYWAY
[illegible]  [illegible]  000407                          BR      7$              ;IF IT EXISTS AND NOT = -1 USE HARD SWR
[illegible]  [illegible]  022626                  6$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
[illegible]  [illegible]  012737  000176  001202          MOV     #SWREG,SWR      ;POINTER TO SOFT SWR
[illegible]  [illegible]  012737  000174  001200          MOV     #DISPREG,DISPLAY;POINTER TO SOFT DISPLAY REG
[illegible]  [illegible]  012637  000004                  MOV     (SP)+,@#4       ;RESTORE VECTORS
[illegible]  [illegible]  012637  000006                  MOV     (SP)+,@#6       ;
[illegible]  [illegible]  105737  001324                  TSTB    INIFLG          ;HAS INITIALIZATION BEEN PERFORMED
[illegible]  [illegible]  001006                          BNE     20$             ;BR IF YES
[illegible]  [illegible]  022737  003432  000042          CMP     #$ENDPS,@#42    ;IF ACT-11 AUTOMATIC MODE, DON'T TYPE ID
[illegible]  [illegible]  001402                          BEQ     20$
[illegible]  [illegible]  104402  001000                  TYPE    ,M'ITLE         ;TYPE TITLE MESSAGE
[illegible]  [illegible]  004737  007470                  JSR     P[illegible],CKSWR      ;CHECK FOR SOFT SWR
[illegible]  [illegible]  017737  176734  001236          MOV     @SWR,STRTSW     ;STORE STARTING SWITCHES
[illegible]  [illegible]  005737  000042                  TST     @#42            ;IS IT RUNNING IN AUTO MODE?
[illegible]  [illegible]  001402                          BEQ     .+6             ;BR IF NO
[illegible]  [illegible]  005037  001236                  CLR     STRTSW          ;IF YES, CLEAR SWITCHES
[illegible]  [illegible]  032737  000001  001236          BIT     #SW00,STRTSW    ;IF SW00=1, QUESTIONS ARE ASKED.
[illegible]  [illegible]  001012                          BNE     17$             ;BR IF SW00=1
[illegible]  [illegible]  105737  001236                  TSTB    STRTSW          ;BIT7=1??
[illegible]  [illegible]  100007                          BPL     17$             ;BR IF SW07=0
[illegible]  [illegible]  005737  001306                  TST     CMACT           ;ARE ANY DEVICES SELECTED?
[illegible]  [illegible]  001005                          BNE     16$             ;BR IF YES
[illegible]  [illegible]  104402  007100                  TYPE,   NOACT           ;NO DEVICES SELECTED.
```

```
                                                HALT                    ;STOP THE SHOW
                                                BR      .-2             ;DISQUALIFY CONTINUE SWITCH
                                        17$:    JSR     PC,AUTO.SIZE    ;GO DO THE AUTO SIZE
                                        16$:    TSTB    INIFLG          ;FIRST TIME?
                                                BEQ     21$             ;BR IF YES
                                                TSTB    STPTSW          ;IF USING SAME PARAMETERS DONT TYPE MAP
                                                BMI     1$
                                                BIT     #BIT1!BIT2,STRTSW;IS TEST NO. OR LOCK SELECTED
                                                BEQ     24$             ;IF NO THEN TYPE STATUS
                                                BR      .+6             ;IF YES DO NOT TYPE STATUS
                                        21$:    COM     INIFLG          ;SET FLAG
                                        24$:    TYPE    ,XHEAD          ;TYPE HEADER
                                                MOV     #DM.MAP,R4      ;SET POINTER
                                        5$:     MOV     R4,TEMP1        ;SET ADDRESS
                                                MOV     (R4)+,TEMP2     ;SET CSR
                                                BEQ     1$              ;ALL DONE IF ZERO
                                                MOV     (R4)+,TEMP3     ;SET STAT1
                                                MOV     (R4)+,TEMP4     ;SET STAT2
                                                MOV     (R4)+,TEMP5     ;SET STAT3
                                                CONVRT                  ;TYPE OUT STATUS MAP
                                                ,STATS                  ;
                                                BR      5$
                                        1$:     MOV     #DM.MAP,R0      ;R0 POINTS TO STATUS TABLE

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

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

```
 1175  002536  005711                  FLOAT:  TST     (R1)            ;CHECK ADDRESS IN R1
 1176  002540  111204                          MOVB    (R2),R4         ;IF NO TIMEOUT, GET NEXT ADDRESS
 1177  002542  060401                          ADD     R4,R1           ;IN R1
 1178  002544  005201                          INC     R1              ;
 1179  002546  040401                          BIC     R4,R1           ;
 1180  002550  005703                          TST     R3              ;ANY MORE DEVICES TO CHECK FOR?
 1181  002552  001371                          BNE     FLOAT           ;BR IF YES
 1182  002554  012703  002612  000004          MOV     #ERR,3#4        ;OK ONLY DMC'S ARE LEFT, SET UP FOR TIMEOUT
 1183  002560  005711                  FY:     TST     (R1)            ;CHECK DMC ADDRESS
 1184  002562  020137  001404                  CMP     R1,DMCSR        ;DOES IT MATCH
 1185  002566  001403                          BEQ     Ok              ;BR IF YES
 1186  002570  062701  000010                  ADD     #10,R1          ;GET NEXT DMC ADDRESS
 1187  002574  000771                          BR      FY              ;DO IT AGAIN
 1188  002576  062700  000010          Ok:     ADD     #10,R0          ;SKIP TO NEXT DMC CSR
 1189  002602  000720                          BR      ALSORT          ;CONTINUE
 1190  002604  122243                  NODEV:  CMPB    (R2)+,-(R3)     ;ON TIMEOUT, INC R2, DEC R3
 1191  002606  000002                          RTI                     ;RETURN
 1192  002610  005737  001252          ERR:    TST     TEMP3           ;CHECK FLAG IF = 0 TYPE HEADER
 1193  002614  001014                          BNE     1$              ;SKIP HEADER
 1194  002616  104402                          TYPE                    ;TYPEOUT HEADER MESSAGE
 1195  002620  007171                          CONERR                  ;CONFIGURATION ERROR!!!!
 1196  002622  012737  002612  001276          MOV     #ERR,SAVPC      ;SAVE PC FOR TYPEOUT
 1197  002630  104411                          CNVRT                   ;TYPE OUT ERROR PC
 1198  002632  002702                          ERRPC                   ;
 1199  002634  104402                          TYPE                    ;TYPE REST OF HEADER
 1200  002636  007233                          CNERR                   ;
 1201  002640  012737  177777  001252          MOV     #-1,TEMP3       ;SET FLAG SO IT ONLY GETS TYPED ONCE
 1202  002646  010137  001262          1$:     MOV     R1,SAVR1        ;SAVE R1 FOR TYPEOUT
 1203  002652  104410                          CONVRT                  ;
 1204  002654  002710                          CONTAB                  ;TYPE CSR VALUES
 1205  002656  005705                          TST     R5              ;DMC OR kMC ?
 1206  002660  001003                          BNE     3$              ;BR IF kMC
 1207  002662  104402                          TYPE                    ;
 1208  002664  007254                          DMCM                    ;
 1209  002666  000402                          BR      4$              ;CONTINUE
 1210  002670  104402                  3$:     TYPE                    ;
 1211  002672  007264                          kMCM                    ;
 1212  002674  022626                  4$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
 1213  002676  000737                          BR      OK              ;BR TO GET OUT
 1214  002700  000001                  ERRPC:  1
 1215  002702     006     002                  .BYTE   6,2
 1216  002704  001276                          SAVPC
 1217  002706  000002                  CONTAB: 2
 1218  002710     006     004                  .BYTE   6,4
 1219  002712  001262                          SAVR1
 1220  002714     006     002                  .BYTE   6,2
 1221  002716  001404                          DMCSR
 1222  002720     007                  DEVTAB: .BYTE   7               ;DJ
 1223  002721     017                          .BYTE   17              ;DH
 1224  002722     007                          .BYTE   7               ;DQ
 1225  002723     007                          .BYTE   7               ;DU
 1226  002724     007                          .BYTE   7               ;DUP
 1227  002725     007                          .BYTE   7               ;LK
 1228  002726     007                          .BYTE   7               ;DMC
 1229  002727     007                          .BYTE   7               ;DZ
 1230  002730     007                          .BYTE   7               ;KMC
```

```
                    002734                          .EVEN
002734  005705      AUDONE: TST     R5              ;DMC?
002736  001005              BNE     1$              ;BR IF KMC AND ALL DONE
002740  012705  177777      MOV     #-1,R5          ;SET R5 TO -1 (KMC
002744  012700  001500      MOV     #DM.MAP,R0      ;RESET R0 TO START OF TABLE
002750  000636              BR      AUSTRT          ;GO DO KMC'S
002752  012637  000006  1$: MOV     (SP)+,@#6       ;RESTORE LOC 6
002756  012637  000004      MOV     (SP)+,@#4       ;RESTORE LOC 4
002762  032737  000010  001236  BIT     #SW03,STRTSW    ;SELECT SPECIFIC DEVICES??
003006  001422              BEQ     3$              ;BR IF NO.
003010  104402  006070      TYPE    ,MNEW           ;TYPE THE MESSAGE.
003014  005000              CLR     R0              ;ZERO DATA LIGHTS
003016  000000              HALT                    ;WAIT FOR USER TO TELL WHAT DEVICES TO RUN
003020  027737  176174  001312  CMP     @SWR,SAVACT     ;IS THE NUMBER VALID?
003026  101404              BLOS    2$              ;BR IF NUMBER IS OK.
003030  104402  005731      TYPE    .MERR3          ;TELL USER OF INVALID NUMBER.
003034  000000              HALT                    ;STOP EVERY THING.
003036  000776              BR      .-2             ;RESTART THE PROGRAM AGAIN.
003040  017737  176154  001306  2$: MOV     @SWR,DMACTV     ;GET NEW DEVICE PATTERN
003046  013700  001306      MOV     DMACTV,R0       ;SHOW THE USER WHAT HE SELECTED.
003052  000000              HALT                    ;CONTINUE DYNAMIC SWITCHES.
003054  012700  000300  3$: MOV     #300,R0         ;PREPARE TO CLEAR THE FLOATING
003060  012701  000302      MOV     #302,R1         ;VECTOR AREA. 300-776
003064  010120          4$: MOV     R1,(R0)+        ;START PUTTING "PC+2 - HAL"
003066  005021              CLR     (R1)+           ;IN VECTOR AREA.
003070  022021              CMP     (R0)+,(R1)+     ;POP POINTERS
003072  022700  001000      CMP     #1000,R0        ;ALL DONE??
003076  001372              BNE     4$              ;BR IF NO.

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

003100  012706  001200  .BEGIN: MOV     #STACK,SP       ;SET UP STACK
003104  013746  000006      MOV     @#6,-(SP)       ;SAVE LOC 6
003110  013746  000004      MOV     @#4,-(SP)       ;SAVE LOC 4
003114  005000              CLR     R0              ;START AT 0
003116  012737  003144  000004  MOV     #2$,@#4         ;SET UP FOR TIME OUT
003124  005037  000006      CLR     @#6             ;TO AUTOSIZE MEMORY
003130  005720          6$: TST     (R0)+           ;CHECK ADDRESS IN R0
003132  022700  157776      CMP     #157776,R0      ;IS IT AT LEAST 28K
003136  001374              BNE     6$              ;BR IF NO
003140  162700  007776      SUB     #7776,R0        ;SAVE 2K FOR MONITORS
003144  010037  001304  7$: MOV     R0,MEM_LIM      ;STORE MEMORY LIMIT
003150  012637  000004      MOV     (SP)+,@#4       ;RESTORE LOC 4
003154  012637  000006      MOV     (SP)+,@#6       ;RESTORE LOC 6
003160  000413              BR      10$             ;CONTINUE
003162  022626          2$: CMP     (SP)+,(SP)+     ;ADJUST STACK
003164  162700  000__      SUB     #4,R0           ;GET LAST GOOD ADDRESS
003170  162700  007776      SUB     #7776,R0        ;SAVE 2K FOR MONITORS
003174  022700  030000      CMP     #30000,R0       ;IS IT 8K?
003200  001351              BNE     7$              ;BR IF NO
003202  012700  037400      MOV     #37400,R0       ;IF 8K DON'T SAVE 2K
003206  000756              BR      7$              ;
003210  012737  000340  177776  10$: MOV     #340,PS         ;LOCK OUT INTERRUPTS
003216  032737  000004  001236  BIT     #BIT2,STRTSW    ;CHECK FOR LOCK ON TEST
003224  001411              BEQ     1$              ;BR IF NO LOCK DESIRED.
```

F03


```
 1287  003210  104402  005767                          TYPE    ,MLOCK          ;TYPE LOCK SELECTED.
 1288  003214  012737  000240  003522                  MOV     #NOP,TTST       ;ADJUST SCOPE ROUTINE.
 1289  003222  012737  000240  003524                  MOV     #NOP,TTST+2     ;SET UP TO LOCK
 1290  003230  000406                                  BR      3$              ;CONTINUE ALONG.
 1291  003232  013737  003640  003522          1$:     MOV     BRW,TTST        ;PREPARE NORMAL SCOPE ROUTINE
 1292  003240  013737  003642  003524                  MOV     BRX,TTST+2      ;LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
 1293  003246  012737  007726  001214          3$:     MOV     #CYCLE,RETURN   ;START AT "CYCLE" FIND WHICH DEVICE TO TEST
 1294  003254  032737  000002  001236          4$:     BIT     #SW01,STRTSW    ;IS TEST NO. SELECTED?
 1295  003262  001002                                  BNE     5$              ;BR IF YES
 1296  003264  104402  005657                          TYPE    ,MR             ;TYPE R
 1297  003270  000177  175720                  5$:     JMP     @RETURN         ;START TESTING
```

```
 1298                                                   ;END OF PASS
 1299                                                   ;TYPE NAME OF TEST
 1300                                                   ;UPDATE PASS COUNT
 1301                                                   ;CHECK FOR EXIT TO ACT-11
 1302                                                   ;RESTART TEST
 1303
 1304  003274  000005                          .EOP:   RESET                   ;MAKE THE  WORLD CLEAN AGAIN.
 1305  003276  005037  001234                          CLR     LSTERR          ;CLEAR LAST ERROR PC
 1306  003302  105037  001335                          CLRB    ERRF_G          ;CLEAR ERROR FLAG
 1307  003306  005237  001230                          INC     PASCNT          ;UPDATE PASS COUNT
 1308  003312  013777  001230  175660                  MOV     PASCNT,@DISPLAY ;DISPLAY PASS COUNT
 1309  003320  104402  005635                          TYPE    ,MEPASS         ;TYPE END PASS
 1310  003324  104402  006016                          TYPE    ,MCSRX          ;TYPE CSR
 1311  003330  104411  003456                          CNVRT   ,XCSR           ;SHOW IT
 1312  003334  104402  006024                          TYPE    ,MVECX          ;TYPE VECTOR
 1313  003340  104411  003464                          CNVRT   ,XVEC           ;SHOW IT
 1314  003344  104402  006032                          TYPE    ,MPASSX         ;TYPE PASSES
 1315  003350  104411  003472                          CNVRT   ,XPASS          ;SHOW IT
 1316  003354  104402  006043                          TYPE    ,MERRX          ;TYPE ERRORS
 1317  003360  104411  003500                          CNVRT   ,XERR           ;SHOW IT
 1318  003364  013700  001322                          MOV     MILK,R0         ;GET POINTER TO PASS COUNT
 1319  003370  013720  001230                          MOV     PASCNT,(R0)+    ;STORE PASS COUNT FOR THIS DMC11
 1320  003374  013720  001232                          MOV     ERRCNT,(R0)+    ;STORE ERROR COUNT FOR THIS DMC11
 1321  003400  005337  001314                          DEC     SAVNUM          ;ARE ALL DEVICES TESTED?
 1322  003404  001017                                  BNE     RESTRT          ;BR IF NO.
 1323  003406  112737  000377  001327                  MOVB    #377,QV.FLG     ;SET THE QUICK VERIFY FLAG.
 1324  003414  013737  001310  001314                  MOV     DMNUM,SAVNUM    ;RESTORE THE COUNT
 1325  003422  013701  000042                          MOV     @#42,R1         ;CHECK FOR ACT-11 OR DDP
 1326  003426  001406                                  BEQ     RESTRT          ;IF NOT, CONTINUE TESTING
 1327  003430  000005                                  RESET                   ;STOP THE SHOW--CLEAR THE WORLD
 1328  003432                                  $ENDAD:
 1329  003432  004711                                  JSR     PC,(R1)
 1330  003434  000240                                  NOP
 1331  003436  000240                                  NOP
 1332  003440  000240                                  NOP
 1333  003442  000240                                  NOP
 1334  003444  012737  007726  001214          RESTRT: MOV     #CYCLE,RETURN
 1335  003452  000137  007726                          JMP     CYCLE
 1336  003456  000001                          XCSR:   1
 1337  003460      006     002                         .BYTE   6,2
 1338  003462  001404                                  DMCSR
 1339  003464  000001                          XVEC:   1
 1340  003466      004     002                         .BYTE   4,2
 1341  003470  001374                                  DMRVEC
 1342  003472  000001                          XPASS:  1
 1343  003474      006     002                         .BYTE   6,2
 1344  003476  001230                                  PASCNT
 1345  003500  000001                          XERR:   1
 1346  003502      006     002                         .BYTE   6,2
 1347  003504  001232                                  ERRCNT
 1348
 1349                                                  ;SCOPE LOOP AND INTERATION HANDLER
 1350                                                  ;--------------------------------
 1351
 1352  003506  004737  007470                  .SCOPE: JSR     PC,CKSWR        ;CKECK FOR SOFT SWR
 1353  003512  010016                                  MOV     R0,(SP)         ;SAVE R0 ON THE STACK
```

```
1354  003514  032777  040000  175460          TTST:   BIT     #BIT14,@SWR     ;"LOOP ON THIS TEST"?
1355  003522  001407                                  BEQ     1$              ;BR IF NO.  (IF LOCK SW01=1; THIS LOC =240)
1356  003524  000437                                  BR      3$              ;GOTO 3$    (IF LOCK SW01=1; THIS LOC =240)
1357  003526  105777  175452                          TSTB    @TKCSR          ;KEYBOAD DONE?
1358  003532  100034                                  BPL     3$              ;BR IF NO. (LOCK: HIT KEY TO GOTO NEXT TEST)
1359  003534  017700  175446                          MOV     @TKDBR,R0       ;CLEAR DONE BIT
1360  003540  000415                                  BR      2$              ;CONTINUE
1361  003542  032777  004000  175432          1$:     BIT     #SW11,@SWR      ;DELETE ITERATION?  (QUICK PASS)
1362  003550  001011                                  BNE     2$              ;BR IF YES
1363  003552  105737  001327                          TSTB    QV.FLG          ;HAVE PASSES BEECOMPLETED?
1364  003556  001406                                  BEQ     2$              ;BR IF QUICK PASS.
1365  003560  005237  001224                          INC     LPCNT           ;UPDATE ITERATION COUNTER
1366  003564  023737  001224  001222                  CMP     LPCNT,ICOUNT    ;ARE ALL ITERATIONS DONE??
1367  003572  101414                                  BLOS    3$              ;BR IF NOT YET
1368  003574  105037  001325          2$:     CLRB    ERRFLG          ;PREPARE FOR NEW TEST
1369  003600  005037  001224                  CLR     LPCNT           ;START ICOUNTER AT 0
1370  003604  005037  001220                  CLR     LOCK
1371  003610  012737  000020  001222                  MOV     #20,ICOUNT      ;RESET ITERATIONS
1372  003616  013737  001216  001214                  MOV     NEXT,RETURN     ;GET NEXT TEST
1373  003624  011600                          3$:     MOV     (SP),R0         ;POP R0 OFF OF THE STACK
1374  003626  022626                                  POP2SP                  ;FAKE AN "RTI"
1375  003630  013701  001404                          MOV     DMCSR,R1        ;R1 CONTAINS BASE DMC ADDRESS
1376  003634  000177  175354                          JMP     @RETURN         ;GO DO THE TEST
1377  003640  001407                          BRW:    1407
1378  003642  000437                          BRX:    437
1379
1380                                                  ;CHECK FOR FREEZE ON CURRENT DATA
1381                                                  ;-------------------------------
1382
1383  003644  004737  007470                  .SCOP1: JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
1384  003650  032777  001000  175324                  BIT     #SW09,@SWR      ;IS SW09=1(SET)?
1385  003656  001405                                  BEQ     1$              ;BR IF NOT SET.
1386  003660  005737  001220                          TST     LOCK
1387  003664  001402                                  BEQ     1$
1388  003666  013716  001220                          MOV     LOCK,(SP)       ;GOTO THE ADDRESS IN LOCK.
1389  003672  000002                          1$:     RTI                     ;GO BACK.
1390
1391                                                  ;TELETYPE OUTPUT ROUTINE
1392                                                  ;----------------------
1393
1394  003674  010546                          .TYPE:  MOV     R5,-(SP)        ;SAVE R5 ON THE STACK.
1395  003676  017605  000002                          MOV     @2(SP),R5       ;GET ADDRESS OF MESSAGE.
1396  003702  062766  000002  000002                  ADD     #2,2(SP)        ;POP OVER ADDRESS.
1397  003710  005737  007664                  4$:     TST     SWFLG           ;SOFT SWR MESSAGE?
1398  003714  001004                                  BNE     1$              ;IF YES TYPE IT OUT REGARDLESS OF SW12
1399  003716  032777  010000  175256                  BIT     #SW12,@SWR      ;INHIBIT ALL PRINT OUT??
1400  003724  001012                                  BNE     3$              ;BR IF NO PRINT OUT WANTED (SW12=1)
1401  003726  105715                          1$:     TSTB    (R5)            ;IS NUMBER MINUS? (MSB=1(BIT7))
1402  003730  100002                                  BPL     2$              ;BR IF NUMBER IS PLUS
1403  003732  104402  005574                          TYPE    ,MCRLF          ;TYPE A CR/LF!
1404  003736  105777  175246                  2$:     TSTB    @TPCSR          ;TTY READY?
1405  003742  100375                                  BPL     2$              ;BR IF NO.
1406  003744  112577  175242                          MOVB    (R5)+,@TPDBR    ;PRINT CURRENT CHAR.
1407  003750  001357                                  BNE     4$              ;IF NOT ZERO KEEP PRINTING!
1408  003752  012605                          3$:     MOV     (SP)+,R5        ;END OF OUTPUT. RESTORE R5
1409  003754  000002                                  RTI                     ;GO HOME
```

```
1410                                                    ;-------------------------
1411
1412  003756  010346                          .INSTR:   MOV     R3,-(SP)        ;SAVE R3 ON STACK
1413  003760  010446                                    MOV     R4,-(SP)        ;SAVE R4 ON STACK
1414  003762  017637  000004  004000                    MOV     @4(SP),.MSG
1415  003770  062766  000002  000004                    ADD     #2,4(SP)
1416  003776  104402                          .INST1:   TYPE
1417  004000  000000                          .MSG:     0
1418  004002  012704  007322                           MOV     #INBUF,R4
1419  004006  012703  000007                           MOV     #7,R3
1420  004012  105777  175166                 1$:       TSTB    @TKCSR
1421  004016  100375                                    BPL     1$
1422  004020  117714  175162                           MOVB    @TKDBR,(R4)
1423  004024  142714  000200                           BICB    #200,(R4)
1424  004030  122427  000015                           CMPB    (R4)+,#15
1425  004034  001417                                    BEQ     INSTR2
1426  004036  105777  175146                 2$:       TSTB    @TPCSR
1427  004042  100375                                    BPL     2$
1428  004044  017777  175136  175140                    MOV     @TKDBR,@TPDBR
1429  004052  005303                                    DEC     R3
1430  004054  001356                                    BNE     1$
1431  004056  012604                                    MOV     (SP)+,R4
1432  004060  012603                                    MOV     (SP)+,R3
1433  004062  104402  005570                 .INSTE:   TYPE    ,MQM
1434  004066  010346                                    MOV     R3,-(SP)
1435  004070  010446                                    MOV     R4,-(SP)
1436  004072  000741                                    BR      .INST1
1437  004074  012604                          INSTR2:   MOV     (SP)+,R4        ;RESTORE R4
1438  004076  012603                                    MOV     (SP)+,R3        ;RESTORE R3
1439  004100  000002                                    RTI
1440
1441                                                    ;CONVERT ASCII STRING TO OCTAL
1442                                                    ;-----------------------------
1443
1444  004102  010546                          .PARAM:   MOV     R5,-(SP)
1445  004104  010446                                    MOV     R4,-(SP)
1446  004106  016605  000004                           MOV     4(SP),R5
1447  004112  012537  004272                           MOV     (R5)+,LOLIM
1448  004116  012537  004274                           MOV     (R5)+,HILIM
1449  004122  012537  004276                           MOV     (R5)+,DEVADR
1450  004126  112537  004300                           MOVB    (R5)+,LOBITS
1451  004132  112537  004301                           MOVB    (R5)+,ADRCNT
1452  004136  010566  000004                           MOV     R5,4(SP)
1453  004142  005005                          PARAM1:   CLR     R5
1454  004144  012704  007322                           MOV     #INBUF,R4
1455  004150  122714  000015                           CMPB    #15,(R4)
1456  004154  001420                                    BEQ     PARERR
1457  004156  121427  000060                 1$:       CMPB    (R4),#60
1458  004162  002415                                    BLT     PARERR
1459  004164  121427  000067                           CMPB    (R4),#67
1460  004170  003012                                    BGT     PARERR
1461  004172  142714  000060                           BICB    #60,(R4)
1462  004176  152405                                    BISB    (R4)+,R5
1463  004200  122714  000015                           CMPB    #15,(R4)
1464  004204  001406                                    BEQ     LIMITS
1465  004206  006305                                    ASL     R5
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```
1466  004210  006305                          ASL     R5
1467  004212  006305                          ASL     R5
1468  004214  000760                          BR      1$
1469  004216  104404                PARERR:   INSTER
1470  004220  000750                          BR      PARAM1
1471
1472                                          ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
1473                                          ;--------------------------------------
1474
1475  004222  020537  004274        LIMITS:   CMP     R5,HILIM
1476  004226  101373                          BHI     PARERR
1477  004230  020537  004272                  CMP     R5,LOLIM
1478  004234  103770                          BLO     PARERR
1479  004236  133705  004300                  BITB    LOBITS,R5
1480  004242  001365                          BNE     PARERR
1481
1482                                          ;STORE NUMBER AT SPECIFIED ADDRESS
1483
1484  004244  013704  004276                  MOV     DEVADR,R4
1485  004250  010524                1$:       MOV     R5,(R4)+
1486  004252  062705  000002                  ADD     #2,R5
1487  004256  105337  004301                  DECB    ADRCNT
1488  004262  001372                          BNE     1$
1489  004264  012604                          MOV     (SP)+,R4
1490  004266  012605                          MOV     (SP)+,R5
1491  004270  000002                          RTI
1492  004272  000000                LOLIM:    0
1493  004274  000000                HILIM:    0
1494  004276  000000                DEVADR:   0
1495  004300  000000                LOBITS:   0
1496          004301                ADRCNT=LOBITS+1
1497
1498                                          ;SAVE PC OF TEST THAT FAILED AND R0-R5
1499                                          ;------------------------------------
1500
1501  004302  016637  000004  001276  .SAVOS:  MOV     4(SP),SAVPC     ;SAVE R7 (PC)
1502
1503                                          ;SAVE R0-R5
1504
1505  004310  010537  001272        SVOS:     MOV     R5,SAVR5        ;SAVE R5
1506  004314  010437  001270                  MOV     R4,SAVR4        ;SAVE R4
1507  004320  010337  001266                  MOV     R3,SAVR3        ;SAVE R3
1508  004324  010237  001264                  MOV     R2,SAVR2        ;SAVE R2
1509  004330  010137  001262                  MOV     R1,SAVR1        ;SAVE R1
1510  004334  010037  001260                  MOV     R0,SAVR0        ;SAVE R0
1511  004340  000002                          RTI                     ;LEAVE.
1512
1513                                          ;RESTORE R0-R5
1514
1515  004342  013700  001260        .RESOS:   MOV     SAVR0,R0        ;RESTORE R0
1516  004346  013701  001262                  MOV     SAVR1,R1        ;RESTORE R1
1517  004352  013702  001264                  MOV     SAVR2,R2        ;RESTORE R2
1518  004356  013703  001266                  MOV     SAVR3,R3        ;RESTORE R3
1519  004362  013704  001270                  MOV     SAVR4,R4        ;RESTORE R4
1520  004366  013705  001272                  MOV     SAVR5,R5        ;RESTORE R5
1521  004372  000002                          RTI                     ;LEAVE
```

```
1522
1523                                                    ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
1524                                                    ;-----------------------------------------------------
1525
1526  004274  104402  005574              .CONVR: TYPE    ,MCRLF
1527  004300  010046                      .CNVRT: MOV     R0,-(SP)
1528  004302  010146                              MOV     R1,-(SP)
1529  004304  010346                              MOV     R3,-(SP)
1530  004306  010446                              MOV     R4,-(SP)
1531  004310  010546                              MOV     R5,-(SP)
1532  004312  017601  000012                      MOV     @12(SP),R1
1533  004316  062766  000002  000012              ADD     #2,12(SP)
1534  004324  012137  004616                      MOV     (R1)+,WRDCNT
1535  004330  112137  004620              1$:     MOVB    (R1)+,CHRCNT
1536  004334  112137  004621                      MOVB    (R1)+,SPACNT
1537  004340  013137  004622                      MOV     @(R1)+,BINWRD
1538  004344  122737  000003  004620              CMPB    #3,CHRCNT
1539  004352  001003                              BNE     2$
1540  004354  042737  177400  004622              BIC     #177400,BINWRD
1541  004362  013704  004622              2$:     MOV     BINWRD,R4
1542  004366  113705  004620                      MOVB    CHRCNT,R5
1543  004372  012700  007364                      MOV     #TEMP,R0
1544  004376  010403                      3$:     MOV     R4,R3
1545  004500  042703  177770                      BIC     #177770,R3
1546  004504  062703  000060                      ADD     #060,R3
1547  004510  110320                              MOVB    R3,(R0)+
1548  004512  000241                              CLC
1549  004514  006004                              ROR     R4
1550  004516  000241                              CLC
1551  004520  006004                              ROR     R4
1552  004522  000241                              CLC
1553  004524  006004                              ROR     R4
1554  004526  005305                              DEC     R5
1555  004530  001362                              BNE     3$
1556  004532  012703  007426                      MOV     #MDATA,R3
1557  004536  114023                      4$:     MOVB    -(R0),(R3)+
1558  004540  105337  004620                      DECB    CHRCNT
1559  004544  001374                              BNE     4$
1560  004546  105737  004621                      TSTB    SPACNT
1561  004552  001405                              BEQ     6$
1562  004554  112723  000040              5$:     MOVB    #040,(R3)+
1563  004560  105337  004621                      DECB    SPACNT
1564  004564  001373                              BNE     5$
1565  004566  105013                      6$:     CLRB    (R3)
1566  004570  104402  007426                      TYPE    ,MDATA
1567  004574  005337  004616                      DEC     WRDCNT
1568  004600  001313                              BNE     1$
1569  004602  012605                              MOV     (SP)+,R5
1570  004604  012604                              MOV     (SP)+,R4
1571  004606  012603                              MOV     (SP)+,R3
1572  004610  012601                              MOV     (SP)+,R1
1573  004612  012600                              MOV     (SP)+,R0
1574  004614  000002                              RTI
1575  004616  000000                      WRDCNT: 0
1576  004620  000000                      CHRCNT: 0
1577          004621                      SPACNT=CHRCNT+1
```

```
 1578  004622  000000                          BINWRD: 0
 1579
 1580
 1581                                                  ;TRAP DISPATCH SERVICE
 1582                                                  ;ARGUMENT OF TRAP IS EXTRACTED
 1583                                                  ;AND USED AS OFFSET TO OBTAIN POINTER
 1584                                                  ;TO SELECTED SUBROUTINE
 1585
 1586  004624  011646                          .TRPSR: MOV     (SP),-(SP)      ;GET PC OF RETURN
 1587  004626  162716  000002                         SUB     #2,(SP)         ;=PC OF TRAP
 1588  004632  017616  000000                         MOV     @(SP),(SP)      ;GET TRP
 1589  004636  006316                          TRPOK:  ASL     (SP)            ;MULTIPLY TRAP ARG BY 2
 1590  004640  042716  177001                         BIC     #177001,(SP)    ;CLEAR UNWANTED BITS
 1591  004644  062716  001330                         ADD     #.TRPTAB,(SP)   ;POINTER TO SUBROUTINE ADDRESS
 1592  004650  017616  000000                         MOV     @(SP),(SP)      ;SUBROUTINE ADDRESS
 1593  004654  000136                              JMP     @(SP)+          ;GO TO SUBROUTINE
 1594
 1595                                                  ;ERROR HANDLER
 1596                                                  ;-------------
 1597
 1598  004656  004737  007470                  .HLT:   JSR     PC,CKSWR        ;CHECK FOR SOFT SWR
 1599  004662  032777  010000  174312                  BIT     #SW12,@SWR      ;BELL ON ERROR?
 1600  004670  001406                              BEQ     XBX             ;BR IF NO BELL
 1601  004672  105777  174312                      TSTB    @TPCSR          ;TTY READY.
 1602  004676  100003                              BPL     XBX             ;DON'T WAIT IF TTY NOT READY.
 1603  004700  112777  000207  174304              MOVB    #207,@TPDBR     ;PUSH A BELL AT THE TTY.
 1604  004706  032777  020000  174266      XBX:    BIT     #SW13,@SWR      ;DELETE ERROR PRINT OUT?
 1605  004714  001105                              BNE     HALTS           ;BR IF NO PRINT OUT WANTED.
 1606  004716  021637  001234                      CMP     (SP),LSTERR     ;WAS THIS ERROR FOUND LAST TIME?
 1607  004722  001404                              BEQ     1$              ;BR IF YES
 1608  004724  011637  001234                      MOV     (SP),LSTERR     ;RECORD BEING HERE
 1609  004730  105037  001325                      CLRB    ERRFLG          ;PREPARE HEADER
 1610  004734  104406                          1$:     SAV05                   ;SAVE ALL PROC REGISTERS
 1611  004736  011605                              MOV     (SP),R5         ;GET THE PC OF ERROR
 1612  004740  162705  000002                      SUB     #2,R5           ;GET ADDRESS OF TRAP CALL
 1613  004744  011504                              MOV     (R5),R4         ;GET HLT INSTRUCTION
 1614  004746  006304                              ASL     R4              ;MULT BY TWO
 1615  004750  061504                              ADD     (R5),R4         ;DOUBLE IT
 1616  004752  006304                              ASL     R4              ;MULT AGAIN
 1617  004754  042704  177001                      BIC     #177001,R4      ;CLEAR JUNK
 1618  004760  062704  031452                      ADD     #.ERRTAB,R4     ;GET POINTER
 1619  004764  012437  005100                      MOV     (R4)+,ERRMSG    ;GET ERROR MESSAGE
 1620  004770  012437  005112                      MOV     (R4)+,DATAHD    ;GET DATA HEADRER
 1621  004774  011437  005124                      MOV     (R4),DATABP     ;GET DATA TABLE
 1622  005000  105737  001325                      TSTB    ERRFLG          ;TYPE HEADREER
 1623  005004  001403                              BEQ     TYPMSG          ;BR IF YES
 1624  005006  005737  005124                      TST     DATABP          ;DOES DATA TABLE EXIST?
 1625  005012  001040                              BNE     TYPDAT          ;BR IF YES.
 1626  005014  104402  005574          TYPMSG:     TYPE    ,MCRLF
 1627  005020  104402  005574                      TYPE    ,MCRLF
 1628  005024  005737  001220                      TST     LOCK
 1629  005030  001402                              BEQ     1$
 1630  005032  104402  006066                      TYPE    ,MASTER
 1631  005036  104402  006054          1$:         TYPE    ,MTSTN
 1632  005042  104411  005232                      CNVRT   ,XTSTN          ;SHOW IT
 1633  005046  104402  006143                      TYPE    ,MERRPC         ;TYPE PC.
```

```
1634  005052  104411  005224                          CNVRT   ,ERTABO         ;SHOW IT
1635  005056  104402  005574                          TYPE    ,MCRLF          ;GIVE A CR/LF
1636  005062  112737  177777  001325                  MOVB    #-1,ERRFLG      ;NO MORE HEADER UNLESS NO DATA TABLE.
1637  005070  005737  005100                          TST     ERRMSG          ;IS THERE AN ERROR MESSAGE?
1638  005074  001402                                  BEQ     WRK0.FM         ;BR IF NO.
1639  005076  104402                                  TYPE                    ;TYPE
1640  005100  000000                      ERRMSG:    0                       ;    ERROR MESSAGE
1641  005102                               WRK0.FM:
1642  005102  005737  005112                          TST     DATAHD          ;DATA HEADER?
1643  005106  001402                                  BEQ     TYPDAT          ;BR IF NO
1644  005110  104402                                  TYPE                    ;TYPE
1645  005112  000000                      DATAHD:    0                       ;    DATA HEADER
1646  005114  005737  005124               TYPDAT:    TST     DATABP          ;DATA TABLE?
1647  005120  001402                                  BEQ     RESREG          ;BR IF NO.
1648  005122  104410                                  CONVRT                  ;SHOW
1649  005124  000000                      DATABP:    0                       ;    DATA TABLE
1650  005126  104407                      RESREG:    RESCS                   ;RESTORE PROC REGISTERS
1651  005130  022737  003432  000042      HALTS:     CMP     #$ENDAD,@#42    ;IF ACT-11 AUTOMATIC MODE, HALT!!
1652  005136  001403                                  BEQ     1$
1653  005140  005777  174036                          TST     @SWR            ;HALT ON ERROR?
1654  005144  100005                                  BPL     EXITER          ;BR IF NO HALT ON ERROR
1655  005146  010046                      1$:        PUSHRO                  ;SAVE RO
1656  005150  016600  000002                          MOV     2(SP),RO        ;SHOW ERROR PC IN DATA LIGHTS
1657  005154  000000                                  HALT                    ;HALT
1658  005156  012600                                  POPRO                   ;GET RO
1659  005160  005237  001232               EXITER:    INC     ERRCNT          ;UPDATE ERROR COUNT
1660  005164  032777  000400  174010                  BIT     #SW08,@SWR      ;GOTO TOP OF TEST?
1661  005172  001007                                  BNE     1$              ;BR IF YES
1662  005174  032777  002000  174000                  BIT     #SW10,@SWR      ;GOTO NEXT TEST?
1663  005202  001407                                  BEQ     2$              ;BR IF NO
1664  005204  013737  001216  001214                  MOV     NEXT,RETURN     ;SET FOR NEXT TEST
1665  005212  012706  001200                1$:        MOV     #STACK,SP       ;RESET SP
1666  005216  000177  173772                          JMP     @RETURN         ;GOTO SPECIFIED TEST
1667  005222  000002                      2$:        RTI                     ;RETURN
1668  005224  000001                      ERTABO:    1
1669  005226     006     002                          .BYTE   6,2
1670  005230  001276                                  SAVPC
1671  005232  000001                      XTSTN:     1
1672  005234     003     002                          .BYTE   3,2
1673  005236  001226                                  TSTNO
1674                                                  ;ENTER HERE ON POWER FAILURE
1675                                                  ;--------------------------
1676
1677
1678  005240                               .PFAIL:
1679  005240  012737  005252  000024                  MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
1680  005246  000000                                  HALT                            ;HALT ON POWER DOWN NORMAL
1681  005250  000777                                  BR      .
1682
1683                                                  ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
1684
1685  005252                               RESTAR:
1686  005252  012737  005240  000024                  MOV     #.PFAIL,24      ;SET UP FOR POWER FAILURE
1687  005260  012706  001200                          MOV     #STACK,SP       ;RESET THE STACK POINTER
1688  005264  013701  001404                          MOV     DMCSR,R1        ;RESTORE R1
1689  005270  005037  007364                          CLR     TEMP            ;READY FOR TIMMER
```

```
1690  005274  005237  007364                  INC     TEMP            ;PLUS ONE TO THE TIMER!
1691  005300  001375                          BNE     .-4             ;BR IF MORE TO GO
1692  005302  104402  005577                  TYPE    .MPFAIL         ;TYPE THE MESSAGE
1693  005306  104411  005332                  ^NVRT   PFTAB           ;TELL WHAT TEST TO RETURN TO.
1694  005312  105037  001325                  CLRB    ERRFLG          ;START CLEAN
1695  005316  105037  001234                  CLR     LOOPER          ;
1696  005322  005011                          CLR     (R1)            ;CLEAR MAINT BITS
1697  005324  104412                          MSTCLR                  ;START CLEAN UP OF DEVICE
1698  005326  000177  173662                  JMP     @RETURN         ;START DOING THAT TEST AGAIN.
1699  005332  000001                  PFTAB:  1
1700  005334     003     002          .BYTE   3,2
1701  005336  001226                          TSTNO
1702
1703  005340                          .DELAY:
1704  005340  012777  000020  174044          MOV     #20,@DMP04
1705  005346  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1706  005350  121111                          121111                  ;POKE CLOCK DELAY BIT
1707  005352                          1$:
1708  005352  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
1709  005354  121224                          121224                  ;PORT4←IBUS*11
1710  005356  032777  000020  174026          BIT     #BIT4,@DMP04    ;IS CLOCK BIT SET?
1711  005364  001772                          BEQ     1$              ;BR IF NO
1712  005366  000002                          RTI
1713
1714  005370                          .MSTCLR:
1715  005370  152777  000100  174010          BISB    #BIT6,@DMCSRH   ;SET MASTER CLEAR
1716  005376  142777  000300  174002          BICB    #BIT6!BIT7,@DMCSRH  ;CLEAR MASTER CLEAR AND RLN
1717  005404  000002                          RTI                     ;RETURN
1718
1719  005406                          .ROMCLK:
1720  005406  152777  000002  173772          BISB    #BIT1,@DMCSRH   ;SET ROMI
1721  005414  013677  173774                  MOV     @(SP)+,@DMP06   ;LOAD INSTRUCTION IN SEL6
1722  005420  062746  000002                  ADD     #2,-(SP)        ;ADJUST STACK
1723  005424  032777  000100  173550          BIT     #SW06,@SWR      ;HALT IF SW06 =1
1724  005432  001401                          BEQ     1$              ;BR IF SW06 =0
1725  005434  000000                          HALT                    ;HALT BEFORE CLOCKING INSTRUCTION
1726  005436  152777  000003  173742  1$:     BISB    #BIT1!BIT0,@DMCSRH ;CLOCK INSTRUCTION
1727  005444  142777  000007  173734          BICB    #BIT2!BIT1!BIT0,@DMCSRH  ;CLEAR ROMO, ROMI, STEP
1728  005452  000002                          RTI
1729
1730  005454                          .DATACLK:
1731  005454  013637  007364                  MOV     @(SP)+,TEMP     ;PUT TICK COUNT IN TEMP
1732  005460  062746  000002                  ADD     #2,-(SP)        ;ADJUST STACK
1733  005464  152777  000020  173714  1$:     BISB    #BIT4,@DMCSRH   ;SET STEP LU
1734  005472  027777  173706  173704          CMP     @DMCSR,@DMCSR   ;WASTE TIME
1735  005500  142777  000020  173700          BICB    #BIT4,@DMCSRH   ;CLEAR STEP LU
1736  005506  005337  007364                  DEC     TEMP            ;DEC TICK COUNT
1737  005512  001364                          BNE     1$              ;BR IF NOT DONE
1738  005514  000002                          RTI                     ;RETURN
1739  005516  000001                  3$:     .BLKW 1
1740
1741  005520                          .TIMER:
1742  005520  013637  007364                  MOV     @(SP)+,TEMP     ;MOVE COUNT TO TEMP
1743  005524  062746  000002                  ADD     #2,-(SP)        ;ADJUST STACK
1744  005530                          1$:
1745  005530  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

B04


```
                                                        021364                  ;PORT4←IBUS# REG11
                                                        BIT     #2,3DMP04       ;IS PGM CLOCK BIT CLEAR?
                                                        BEQ     1$              ;BR IF YES
                                                2$:
                                                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
                                                        021364                  ;PORT4←IBUS# REG11
                                                        BIT     #2,3DMP04       ;IS PGM CLOCK BIT SET?
                                                        BNE     2$              ;BR IF YES
                                                        DEC     #EMP            ;DEC COUNT
                                                        BNE     1$              ;BR IF NOT DONE
                                                        RTI                     ;RETURN

                                                MGM:    .ASCIZ  /  ?/
                                                MCRLF:  .ASCIZ  <15><12>
                                                MPFAIL: .ASCIZ  <377>/PWR FAILED. RESTART AT TEST /
                                                MEPASS: .ASCIZ  <377>/END PASS DZDME  /
                                                MR:     .ASCIZ  <377>/R/
                                                MERR2:  .ASCIZ  <377>/PROGRAM INDICATES NO DEVICES PRESENT./
                                                MERR3:  .ASCIZ  <377>/INSUFFICIENT DATA!/
                                                MTSTPC: .ASCIZ  <377>/TEST PC-/
                                                MLOCK:  .ASCIZ  <377>/LOCK ON SELECTED TEST/
                                                MCSRX:  .ASCIZ  /CSR: /
                                                MVECX:  .ASCIZ  /VEC: /
                                                MPASSX: .ASCIZ  /PASSES:
                                                MERRX:  .ASCIZ  /ERRORS: /
                                                MTSTN:  .ASCIZ  /TEST NO: /
                                                MASTER: .ASCIZ  /*/
                                                MNEW:   .ASCIZ  <377> SET SWITCH REG TO DMC11'S DESIRED ACTIVE./
                                                MERRPC: .ASCIZ  /PC:
                                                XHEAD:  .ASCII  <212>           MAP OF DMC11 STATUS/
                                                        .ASCII  <3>             ------------------/
                                                        .ASCII  <212>/  PC      CSR     STAT1   STAT2   STAT3/
                                                        .ASCIZ  <377>/------  ------  ------  ------  ------/
                                                NUM:    .ASCIZ  <377>/HOW MANY DMC11'S TO BE TESTED?/
                                                CSR:    .ASCIZ  <377>/CSR ADDRESS?/
                                                .EC:    .ASCIZ  <377>/VECTOR ADDRESS?/
                                                PRIO:   .ASCIZ  <377>/BR PRIORITY LEVEL? (4,5,6,7)?/
                                                CRAM:   .ASCIZ  <377>/IF DMC HAS CRAM (M8204) TYPE "Y", IF CROM (M8203) TYPE "N"
                                                MODU:   .ASCIZ  <377>/WHICH LINE UNIT? IF NONE TYPE "N", IF M820: TYPE "-", IF ..
                                                LINE:   .ASCIZ  <377>/SWITCH PAC#1 (DDCMP LINE #)?/
                                                BM:     .ASCIZ  <377>/SWITCH PAC#2 (BM873 BOOT ADD..?/
                                                CONN:   .ASCIZ  <377>/IS THE LOOP BACK CONNECTOR ON?
                                                NOACT:  .ASCIZ  <377>/PROGRAM INDICATES NO DEVICES ARE SELECTED
                                                SWMES:  .ASCIZ  <377><12>/SWR=
                                                SWMES1: .ASCIZ  /NEW? /
                                                CONERR: .ASCIZ  <377><377>/DMC11 CONFIGURATION ERROR  PC:
                                                CMERR:  .ASCIZ  <377>/EXPECTED  FOUND
                                                DMCM:   .ASCIZ  / (DMC)/
                                                KMCM:   .ASCIZ  / (KMC)/
                                                .EVEN
                                                XSTATQ: 5
                                                        .BYTE   6,3
                                                        TEMP1
                                                        .BYTE   6,3
                                                        TEMP2
                                                        .BYTE   6,3
```

```
007310  001252                                  TEMP3
007312     006     003                          .BYTE   6.3
007314  001254                                  TEMP4
007316     006     002                          .BYTE   6.2
007320  001256                                  TEMP5
                                        .EVEN

                                        ;BUFFERS FOR INPUT-OUTPUT

007322  000000                          INBUF:  0
                                        .=.+40
007364  000000                          TEMP:   0
                                        .=.+40
007426  000000                          MDATA:  0
                                        .=.+40


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

007470  022737  000176  001202          CKSWR:  CMP     #SWREG,SWR      ;IS THE SOFT SWR BEING USED?
007476  001003                                  BNE     CKSWR5          ;BR IF NO
007500  022737  000007  171500                  CMP     #7,@TKDBR       ;WAS CTRL G TYPED? (7 BIT ASCII)
007506  001404                                  BEQ     1$              ;BR IF YES
007510  022737  000207  171470                  CMP     #207,@TKDBR     ;WAS CTRL G TYPED? (8 BIT ASCII)
007516  001061                                  BNE     CKSWR5          ;BR IF NO
007520  010246                          1$:     MOV     R2,-(SP)        ;STORE R2
007522  010346                                  MOV     R3,-(SP)        ;STORE R3
007524  010446                                  MOV     R4,-(SP)        ;STORE R4
007526  012737  177777  007664                  MOV     #-1,SWFLG       ;SET SOFT TYPE OUT FLAG
007534  005002                          CKSWR1: CLR     R2              ;CLEAR NEW SWR CONTENTS
007536  012704  177777                          MOV     #-1,R4          ;SET FLAG TO ALL ONES
007542  104402  007153                          TYPE    ,SWMES          ;TYPE "SWR= "
007546  104411                          CKSWR2: CNVRT                   ;TYPE OUT PRESENT CONTENTS
007550  007720                                  SOFTSW                  ;OF SOFT SWITCH REGISTER
007552  104402  007163                  CKSWR3: TYPE    ,SWMES1         ;TYPE "NEW? "
007556  004737  007666                  CKSWR4: JSR     PC,INCHAR       ;GET RESPONSE
007562  022703  000015                          CMP     #15,R3          ;WAS IT A CR?
007566  001424                                  BEQ     5$              ;BR IF YES
007570  022703  000012                          CMP     #12,R3          ;WAS IT A LF?
007574  001416                                  BEQ     4$              ;BR IF YES
007576  022703  000025                          CMP     #25,R3          ;WAS IT CTRL U?
007602  001754                                  BEQ     CKSWR1          ;BR IF YES(START OVER)
007604  022703  000007                          CMP     #7,R3           ;IF CNTL G GET NEXT CHAR
007610  001762                                  BEQ     CKSWR4
007612  005004                                  CLR     R4              ;IT MUST BE A DIGIT SO CLR FLAG
007614  042703  177770                          BIC     #177770,R3      ;ONLY 0-7 ARE LEGAL SO MASK OFF BITS
007620  006303                                  ASL     R3              ;SHIFT R3 3 TIMES
007622  006302                                  ASL     R2
007624  006302                                  ASL     R2
007626  050302                                  BIS     R3,R2           ;ADD LAST DIGIT
007630  000757                                  BR      CKSWR4          ;GET NEXT CHARACTER
007632  012766  002302  000006          4$:     MOV     #.START,6(SP)   ;LF WAS TYPED SO GO TO START
007640  005704                          5$:     TST     R4              ;IS FLAG CLEAR?
007642  001004                                  BNE     6$              ;IF NOT DON'T CHANGE SOFT SWR
```

D04


```
 1820  007644  010277  171332                 MOV     R2,@SWR         ;IF YES THEN WRITE NEW CONTENTS TO SOFT SWR
 1821  007650  005037  007664         6$:     CLR     SWFLG           ;CLEAR TYPEOUT FLAG
 1822  007654  012604                         MOV     (SP)+,R4        ;RESTORE R4
 1823  007656  012603                         MOV     (SP)+,R3        ;RESTORE R3
 1824  007660  012602                         MOV     (SP)+,R2        ;RESTORE R2
 1825  007662  000207                 CKSWR5: RTS     PC              ;RETURN
 1826
 1827  007664  000000                 SWFLG:  0
 1828
 1829  007666  105777  171312         INCHAR: TSTB    @TKCSR
 1830  007672  100375                         BPL     .-4
 1831  007674  017703  171306                 MOV     @TKDBR,R3
 1832  007700  105777  171304                 TSTB    @TPCSR
 1833  007704  100375                         BPL     .-4
 1834  007706  010377  171300                 MOV     R3,@TPDBR
 1835  007712  042703  000200                 BIC     #BIT7,R3
 1836  007716  000207                         RTS     PC
 1837
 1838  007720  000001                 SOFTSW: 1
 1839  007722      006      002                .BYTE   6,2
 1840  007724  000176                         SWREG
```

```
                                                        ;
                                                        ;ROUTINE USED TO "CYCLE" THROUGH UP TO 16 DMC11'S
                                                        ;THIS ROUTINE SETS UP THE CONTROL ADDRESS FOR THE DIAGNOSTIC
                                                        ;AND RUNS THE SPECIFIED DMC11'S.  THIS ROUTINE *MUST*
                                                        ;BE RUN FIRST BEFORE ENTERING THE DIAGNOSTIC FOR THE
                                                        ;SETUP NECESSARY.
                                                        ;
007726  005737  001306          CYCLE:  TST     DMACTV          ;ARE ANY DMC11'S TO BE TESTED?
007732  001004                          BNE     1$              ;BR IF OK.
007734  104402  007100                  TYPE    ,NOACT          ;NO DMC11'S SELECTED!!
007740  000000                          HALT                    ;STOP THE SHOW.
007742  000776                          BR      .-2             ;DISQUALIFY CONT. SW.
007744  000241                  1$:     CLC                     ;CLEAR PROC. CARRY BIT.
007746  006137  001316                  ROL     RUN             ;UPDATE POINTER
007752  005537  001316                  ADC     RUN             ;CATCH CARRY FROM RUN
007756  062737  000004  001322          ADD     #4,MILK         ;UPDATE POINTER
007764  062737  000010  001320          ADD     #10,CREAM       ;UPDATE ADDRESS POINTER.
007772  022737  001700  001320          CMP     #DM.MAP+200,CREAM
010000  001006                          BNE     2$              ;KEEP GOING; NOT ALL TESTED FOR.
010002  012737  001500  001320          MOV     #DM.MAP,CREAM   ;RESET ADDRESS POINTER.
010010  012737  001702  001322          MOV     #CNT.MA.,MILK   ;RESET PASS COUNT POINTER
010016  033737  001316  001306  2$:     BIT     RUN,DMACTV      ;IS THIS ONE ACTIVE?
010024  001747                          BEQ     1$              ;BR IF NO
010026  013700  001320                  MOV     CREAM,R0        ;GET ADDRESS POINTER
010032  013702  001322                  MOV     MILK,R2         ;GET PASS COUNT POINTER
010036  012037  001404                  MOV     (R0)+,DMCSR     ;LOAD SYSTEM CTRL. REG
010042  011037  001374                  MOV     (R0),DMRVEC     ;LOAD VECTOR
010046  042737  177000  001374          BIC     #177000,DMRVEC  ;CLEAR UNWANTED BITS
010054  012037  001366                  MOV     (R0)+,STAT1     ;LOAD STAT1
010060  012037  001370                  MOV     (R0)+,STAT2     ;LOAD STAT2
010064  012037  001372                  MOV     (R0)+,STAT3     ;LOAD STAT3
010070  012237  001230                  MOV     (R2)+,PASCNT    ;LOAD PASS COUNT
010074  012237  001232                  MOV     (R2)+,ERRCNT    ;LOAD ERROR COUNT
010100  012700  000002                  MOV     #2,R0           ;SAVE CORE THIS WAY!
010104  013737  001404  001406          MOV     DMCSR,DMCSRH
010112  005237  001406                  INC     DMCSRH
010116  013737  001406  001410          MOV     DMCSRH,DMCTL
010124  005237  001410                  INC     DMCTL
010130  013737  001410  001412          MOV     DMCTL,DMP04
010136  060037  001412                  ADD     R0,DMP04
010142  013737  001412  001414          MOV     DMP04,DMP06
010150  060037  001414                  ADD     R0,DMP06

010154  013737  001374  001376          MOV     DMRVEC,DMRLVL   ;PTY LVL
010162  060037  001376                  ADD     R0,DMRLVL       ;
010166  013737  001376  001400          MOV     DMRLVL,DMTVEC   ;TX VEC
010174  060037  001400                  ADD     R0,DMTVEC       ;
010200  013737  001400  001402          MOV     DMTVEC,DMTLVL   ;TX LVL
010206  060037  001402                  ADD     R0,DMTLVL

010212  032737  000002  001236          BIT     #SW01,STRTSW    ;IS TEST NO. SELECTED
010220  001450                          BEQ     7$              ;BR IF NO
010222                          4$:
010222  005737  000042                  TST     @#42            ;RUNNING IN AUTO MODE?
```

```
 1897  010226  001045                          BNE     7$              ;BR IF YES
 1898  010230  104402  005574                  TYPE    ,MCRLF
 1899  010234  104403                          INSTR                   ;GET TEST NO.
 1900  010236  006054                          MTSTN
 1901  010240  104405                          PARAM
 1902  010242  000001                          1
 1903  010244  001000                          1000
 1904  010246  001226                          TSTNO
 1905  010250     000                  .BYTE   0
 1906  010251     001                  .BYTE   1
 1907  010252  012700  012074                  MOV     #TST1,R0
 1908  010256  022710                  5$:     CMP     (PC)+,(R0)      ;CMP FIRST WORD TO 12737
 1909  010260  012737                          MOV     (PC)+,2(PC)+
 1910  010262  001020                          BNE     6$              ;BR IF NOT SAME
 1911  010264  023760  001226  000002          CMP     TSTNO,2(R0)     ;DOES TSTNO MATCH?
 1912  010272  001014                          BNE     6$              ;BR IF NO
 1913  010274  022760  001226  000004          CMP     #TSTNO,4(R0)    ;IS LAST WORD OK?
 1914  010302  001010                          BNE     6$              ;BR IF NO
 1915  010304  010037  001214                  MOV     R0,RETURN       ;IT IS A LEGAL TEST SO DO IT
 1916  010310  104402  005657                  TYPE    ,MR
 1917  010314  042737  000002  001236          BIC     #SW01,STRTSW
 1918  010322  000412                          BR      8$
 1919  010324  005720                  6$:     TST     (R0)+           ;POP R0
 1920  010326  020027  025604                  CMP     R0,#TLAST+10    ;AT END YET?
 1921  010332  001351                          BNE     5$              ;BR IF NO
 1922  010334  104402  005570                  TYPE    ,MQM            ;YES ILLEGAL TEST NO.
 1923  010340  000730                          BR      4$              ;TRY AGAIN
 1924
 1925  010342  012737  012074  001214  7$:     MOV     #TST1,RETURN    ;PREPARE RETURN ADDRESS
 1926  010350  013701  001404          8$:     MOV     DMCSR,R1        ;R1 = BASE DMC11 ADDRESS
 1927  010354  000177  170634                  JMP     @RETURN         ;GO START TESTING.
 1928
 1929
 1930                                          ;ROUTINE USED TO "AUTO SIZE" THE DMC11
 1931                                          ;CSR AND VECTOR.
 1932                                          ;NOTE:  THE CSR MAY BE ANY WHERE IN THE FLOATING
 1933                                          ;       ADDRESS RANGE (16C000:164000)
 1934                                          ;       AND THE VECTOR MAY BE ANY WHERE IN THE
 1935                                          ;       FLOATING VECTOR RANGE (300:770)
 1936                                          ;
 1937
 1938  010360                          AUTO.SIZE:
 1939  010360  000005                          RESET                   ;INSURE A BUS INIT.
 1940  010362  012702  001500          CSRMAP: MOV     #DM.MAP,R2      ;LOAD MAP POINTER.
 1941  010366  005022                  1$:     CLR     (R2)+           ;ZERO ENTIRE MAP
 1942  010370  022702  001700                  CMP     #DM.END,R2      ;ALL DONE?
 1943  010374  001374                          BNE     1$              ;BR IF NO
 1944  010376  005037  001310                  CLR     DMNUM           ;SET OCTAL NUMBER OF DMC11'S TO 0
 1945  010402  012702  001500                  MOV     #DM.MAP,R2      ;R2 POINTS TO DMC MAP
 1946  010406  005037  001306                  CLR     DMACTV          ;CLEAR ACTIVE
 1947  010412  032737  000001  001236          BIT     #SW00,STRTSW    ;QUESTIONS?
 1948  010420  001002                          BNE     .+6             ;BR IF YES
 1949  010422  000137  011052                  JMP     7$              ;IF NO SKIP QUESTIONS
 1950  010426  012737  000001  001256          MOV     #1,TEMP5        ;START WITH 1
 1951  010434  104403                          INSTR
 1952  010436  006374                          NUM
```

```
 1953  010440  104405                                    PARAM
 1954  010442  000001                                    1
 1955  010444  000020                                    16.
 1956  010446  001252                                    TEMP3
 1957  010450     000                                    .BYTE   0
 1958  010451     001                                    .BYTE   1
 1959  010452  013737  001252  001310                    MOV     TEMP3,DMNUM     ;DMNUM = HOW MANY
 1960  010460  104402  005574                 12$:      TYPE    ,MCRLF
 1961  010464  104410                                    CONVRT                  ;TYPE WHICH DMC IS BEING DONE
 1962  010466  011556                                    WHICH                   ;TEMP5 IS WHICH DMC
 1963  010470  005237  001256                            INC     TEMP5
 1964  010474  104403                                    INSTR
 1965  010476  006434                                    CSR
 1966  010500  104405                                    PARAM
 1967  010502  160000                                    160000
 1968  010504  164000                                    164000
 1969  010506  001254                                    TEMP4
 1970  010510     000                                    .BYTE   0
 1971  010511     001                                    .BYTE   1
 1972  010512  013722  001254                            MOV     TEMP4,(R2)+     ;STORE CSR IN MAP
 1973  010516  104403                                    INSTR
 1974  010520  006452                                    VEC
 1975  010522  104405                                    PARAM
 1976  010524  000000                                    0
 1977  010526  000776                                    776
 1978  010530  001254                                    TEMP4
 1979  010532     000                                    .BYTE   0
 1980  010533     001                                    .BYTE   1
 1981  010534  013712  001254                            MOV     TEMP4,(R2)      ;STORE VECTOR IN MAP
 1982  010540  104402                 10$:      TYPE
 1983  010542  006473                                    PRIO                    ;ASK WHAT BR LEVEL
 1984  010544  004737  012042                            JSR     PC,INTTY        ;GET RESPONSE
 1985  010550  022703  000024                            CMP     #24,R3          ;
 1986  010554  101014                                    BHI     50$             ;BR IF LESS THAN 4
 1987  010556  022703  000027                            CMP     #27,R3          ;
 1988  010562  103411                                    BLO     50$             ;BR IF GREATER THAN 7
 1989  010564  012704  000011                            MOV     #11,R4          ;R4 = NUMBER OF SHIFTS
 1990  010570  006303                                    ASL     R3              ;SHIFT R3 LEFT
 1991  010572  005304                                    DEC     R4              ;DEC SHIFT COUNT
 1992  010574  001375                                    BNE     .-4             ;BR IF NOT DONE
 1993  010576  042703  170777                            BIC     #170777,R3      ;BIC UNWANTED BITS
 1994  010602  050312                                    BIS     R3,(R2)         ;PUT BR LEVEL IN STATLS MAP
 1995  010604  000403                                    BR      8$              ;CONTINUE
 1996  010606  104402                 50$:      TYPE
 1997  010610  005570                                    MQM                     ;RESPONSE IS OUT OF LIMITS
 1998  010612  000752                                    BR      10$             ;TRY AGAIN
 1999  010614  104402                 8$:       TYPE
 2000  010616  006532                                    CRAM                    ;DOES DMC HAVE CRAM?
 2001  010620  004737  012042                            JSR     PC,INTTY        ;GET REPLY
 2002  010624  022703  000131                            CMP     #131,R3
 2003  010630  001406                                    BEQ     9$              ;YES
 2004  010632  022703  000116                            CMP     #116,R3         ;NO
 2005  010636  001405                                    BEQ     16$             ;NOT A Y OR N
 2006  010640  104402                                    TYPE
 2007  010642  005570                                    MQM                     ;TYPE "?"
 2008  010644  000763                                    BR      8$              ;ASK AGAIN
```

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2009  010646  052712  100000          9$:     BIS     #BIT15,(R2)     ;SET BIT 15 IF CRAM
2010  010652  104402                  16$:    TYPE
2011  010654  006630                          MODU                    ;ASK WHICH LINE UNIT
2012  010656  004737  012042                  JSR     PC,INTTY        ;GET REPLY
2013  010662  022703  000021                  CMP     #21,R3          ;"1"
2014  010666  001417                          BEQ     30$
2015  010670  022703  000022                  CMP     #22,R3          ;"2"
2016  010674  001412                          BEQ     31$
2017  010676  022703  000116                  CMP     #116,R3         ;"N"
2019  010702  001403                          BEQ     32$
2019  010704  104402                          TYPE
2020  010706  005570                          MQM                     ;IF NOT A 1,2 OR N TYPE "?"
2021  010710  000760                          BR      16$             ;TRY AGIAN
2022  010712  052722  010000          32$:    BIS     #BIT12,(R2)+    ;SET BIT 12 IN STAT2 IF NO LU
2023  010716  022222                          CMP     (R2)+,(R2)+     ;POP OVER STAT2 AND STAT3
2024  010720  000447                          BR      33$
2025  010722  052712  020000          31$:    BIS     #BIT13,(R2)     ;SET BIT 13 IN STAT2 IF M8202
2026  010726  104402                  30$:    TYPE
2027  010730  007040                          CONN                    ;ASK IF LOOP-BACK IS ON
2028  010732  004737  012042                  JSR     PC,INTTY        ;GET REPLY
2029  010736  022703  000131                  CMP     #131,R3         ;Y
2030  010742  001406                          BEQ     17$
2031  010744  022703  000116                  CMP     #116,R3         ;N
2032  010750  001406                          BEQ     18$
2033  010752  104402                          TYPE
2034  010754  005570                          MQM                     ;IF NOT Y OR N TYPE "?"
2035  010756  000763                          BR      30$             ;TRY AGAIN
2036  010760  052722  040000          17$:    BIS     #BIT14,(R2)+    ;TURNAROUND IS CONNECTED
2037  010764  000402                          BR      19$
2038  010766  042722  040000          18$:    BIC     #BIT14,(R2)+    ;NO TURNAROUND
2039  010772                          19$:
2040  010772  104403                          INSTR
2041  010774  006742                          LINE
2042  010776  104405                          PARAM
2043  011000  000000                          0
2044  011002  000377                          377
2045  011004  001254                          TEMP4
2046  011006     000                          .BYTE   0
2047  011007     001                          .BYTE   1
2048  011010  113722  001254                  MOVB    TEMP4,(R2)+     ;STORE SWITCH PAC IN MAP
2049  011014  104403                          INSTR
2050  011016  007000                          BM
2051  011020  104405                          PARAM
2052  011022  000000                          0
2053  011024  000377                          377
2054  011026  001254                          TEMP4
2055  011030     000                          .BYTE   0
2056  011031     001                          .BYTE   1
2057  011032  113722  001254                  MOVB    TEMP4,(R2)+     ;STORE SWITCH PAC IN MAP
2058  011036  005722                          TST     (R2)+           ;POP OVER STAT3
2059  011040  005337  001252          33$:    DEC     TEMP3           ;DEC DMC COUNT
2060  011044  001205                          BNE     12$             ;BR IF MORE TO DO
2061  011046  000137  011456                  JMP     13$             ;CONTINUE
2062  011052  012701  160000          7$:     MOV     #160000,R1      ;SET FOR FIRST ADDRESS TO BE TESTED
2063  011056  012737  011550  000004          MOV     #6$,@#4         ;SET FOR NON-EXISTANT DEVICE TIME OUT
2064  011064  005011                  2$:     CLR     (R1)            ;CLEAR SELO
```

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 2065  011066  005711                          TST     (R1)            ;IF DMC11 DMCSR S/B 0
 2066  011070  001162                          BNE     3$              ;IF NO DEV ; TRAP TO 4. IF NO BIT 8 THEN NO DMC1
 2067  011072  005061  000006                  CLR     6(R1)           ;CLEAR SEL6
 2068  011076  005761  000006                  TST     6(R1)           ;IF DMC11 THEN DMRIC S/B =0!
 2069  011102  001155                          BNE     3$              ;BR IF NOT DMC11
 2070  011104  012711  002000                  MOV     #BIT10,(R1)     ;SET ROMO
 2071  011110  005061  000004                  CLR     4(R1            ;CLEAR SEL4
 2072  011114  012761  125252  000006          MOV     #125252,6(R1)   ;WRITE THIS TO SEL6
 2073  011122  052711  020000                  BIS     #BIT13,(R1)     ;WRITE IT!
 2074  011126  022761  125252  000004          CMP     #125252,4(R1)   ;WAS IT WRITTEN?
 2075  011134  001004                          BNE     21$             ;IF NO IT IS NOT CRAM
 2076  011136  052762  100000  000002          BIS     #BIT15,2(R2)    ;SET BIT15 IF CRAM
 2077  011144  000421                          BR      22$
 2078  011146  012711  001000          21$:    MOV     #BIT9,(R1)      ;SET ROMI
 2079  011152  012761  100400  000006          MOV     #100400,6(R1)   ;PUT INSTRUCTION IN SEL6
 2080  011160  012711  001400                  MOV     #BIT9!BIT8,(R1) ;CLOCK INSTRUCTION (MICRO PROC PC TO 0)
 2081  011164  012711  002000                  MOV     #BIT10,(R1)     ;SET ROMO
 2082  011170  022761  063220  000006          CMP     #63220,6(R1)    ;IS IT CROM
 2083  011176  001404                          BEQ     22$             ;BR IF YES
 2084  011200  022761  177777  000006          CMP     #-1,6(R1)       ;IF = -1 IT HAS NO CROM
 2085  011206  001113                          BNE     3$              ;BR IF NOT DMC11
 2086                          ;AT THIS POINT IT IS ASSUMED THAT R1 HOLDS A DMC11 CSR ADDRESS.
 2087  011210  010122          22$:    MOV     R1,(R2)+        ;STORE CSR IN CORE TABLE.
 2088  011212  012711  001000  15$:    MOV     #BIT9,(R1)      ;CLEAR LINE UNIT LOOP
 2089  011216  005061  000004                  CLR     4(R1)           ;CLEAR PORT4
 2090  011222  012761  122113  000006          MOV     #122113,6(R1)   ;LOAD INSTRUCTION (CLR DTR)
 2091  011230  052711  000400                  BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION
 2092  011234  012761  021264  000006          MOV     #021264,6(R1)   ;LOAD INSTRUCTION
 2093  011242  052711  000400                  BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION
 2094  011246  122761  000377  000004          CMPB    #377,4(R1)      ;IS IT ALL ONES?
 2095  011254  001003                          BNE     .+10            ;BR IF NO
 2096  011256  052712  010000                  BIS     #BIT12,(R2)     ;IF YES, NO LINE UNIT, SET STATUS BIT
 2097  011262  000436                          BR      20$
 2098  011264  032761  000002  000004          BIT     #BIT1,4(R1)     ;IS SWITCH A ONE?
 2099  011272  001403                          BEQ     .+10            ;BR IF M8201
 2100  011274  052712  060000                  BIS     #BIT13!BIT14,(R2) ;M8202 ASSUME CONNECTOR
 2101  011300  000427                          BR      20$             ;CONNECTOR ON)
 2102  011302  032761  000010  000004          BIT     #BIT3,4(R1)     ;IS MRDY SET
 2103  011310  001023                          BNE     20$             ;BR IF M9201 NO CONNECTOR (ON LINE)
 2104  011312  012761  000100  000004          MOV     #BIT6,4(R1)     ;LOAD PORT4
 2105  011320  012761  122113  000006          MOV     #122113,6(R1)   ;LOAD INSTRUCTION
 2106  011326  052711  000400                  BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION(SET DTR)
 2107  011332  012761  021264  000006          MOV     #021264,6(R1)   ;LOAD INSTRUCTION
 2108  011340  052711  000400                  BIS     #BIT8,(R1)      ;CLOCK INSTRUCTION(READ MODEM REG)
 2109  011344  032761  000010  000004          BIT     #BIT3,4(R1)     ;IS MRDY SET NOW?
 2110  011352  001402                          BEQ     20$             ;BR IF NO CONNECTOR
 2111  011354  052712  040000                  BIS     #BIT14,(R2)     ;SET STATUS BIT FOR CONNECTOR
 2112  011360  005722          20$:    TST     (R2)+           ;POP POINTER
 2113  011362  012761  021324  000006          MOV     #021324,6(R1)   ;PUT INSTRUCTION IN PORT6
 2114  011370  012711  001400                  MOV     #BIT9!BIT8,(R1) ;PORT4=LU 15
 2115  011374  156122  000004                  BISB    4(R1),(R2)+     ;STORE DDCMP LINE # IN TABLE
 2116  011400  012761  021344  000006          MOV     #021344,6(R1)   ;PORT6=INSTRUCTION
 2117  011406  012711  001400                  MOV     #BIT8!BIT9,(R1) ;CLOCK INSTR.
 2118  011412  156122  000004                  BISB    4(R1),(R2)+     ;STORE BM873 ADD IN TABLE
 2119  011416  005722                          TST     (R2)+           ;POP OVER STAT3
 2120  011420  005011                          CLR     (R1)            ;CLEAR ROMI
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J04


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2121  011422  005237  001310                    INC     DMNUM           ;UPDATE DEVICE COUNTER
2122  011426  022737  000020  001310            CMP     #20.DMNUM       ;ARE MAX. NO. OF DEV FOUND?
2123  011434  001410                            BEQ     13$             ;YES DON'T LOOK FOR ANY MORE.
2124  011436  005011                    3$:     CLR     (R1)            ;CLEAR BIT 10
2125  011440  005061  000006                    CLR     6(R1)           ;CLEAR SEL 6
2126  011444  062701  000010            14$:    ADD     #10,R1          ;UPDATE CSR POINTER ADDRESS
2127  011450  022701  164000                    CMP     #164000,R1
2128  011454  001203                            BNE     2$              ;BR IF MORE ADDRESS TO CHECK.
2129  011456  005037  001306            13$:    CLR     DMACTV
2130  011462  005737  001310                    TST     DMNUM           ;WERE ANY DMC11'S FOUND AT ALL?
2131  011466  001423                            BEQ     5$              ;ERROR AUTO SIZER FOUND NO DMC11'S IN THIS SYS.
2132  011470  013701  001310                    MOV     DMNUM,R1
2133  011474  010137  001314                    MOV     R1,SAVNUM       ;SAVE NUMBER OF DEVICES
2134  011500  000241                    4$:     CLC
2135  011502  006137  001306                    ROL     DMACTV          ;GENERATE ACTIVE REGISTER OF DEVICES.
2136  011506  005237  001306                    INC     DMACTV          ;SET THE BIT
2137  011512  005301                            DEC     R1
2138  011514  001371                            BNE     4$              ;BR IF MORE TO GENERATE
2139  011516  012737  000006  000004            MOV     #6,@#4          ;RESTORE TRAP VECTOR
2140  011524  013737  001306  001312            MOV     DMACTV,SAVACT   ;SAVE ACTIVE REGISTER
2141  011532  000137  011564                    JMP     VECMAP          ;GO FIND THE VECTOR NOW.
2142  011536  104402  005662            5$:     TYPE    ,MERR2          ;NOTIFY OPR THAT NO DMC11'S FOUND.
2143  011542  005000                            CLR     R0              ;MAKE DATA LIGHTS ZERO
2144  011544  000000                            HALT                    ;STOP THE SHOW
2145  011546  000776                            BR      .-2             ;DISABLE CONT. SW.
2146  011550  012716  011444            6$:     MOV     #14$,(SP)       ;ENTERED BY NON-EXISTANT TIME-OUT.
2147  011554  000002                            RTI                     ;RETURN TO MAINSTREAM
2148
2149  011556  000001            WHICH:  1
2150  011560     002     002                    .BYTE   2,2
2151  011562  001256                            TEMP5
2152
2153  011564  032737  000001  001236    VECMAP: BIT     #SW00,STRTSW
2154  011572  001114                            BNE     5$
2155  011574  012737  000340  000022            MOV     #340,@#22       ;SET IOT TRAP PRIO TO 7
2156  011602  012737  011756  000020            MOV     #4$,@#20        ;SET IOT TRAP VECTOR
2157  011610  012702  001500                    MOV     #DM.MAP,R2      ;SET SOFTWARE POINTER
2158  011614  012700  000300                    MOV     #300,R0         ;FLOATING VECTORS START HERE.
2159  011620  012701  000302                    MOV     #302,R1         ;PC OF IOT INSTR.
2160  011624  010120            1$:     MOV     R1,(R0)+        ;START FILLING VECTOR AREA
2161  011626  012721  000004                    MOV     #4,(R1)+        ;WITH .+2: IOT
2162  011632  022021                            CMP     (R0)+,(R1)+     ;ADD 2 TO R0 +R1
2163  011634  020127  001000                    CMP     R1,#1000
2164  011640  101771                            BLOS    1$              ;BR IF MORE TO FILL
2165  011642  013737  001306  001246            MOV     DMACTV,TEMP1    ;STORE TEMPORALLY
2166  011650  006037  001246            2$:     ROR     TEMP1           ;BRING OUT A BIT
2167  011654  103063                            BCC     5$              ;BR IF ALL DONE
2168  011656  012704  000012                    MOV     #12,R4          ;R4 IS INDEX REGISTER
2169  011662  016437  012026  177776            MOV     BRLVL(R4),PS    ;SET PS TO 7
2170  011670  011201                            MOV     (R2),R1
2171  011672  012761  000200  000004            MOV     #200,4(R1)
2172  011700  012711  001000                    MOV     #BIT9,(R1)      ;SET ROMI
2173  011704  012761  121111  000006            MOV     #121111,6(R1)   ;PUT INSTRUCTION IN PORTS
2174  011712  012711  001400                    MOV     #BIT9!BIT8,(R1) ;FORCE AN INTERRUPT
2175  011716  105200            7$:     INCB    R0              ;STALL
2176  011720  001376                            BNE     .-2             ;FOR TIME TO INTERUPT
```

```
 2177  011722  162704  000002                        SUB     #2,R4           ;GET NEXT LOWEST PS LEVEL
 2178  011726  001404                                BEQ     6$              ;BR IF R4 = 0
 2179  011730  016437  012026  177776                MOV     BRLVL(R4),PS    ;MOVE NEXT LOWER LEVEL IN PS
 2180  011736  000767                                BR      7$              ;BR TO DELAY
 2181  011740  052762  005300  000002        6$:     BIS     #5300,2(R2)     ;NO INTERUPT ASSUME 300 AT LEVEL 5 AND FIX DMC11
 2182  011746  005011                        3$:     CLR     (R1)            ;CLEAR ROMI
 2183  011750  062702  000010                        ADD     #10,R2          ;POP SOFTWARE POINTER
 2184  011754  000735                                BR      2$              ;KEEP GOING
 2185  011756  051662  000002                4$:     BIS     (SP),2(R2)      ;GET VECTOR ADDRESS
 2186  011762  042762  000007  000002                BIC     #7,2(R2)        ;CLEAR JUNK
 2187  011770  016405  012030                        MOV     BRLVL+2(R4),R5  ;GET BR LEVEL OF DMC11
 2188  011774  006305                                ASL     R5              ;SHIFT LEVEL 4 PLACES
 2189  011776  006305                                ASL     R5              ;TO THE LEFT FOR THE
 2190  012000  006305                                ASL     R5              ;STATUS TABLE
 2191  012002  006305                                ASL     R5
 2192  012004  042705  170777                        BIC     #170777,R5      ;CLEAR UNWANTED BITS
 2193  012010  050562  000002                        BIS     R5,2(R2)        ;PUT BR LEVEL IN STATUS TABLE
 2194  012014  022626                                CMP     (SP)+,(SP)+     ;POP IOT JUNK OFF STACK
 2195  012016  012716  011746                        MOV     #3$,(SP)        ;SET FOR RETURN
 2196  012022  000002                                RTI
 2197  012024  000207                        5$:     RTS     PC              ;ALL DONE WITH "AUTO SIZING"
 2198
 2199  012026  000000                        BRLVL:  0       ;LEVEL 0
 2200  012030  000000                                0       ;LEVEL 0
 2201  012032  000200                                200     ;LEVEL 4
 2202  012034  000240                                240     ;LEVEL 5
 2203  012036  000300                                300     ;LEVEL 6
 2204  012040  000340                                340     ;LEVEL 7
 2205
 2206
 2207  012042  105777  167136                INTTY:  TSTB    @TKCSR          ;WAIT FOR DONE
 2208  012046  100375                                BPL     .-4
 2209  012050  017703  167132                        MOV     @TKDBR,R3       ;PUT CHAR IN R3
 2210  012054  105777  167130                        TSTB    @TPCSR          ;WAIT UNTIL PRINTER IS READY
 2211  012060  100375                                BPL     .-4
 2212  012062  010377  167124                        MOV     R3,@TPDBR       ;ECHO CHAR
 2213  012066  042703  000240                        BIC     #BIT7!BIT5,R3   ;MASK OFF LOWER CASE
 2214  012072  000207                                RTS     PC              ;RETURN
 2215
 2216                                  02100
 2217                  ------
 2218
 2219                                          ;*************************** TEST 1 ***************************
 2220                                          ;*OUT CONTROL REGISTER READ/ONLY TEST
 2221                                          ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
 2222                                          ;*BITS ARE IN THE CORRECT STATE
 2223                                          ;:**********************************************************
 2224
 2225                                          ;  TEST 1
 2226                                          ;--------------
 2227  012074  012737  000001  001226  TST1:   MOV     #1,TSTNO
 2228  012102  012737  012150  001216          MOV     #TST2,NEXT
 2229                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
 2230  012110  005077  167270                  CLR     @DMCSR          ;CLEAR SEL0
 2231  012114  012702  000011                  MOV     #11,R2          ;SAVE R2 FOR TYPEOUT
 2232  012120  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
2233  012122  021224                                    021004!<20*11>          ;PORT4←LINE UNIT REG 11
2234  012124  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
2235  012130  042704  000054                           BIC     #54,R4          ;CLEAR UNKNOWN BITS
2236  012134  012705  000020                           MOV     #20,R5          ;PUT "EXPECTED" IN R5
2237  012140  120504                                    CMPB    R5,R4           ;IS CUT READY SET?
2238  012142  001401                                    BEQ     1$              ;BR IF YES
2239  012144  104002                                    HLT     2               ;ERROR IN LU 11
2240  012146  104400                          1$:       SCOPE                   ;SCOPE THIS TEST
2241
2242
2243                                                    ;************************** TEST 2 **************************
2244                                                    ;*IN CONTROL REGISTER READ/ONLY TEST
2245                                                    ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
2246                                                    ;*BITS ARE IN THE CORRECT STATE
2247                                                    ;:************************************************************
2248
2249                                                    ;  TEST 2
2250                                                    ;--------------
2251  012150  012737  000002  001226          TST2:    MOV     #2,TSTNO
2252  012156  012737  012216  001216                   MOV     #TST3,NEXT
2253                                                                            ;R1 CONTAINS BASE DMC11 ADDRESS
2254  012164  012702  000012                           MOV     #12,R2          ;SAVE R2 FOR TYPEOUT
2255  012170  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2256  012172  021244                                    021004!<20*12>          ;PORT4←LINE UNIT REG 12
2257  012174  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
2258  012200  042704  000017                           BIC     #17,R4          ;CLEAR UNKNOWN BITS
2259  012204  005005                                    CLR     R5              ;PUT "EXPECTED" IN R5
2260  012206  120504                                    CMPB    R5,R4           ;ARE ALL BITS CLEARED?
2261  012210  001401                                    BEQ     1$              ;BR IF YES
2262  012212  104002                                    HLT     2               ;ERROR IN LU 12
2263  012214  104400                          1$:       SCOPE                   ;SCOPE THIS TEST
2264
2265
2266                                                    ;************************** TEST 3 **************************
2267                                                    ;*MODEM CONTROL REGISTER READ/ONLY TEST
2268                                                    ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/ONLY
2269                                                    ;*BITS ARE IN THE CORRECT STATE
2270                                                    ;:************************************************************
2271
2272                                                    ;  TEST 3
2273                                                    ;--------------
2274  012216  012737  000003  001226          TST3:    MOV     #3,TSTNO
2275  012224  012737  012270  001216                   MOV     #TST4,NEXT
2276                                                                            ;R1 CONTAINS BASE DMC11 ADDRESS
2277  012232  104412                                    MSTCLR                  ;MASTER CLEAR DMC11
2278  012234  012702  000013                           MOV     #13,R2          ;SAVE R2 FOR TYPEOUT
2279  012240  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2280  012242  021264                                    021004!<20*13>          ;PORT4←LINE UNIT REG 13
2281  012244  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
2282  012250  042704  000213                           BIC     #213,R4         ;CLEAR UNkNOWN BITS
2283  012254  012705  000100                           MOV     #100,R5         ;PUT "EXPECTED" IN R5
2284  012260  120504                                    CMPB    R5,R4           ;ARE RING, DTR,  AND MODEM READY SET?
2285  012262  001401                                    BEQ     1$              ;BR IF YES
2286  012264  104002                                    HLT     2               ;ERROR IN LU 13
2287  012266  104400                          1$:       SCOPE                   ;SCOPE THIS TEST
2288
```

```
2289
2290                                        ;************************** TEST 4 **************************
2291                                        ;*MAINTENANCE REGISTER READ/ONLY TEST
2292                                        ;*DO A MASTER CLEAR, VERIFY THAT ALL READ/CNLY
2293                                        ;*BITS ARE IN THE CORRECT STATE
2294                                        ;:************************************************************
2295
2296                                        ;  TEST 4
2297                                        ;--------------
2298  012270  012737  000004  001226  TST4: MOV     #4,TSTNO
2299  012276  012737  012362  001216        MOV     #TST5,NEXT
2300                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
2301  012304  104412                       MSTCLR                  ;MASTER CLEAR DMC11
2302  012306  012702  000017               MOV     #17,R2          ;SAVE R2 FOR TYPEOUT
2303  012312  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2304  012314  021364                       021004!<20*17>          ;PORT4+LINE UNIT REG 17
2305  012316  016104  000004               MOV     4(R1),R4        ;PUT "FOUND" IN R4
2306  012322  042704  000206               BIC     #206,R4         ;CLEAR UNKNOWN BITS
2307  012326  012705  000051               MOV     #51,R5          ;PUT "EXPECTED" IN R5
2309  012332  032737  020000  001366       BIT     #BIT13,STAT1    ;IS LU AN M8202 OR M8201?
2309  012340  001404                       BEQ     .+12            ;BR IF M8201
2310  012342  042704  000040               BIC     #40,R4          ;MASK OFF SI BIT IF M8202
2311  012346  042705  000040               BIC     #BIT5,R5        ;SI BIT IS UNKNOWN ON AN M8202
2312  012352  120504                       CMPB    R5,R4           ;ARE SI AND ICIR SET?
2313  012354  001401                       BEQ     1$              ;BR IF YES
2314  012356  104002                       HLT     2               ;ERROR IN LU 17
2315  012360  104400               1$:     SCOPE                   ;SCOPE THIS TEST
2316
2317
2318                                        ;************************** TEST 5 **************************
2319                                        ;*LINE UNIT REGISTER WRITE/READ TEST
2320                                        ;*SET BIT5 IN LU REGISTER 12, VERIFY IT IS SET
2321                                        ;*CLEAR BIT5 IN LU REGISTER 12, VERIFY IT IS CLEAR
2322                                        ;:************************************************************
2323
2324                                        ;  TEST 5
2325                                        ;--------------
2326  012362  012737  000005  001226  TST5: MOV     #5,TSTNO
2327  012370  012737  012522  001216        MOV     #TST6,NEXT
2328  012376  012737  012412  001220        MOV     #1$,LOCK
2329                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
2330  012404  104412                       MSTCLR                  ;MASTER CLEAR DMC11
2331  012406  012702  000012               MOV     #12,R2          ;SAVE REGISTER ADDRESS FOR TYPEOUT
2332  012412  012761  000040  000004  1$:  MOV     #40,4(R1)       ;LOAD PORT4
2333  012420  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2334  012422  122112                       122112                  ;SET BIT5 IN LU-12
2335  012424  104414                       ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2336  012426  021245                       021245                  ;READ LU-12
2337  012430  012705  000040               MOV     #40,R5          ;PUT "EXPECTED" IN R5
2338  012434  116104  000005               MOVB    5(R1),R4        ;PUT "FOUND" IN R4
2339  012440  042704  000337               BIC     #337,R4         ;CLEAR UNWANTED BITS
2340  012444  120504                       CMPB    R5,R4           ;IS BIT5 SET?
2341  012446  001401                       BEQ     2$              ;BR IF YES
2342  012450  104003                       HLT     3               ;ERROR  BIT 5 IS NOT SET
2343  012452  104401               2$:     SCOP1                   ;SCOPE SUBTEST (SW09=1)
2344  012454  012737  012462  001220        MOV     #3$,LOCK        ;NEW SCOP1
```

```
2345  012462  005061  000004          3$:   CLR     4(R1)           ;LOAD PORT4
2346  012466  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2347  012470  122112                        122112                  ;CLEAR BIT 5 IN LU-12
2348  012472  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2349  012474  021245                        021245                  ;READ LU-12
2350  012476  005005                        CLR     R5              ;PUT "EXPECTED" IN R5
2351  012500  116104  000005                MOVB    5(R1),R4        ;PUT "FOUND" IN R4
2352  012504  042704  000337                BIC     #337,R4         ;CLEAR UNWANTED BITS
2353  012510  120504                        CMPB    R5,R4           ;IS BIT5 CLEAR?
2354  012512  001401                        BEQ     4$              ;BR IF YES
2355  012514  104003                        HLT     3               ;ERROR, BITS IS NOT CLEAR
2356  012516  104401                  4$:   SCOP1                   ;SCOPE SUBTEST (SW09=1)
2357  012520  104400                        SCOPE                   ;SCOPE THIS TEST
2358
2359
2360                                        ;************************** TEST 6 **************************
2361                                        ;*LINE UNIT REGISTER WRITE/READ TEST
2362                                        ;*SET BIT1 IN LU REGISTER 17, VERIFY IT IS SET
2363                                        ;*CLEAR BIT1 IN LU REGISTER 17, VERIFY IT IS CLEAR
2364                                        ;;**********************************************************
2365
2366                                        ;  TEST 6
2367                                        ;--------------
2368  012522  012737  000006  001226  TST6: MOV     #6,TSTNO
2369  012530  012737  012662  001216        MOV     #TST7,NEXT
2370  012536  012737  012552  001220        MOV     #1$,LOCK
2371                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
2372  012544  104412                        MSTCLR                  ;MASTER CLEAR DMC11
2373  012546  012702  000017                MOV     #17,R2          ;SAVE REGISTER ADDRESS FOR TYPEOUT
2374  012552  012761  000001  000004  1$:   MOV     #1,4(R1)        ;LOAD PORT4
2375  012560  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2376  012562  122117                        122117                  ;SET BIT1 IN LU-17
2377  012564  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2378  012566  021365                        021365                  ;READ LU-17
2379  012570  012705  000001                MOV     #1,R5           ;PUT "EXPECTED" IN R5
2380  012574  116104  000005                MOVB    5(R1),R4        ;PUT "FOUND" IN R4
2381  012600  042704  000376                BIC     #376,R4         ;CLEAR UNWANTED BITS
2382  012604  120504                        CMPB    R5,R4           ;IS BIT1 SET?
2383  012606  001401                        BEQ     2$              ;BR IF YES
2384  012610  104003                        HLT     3               ;ERROR, BIT 1 IS NOT SET
2385  012612  104401                  2$:   SCOP1                   ;SCOPE SUBTEST (SW09=1)
2386  012614  012737  012622  001220        MOV     #3$,LOCK        ;NEW SCOP1
2387  012622  005061  000004          3$:   CLR     4(R1)           ;LOAD PORT4
2388  012626  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2389  012630  122117                        122117                  ;CLEAR BIT 1 IN LU-17
2390  012632  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2391  012634  021365                        021365                  ;READ LU-17
2392  012636  005005                        CLR     R5              ;PUT "EXPECTED" IN R5
2393  012640  116104  000005                MOVB    5(R1),R4        ;PUT "FOUND" IN R4
2394  012644  042704  000376                BIC     #376,R4         ;CLEAR UNWANTED BITS
2395  012650  120504                        CMPB    R5,R4           ;IS BIT1 CLEAR?
2396  012652  001401                        BEQ     4$              ;BR IF YES
2397  012654  104003                        HLT     3               ;ERROR, BIT1 IS NOT CLEAR
2398  012656  104401                  4$:   SCOP1                   ;SCOPE SUBTEST (SW09=1)
2399  012660  104400                        SCOPE                   ;SCOPE THIS TEST
2400
```

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

                                                        ;  TEST 7
                                                        ;--------------
012662  012737  000007  001226          TST7:   MOV     #7,TSTNO
012666  012737  012372  001216                  MOV     #TST10,NEXT
012674  012737  012716  001220                  MOV     #64$,LOCK
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
012704  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
012706  012702  000013                          MOV     #13,R2          ;SAVE REGISTER ADDRESS FOR TYPEOUT
012712  012700  000001                          MOV     #1,R0           ;START WITH BIT 0
012716                                  64$:
012716  010061  000004                          MOV     R0,4(R1)        ;PUT PATTERN INTO PORT4
012722  042761  000257  000004                  BIC     #257,4(R1)      ;CLEAR UNWANTED BITS
012730  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
012732  122113                                  122103!13               ;MOV DATA TO IBUS REGISTER 13
012734  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
012736  021265                                  21005!(13*20)           ;READ FROM IBUS REGISTER 13
012740  010005                                  MOV     R0,R5           ;PUT EXPECTED IN R5
012742  042705  000257                          BIC     #257,R5         ;CLEAR UNWANTED BITS
012746  116104  000005                          MOVB    5(R1),R4        ;PUT "FOUND" INTO R4
012752  042704  000257                          BIC     #257,R4         ;CLEAR UNWANTED BITS
012756  120504                                  CMPB    R5,R4           ;DATA CORRECT?
012760  001401                                  BEQ     65$             ;BR IF YES
012762  104003                                  HLT     3               ;ERROR
012764  104401                          65$:    SCOP1                   ;SW09=1?
012766  000241                                  CLC                     ;CLEAR CARRY
012770  106000                                  ROLB    R0              ;SHIFT BIT IN RC
012772  001351                                  BNE     64$             ;IF R0=0 THEN DONE
012774  012737  013010  001220                  MOV     #67$,LOCK       ;NEW SCOP1
013002  012700  000001                          MOV     #1,R0           ;START WITH BIT 0
013006  005100                          69$:    COM     R0              ;CHANGE TO FLOATING ZERO
013010                                  67$:
013010  010061  000004                          MOV     R0,4(R1)        ;PUT PATTERN INTO PORT4
013014  042761  000257  000004                  BIC     #257,4(R1)      ;CLEAR UNWANTED BITS
013022  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013024  122113                                  122103!13               ;MOV DATA TO IBUS REGISTER 13
013026  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013030  021265                                  21005!(13*20)           ;READ FROM IBUS REGISTER 13
013032  010005                                  MOV     R0,R5           ;PUT EXPECTED IN R5
013034  042705  000257                          BIC     #257,R5         ;CLEAR UNWANTED BITS
013040  116104  000005                          MOVB    5(R1),R4        ;PUT "FOUND" INTO R4
013044  042704  000257                          BIC     #257,R4         ;CLEAR UNWANTED BITS
013050  120504                                  CMPB    R5,R4           ;DATA CORRECT?
013052  001401                                  BEQ     68$             ;BR IF YES
013054  104003                                  HLT     3               ;ERROR
013056  104401                          68$:    SCOP1                   ;SW09=1?
013060  005100                                  COM     R0              ;CHANGE TO FLOATING 1
013062  000241                                  CLC                     ;CLEAR CARRY
013064  106000                                  ROLB    R0              ;SHIFT BIT IN R0
013066  001347                                  BNE     69$             ;IF R0=0 THEN DONE
```

```
                                                        SCOPE                   ;SCOPE THIS TEST


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

                                                        ;  TEST 10
                                                        ;--------------
013072  012737  000010  001226          TST10:  MOV     #10,TSTNO
013100  012737  013246  001216                  MOV     #TST11,NEXT
013106  012737  013126  001220                  MOV     #64$,LOOK
                                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
013114  104412                                 MSTCLR                          ;MASTER CLEAR DMC11
013116  012702  000014                          MOV     #14,R2                  ;SAVE REGISTER ADDRESS FOR TYPEOUT
013122  012700  000001                          MOV     #1,R0                   ;START WITH BIT 0
013126                                  64$:
013126  010061  000004                          MOV     R0,4(R1)                ;PUT PATTERN INTO PORT4
013132  104414                                 ROMC                            ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013134  122114                                 122100!14                       ;MOV DATA TO IBUS REGISTER 14
013136  104414                                 ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013140  021305                                 21005!(14*20)                   ;READ FROM IBUS REGISTER 14
013142  010005                                 MOV     R0,R5                   ;PUT EXPECTED IN R5
013144  116104  000005                          MOVB    5(R1),R4                ;PUT "FOUND" INTO R4
013150  120504                                 CMPB    R5,R4                   ;DATA CORRECT?
013152  001401                                 BEQ     65$                     ;BR IF YES
013154  104003                                 HLT     3                       ;ERROR
013156  104401                          65$:   SCOP1                           ;SW09=1?
013160  000241                                 CLC                             ;CLEAR CARRY
013162  106100                                 ROLB    R0                      ;SHIFT BIT IN R0
013164  001360                                 BNE     64$                     ;IF R0=0 THEN DONE
013166  012737  013202  001220                  MOV     #67$,LOOK               ;NEW SCOP1
013174  012700  000001                          MOV     #1,R0                   ;START WITH BIT 0
013200  005100                          69$:   COM     R0                      ;CHANGE TO FLOATING ZERO
013202                                  67$:
013202  010061  000004                          MOV     R0,4(R1)                ;PUT PATTERN INTO PORT4
013206  104414                                 ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013210  122114                                 122100!14                       ;MOV DATA TO IBUS REGISTER 14
013212  104414                                 ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013214  021305                                 21005!(14*20)                   ;READ FROM IBUS REGISTER 14
013216  010005                                 MOV     R0,R5                   ;PUT EXPECTED IN R5
013220  116104  000005                          MOVB    5(R1),R4                ;PUT "FOUND" INTO R4
013224  120504                                 CMPB    R5,R4                   ;DATA CORRECT?
013226  001401                                 BEQ     68$                     ;BR IF YES
013230  104003                                 HLT     3                       ;ERROR
013232  104401                          68$:   SCOP1                           ;SW09=1?
013234  005100                                 COM     R0                      ;CHANGE TO FLOATING 1
013236  000241                                 CLC                             ;CLEAR CARRY
013240  106100                                 ROLB    R0                      ;SHIFT BIT IN R0
013242  001356                                 BNE     69$                     ;IF R0=0 THEN DONE
013244  104400                                 SCOPE                           ;SCOPE THIS TEST


                                                        ;************************** TEST 11 **************************
```

DDS

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

                                                        ;  TEST 11
                                                        ;--------------
013246  012737  000011  001226          TST11:  MOV     #11,TSTNO
013254  012737  013310  001216                  MOV     #TST12,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
013262  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
013264  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=53C4
013266  021324                                  021324                  ;PORT4=LU15
013270  016104  000004                          MOV     4,R1),R4        ;PUT "FOUND" IN R4
013274  113705  001370                          MOVB    STAT2,R5        ;PUT "EXPECTED" IN R5
013300  120504                                  CMPB    R5,R4           ;SW OK?
013302  001401                                  BEQ     1$              ;BR IF YES
013304  104031                                  HLT     31              ;ERROR. SWITCH PAC READ ERROR
013306  104400                          1$:     SCOPE                   ;SCOPE THIS TEST


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

                                                        ;  TEST 12
                                                        ;--------------
013310  012737  000012  001226          TST12:  MOV     #12,TSTNO
013316  012737  013352  001216                  MOV     #TST13,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
013324  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
013326  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=53C4
013330  021344                                  021344                  ;PORT4=LU16
013332  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
013336  113705  001371                          MOVB    STAT2+1,R5      ;PUT "EXPECTED" IN R5
013342  120504                                  CMPB    R5,R4           ;SW OK?
013344  001401                                  BEQ     1$              ;BR IF YES
013346  104031                                  HLT     31              ;ERROR. SWITCH PAC READ ERROR
013350  104400                          1$:     SCOPE                   ;SCOPE THIS TEST


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

                                                        ;  TEST 13
                                                        ;--------------
013352  012737  000013  001226          TST13:  MOV     #13,TSTNO
013360  012737  013452  001216                  MOV     #TST14,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
013366  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
013370  005037  007364                          CLR     TEMP            ;PREPARE FOR DELAY
```

```
 2563  013374                                        1$:
 2564  013374  104414                                      ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2565  013376  021364                                      021364                  ;PORT4←LU-17
 2566  013400  032761  000002  000004                      BIT     #2.4(R1)        ;IS CLOCK BIT SET?
 2567  013406  001004                                      BNE     2$              ;BR IF YES
 2568  013410  005237  007364                             INC     TEMP            ;DELAY
 2569  013414  001367                                      BNE     1$      :DELAY FINISHED?
 2570  013416  104004                                      HLT     4               ;ERROR BIT IS STUCK CLEAR
 2571  013420  005037  007364                      2$:    CLR     TEMP            ;PREPARE FOR DELAY
 2572  013424                                        3$:
 2573  013424  104414                                      ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2574  013426  021364                                      021364                  ;PORT4←LU-17
 2575  013430  032761  000002  000004                      BIT     #2.4(R1)        ;IS CLOCK BIT CLEAR?
 2576  013436  001404                                      BEQ     4$              ;BR IF YES
 2577  013440  005237  007364                             INC     TEMP            ;DELAY
 2578  013444  001367                                      BNE     3$              ;BR IF DELAY NOT DONE
 2579  013446  104004                                      HLT     4               ;ERROR BIT IS STUCK SET
 2580  013450  104430                                4$:   SCOPE
 2581
 2582
 2583                                                    ;************************** TEST 14 **************************
 2584                                                    ;*OJT DATA SILO TEST
 2585                                                    ;*SET SOM AND LOAD OUT DATA SILO
 2586                                                    ;*VERIFY THAT OCOR SET, INDICATING THAT THE
 2587                                                    ;*CHARACTER IS AT THE BOTTOM OF THE OUT SILO
 2588                                                    ;;*********************************************************
 2589
 2590                                                    ;  TEST 14
 2591                                                    ;--------------
 2592  013452  012737  000014  001226          TST14:   MOV     #14,TSTNO
 2593  013460  012737  013552  001216                   MOV     #TST15,NEXT
 2594                                                                            ;R1 CONTAINS BASE DMC11 ADDRESS
 2595  013466  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
 2596  013470  012711  004000                           MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 2597  013474  012761  000001  000004                   MOV     #1,4(R1)        ;LOAD PORT4 WITH BIT0
 2598  013502  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2599  013504  122111                                   122111                  ;SET SOM
 2600  013506  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2601  013510  122110                                   122110                  ;LOAD OUT DATA SILO
 2602  013512  104416  000002                           TIMER.  2               ;WAIT FOR OCOR
 2603  013516  012702  000017                           MOV     #17,R2          ;SAVE ADDRESS FOR TYPEOUT
 2604  013522  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2605  013524  021364                                   021364                  ;PORT4←LU 17
 2606  013526  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
 2607  013532  042704  000357                           BIC     #357,R4         ;CLEAR UNWANTED BITS
 2608  013536  012705  000020                           MOV     #20,R5          ;PUT "EXPECTED" IN R5
 2609  013542  120504                                   CMPB    R5,R4           ;IS OCOR SET?
 2610  013544  001401                                   BEQ     1$              ;BR IF YES
 2611  013546  104005                                   HLT     5
 2612  013550                                  1$:
 2613  013550  104400                                   SCOPE                   ;SCOPE THIS TEST
 2614
 2615
 2616                                                    ;************************** TEST 15 **************************
 2617                                                    ;*DDCMP TEST OF RTS AND OUT ACTIVE
 2618                                                    ;*SET SOM AND LOAD OUT DATA SILO
```

```
                                        ;*SINGLE STEP 2 DATA CLOCKS, VERIFY
                                        ;*THAT RTS AND ACTIVE ARE SET
                                        ;;*****************************************************************

                                        ;  TEST 15
                                        ;--------------
013552  012737  000015  001226  TST15:  MOV     #15,TSTNO
013560  012737  013710  001216          MOV     #TST16,NEXT
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
013566  104412                          MSTCLR                  ;MASTER CLEAR DMC11
013570  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
013574  012761  000001  000004          MOV     #1,4(R1)        ;LOAD PORT4 WITH BIT0
013602  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013604  122111                          122111                  ;SET SOM
013606  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013610  122110                          122110                  ;LOAD OUT DATA SILO
013612  004737  026144                  JSR     PC,DCOR         ;WAIT FOR DCOR
013616  104415  000002                  DATACLK,        2       ;CLOCK DATA FOUR TIMES
013622  012702  000011                  MOV     #11,R2          ;SAVE ADDRESS FOR TYPEOUT
013626  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013630  021224                          021224                  ;PORT4=LU 11
013632  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
013636  042704  000257                  BIC     #257,R4         ;CLEAR UNWANTED BITS
013642  012705  000120                  MOV     #120,R5         ;PUT "EXPECTED" IN R5
013646  120504                          CMPB    R5,R4           ;IS ACTIVE SET?
013650  001401                          BEQ     1$              ;BR IF YES
013652  104005                          HLT     5
013654                          1$:
013654  012702  000013                  MOV     #13,R2          ;SAVE ADDRESS FOR TYPEOUT
013660  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
013662  021264                          021264                  ;PORT4=LU 13
013664  016104  000004                  MOV     4(R1),R4        ;PUT EXPECTED IN R4
013670  042704  000337                  BIC     #337,R4         ;CLEAR UNWANTED BITS
013674  012705  000040                  MOV     #BIT5,R5        ;PUT "EXPECTED" IN R5, RTS SHOULD BE SET
013700  120504                          CMPB    R5,R4           ;IS RTS OK?
013702  001401                          BEQ     2$              ;BR IF YES
013704  104005                          HLT     5               ;RTS ERROR
013706                          2$:
013706  104400                          SCOPE                   ;SCOPE THIS TEST


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

                                        ;  TEST 16
                                        ;--------------
013710  012737  000016  001226  TST16:  MOV     #16,TSTNO
013716  012737  014106  001216          MOV     #TST17,NEXT
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
013724  104412                          MSTCLR                  ;MASTER CLEAR DMC11
013726  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
013732  012761  000001  000004          MOV     #1,4(R1)        ;LOAD PORT4 WITH BIT0
```

```
 2681  013740  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2682  013742  122111                                    122111                  ;SET SOM
 2683  013744  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2684  013746  122110                                    122110                  ;LOAD OUT DATA SILO
 2685  013750  004737  026144                           JSR     PC,OCOR         ;WAIT FOR OCOR
 2686  013754  104415  000002                           DATACLK,        2       ;CLOCK DATA FOUR TIMES
 2687  013760  012761  000200  000004                   MOV     #BIT7,4(R1)     ;SET BIT7 IN PORT4
 2688  013766  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2689  013770  122111                                    122111                  ;SET OUT CLEAR
 2690  013772  104415  000001                           DATACLK,        1       ;GIVE A TICK TO CLEAR RTS
 2691  013776  012702  000017                           MOV     #17,R2          ;SAVE ADDRESS FOR TYPEOUT
 2692  014002  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2693  014004  021364                                    021364                  ;PORT4<-LU 17
 2694  014006  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
 2695  014012  042704  000357                           BIC     #357,R4         ;CLEAR UNWANTED BITS
 2696  014016  005005                                    CLR     R5              ;PUT "EXPECTED" IN R5
 2697  014020  120504                                    CMPB    R5,R4           ;IS OCOR CLEARED?
 2698  014022  001401                                    BEQ     1$              ;BR IF YES
 2699  014024  104005                                    HLT     5
 2700  014026                                  1$:
 2701  014026  012702  000013                           MOV     #13,R2          ;SAVE ADDRESS FOR TYPEOUT
 2702  014032  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2703  014034  021264                                    021264                  ;PORT4<-LU 13
 2704  014036  016104  000004                           MOV     4(R1),R4        ;PUT EXPECTED IN R4
 2705  014042  042704  000337                           BIC     #337,R4         ;CLEAR UNWANTED BITS
 2706  014046  005005                                    CLR     R5              ;PUT "EXPECTED" IN R5, RTS SHOULD BE CLEARED
 2707  014050  120504                                    CMPB    R5,R4           ;IS RTS OK?
 2708  014052  001401                                    BEQ     2$              ;BR IF YES
 2709  014054  104005                                    HLT     5               ;RTS ERROR
 2710  014056                                  2$:
 2711  014056  012702  000011                           MOV     #11,R2          ;SAVE ADDRESS FOR TYPEOUT
 2712  014062  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2713  014064  021224                                    021224                  ;PORT4<-LU11
 2714  014066  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
 2715  014072  012705  000020                           MOV     #BIT4,R5        ;ONLY OUT READY SHOULD BE SET
 2716  014076  120504                                    CMPB    R5,R4           ;IS ACTIVE CLEAR?
 2717  014100  001401                                    BEQ     3$              ;BR IF YES
 2718  014102  104005                                    HLT     5               ;ERROR ACTIVE NOT CLEARED
 2719  014104                                  3$:
 2720  014104  104400                                    SCOPE                   ;SCOPE THIS TEST
 2721
 2722
 2723                                                    ;*************************** TEST 17 ****************************
 2724                                                    ;*DDCMP TRANSMITTER TEST
 2725                                                    ;*SINGLE CLOCK THE CHARACTER 0
 2726                                                    ;*VERIFY EACH BIT POSITION AS IT
 2727                                                    ;*PASSES THE BIT WINDOW (SI BIT)
 2728                                                    ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
 2729                                                    ;;************************************************************
 2730
 2731                                                    ;  TEST 17
 2732                                                    ;--------------
 2733  014106  012737  000017  001226           TST17:  MOV     #17,TSTNO
 2734  014114  012737  014270  001216                   MOV     #TST20,NEXT
 2735                                                                            ;R1 CONTAINS BASE DMC11 ADDRESS
 2736  014122  104412                                    MSTCLR                  ;MASTER CLEAR DMC11
```

```
 2737  014124  012711  004000                      MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 2738  014130  004737  026276                      JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2739  014134  012761  000001  000004              MOV     #1,4(R1)        ;SET BIT0 IN PORT4
 2740  014142  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2741  014144  122111                              122111                  ;SET SOM!
 2742  014146  012705  000000                      MOV     #0,R5   ;LOAD CHARACTER IN R5 FOR TYPEOUT
 2743  014152  004737  026276                      JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2744  014156  010561  000004                      MOV     R5,4(R1)        ;LOAD PORT4 WITH CHARACTER
 2745  014162  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2746  014164  122110                              122110                  ;LOAD OUT DATA
 2747  014166  004737  026144                      JSR     PC,OCOR         ;WAIT FOR OCOR TO SET
 2748  014172  005003                              CLR     R3              ;CLEAR BIT COUNTER
 2749  014174  010502                              MOV     R5,R2           ;LOAD CHARACTER IN R2
 2750  014176  104415  000002                      DATACLK,        2       ;2 TICKS TO SET UP TRANSMITTER
 2751  014202  104415  000001              1$:     DATACLK,        1       ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
 2752  014206  106002                              RORB    R2              ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
 2753  014210  103005                              BCC     2$              ;BR IF CARRY CLEAR
 2754  014212  004737  026112                      JSR     PC,GETSI        ;GET THE WINDOW
 2755  014216  103406                              BCS     3$              ;BR IF BIT IS A MARK
 2756  014220  104006                              HLT     6               ;ERROR BIT WAS A SPACE
 2757  014222  000404                              BR      3$              ;CONTINE WITH TEST
 2758  014224  004737  026112              2$:     JSR     PC,GETSI        ;GET THE WINDOW
 2759  014230  103001                              BCC     3$              ;BR IF BIT IS A SPACE
 2760  014232  104006                              HLT     6               ;ERROR BIT WAS A MARK
 2761  014234                              3$:
 2762  014234  005203                              INC     R3              ;NEXT BIT
 2763  014236  022703  000010                      CMP     #10,R3          ;DONE YET?
 2764  014242  001357                              BNE     1$              ;BR IF NO
 2765  014244  104415  000014                      DATACLK,        14      ;CLOCK TRANSMITTER 14 MORE TICKS
 2766  014250  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2767  014252  021264                              021264                  ;PORT4=LL-13
 2768  014254  032761  000040  000004              BIT     #BIT5,4(R1      ;RTS SHOULD BE CLEAR NOW
 2769  014262  001401                              BEQ     4$              ;BR IF YES
 2770  014264  104034                              HLT     34              ;ERROR, RTS NOT CLEAR
 2771  014266  104400              4$:     SCOPE                           ;SCOPE THIS TEST
 2772
 2773
 2774                                              ;*************************** TEST 20 ****************************
 2775                                              ;*DDCMP TRANSMITTER TEST
 2776                                              ;*SINGLE CLOCK THE CHARACTER 125
 2777                                              ;*VERIFY EACH BIT POSITION AS IT
 2778                                              ;*PASSES THE BIT WINDOW (SI BIT)
 2779                                              ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
 2780                                              ;;************************************************************
 2781
 2782                                              ;  TEST 20
 2783                                              ;--------------
 2784  014270  012737  000020  001226      TST20:  MOV     #20,TSTNO
 2785  014276  012737  014452  001216              MOV     #TST21,NEXT
 2786                                                                      ;R1 CONTAINS BASE DMC11 ADDRESS
 2787  014304  104412                              MSTCLR                  ;MASTER CLEAR DMC11
 2788  014306  012711  004000                      MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 2789  014312  004737  026276                      JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2790  014316  012761  000001  000004              MOV     #1,4(R1)        ;SET BIT0 IN PORT4
 2791  014324  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2792  014326  122111                              122111                  ;SET SOM!
```

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 2793  014330  012705  000125                          MOV     #125,R5 ;LOAD CHARACTER IN R5 FOR TYPEOUT
 2794  014334  004737  026276                          JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2795  014340  010561  000004                          MOV     R5,4(R1)        ;LOAD PORT4 WITH CHARACTER
 2796  014344  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2797  014346  122110                                  122110                  ;LOAD OUT DATA
 2798  014350  004737  026144                          JSR     PC,OCOR         ;WAIT FOR OCOR TO SET
 2799  014354  005003                                  CLR     R3              ;CLEAR BIT COUNTER
 2800  014356  010502                                  MOV     R5,R2           ;LOAD CHARACTER IN R2
 2801  014360  104415  000002                          DATACLK,        2       ;2 TICKS TO SET UP TRANSMITTER
 2802  014364  104415  000001                  1$:     DATACLK,        1       ;SHIFT NEXT BIT IN THE WINDOW (SI BIT.
 2803  014370  106002                                  RORB    R2              ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
 2804  014372  103005                                  BCC     2$              ;BR IF CARRY CLEAR
 2805  014374  004737  026112                          JSR     PC,GETSI        ;GET THE WINDOW
 2806  014400  103406                                  BCS     3$              ;BR IF BIT IS A MARK
 2807  014402  104006                                  HLT     6               ;ERROR BIT WAS A SPACE
 2808  014404  000404                                  BR      3$              ;CONTINE WITH TEST
 2809  014406  004737  026112                  2$:     JSR     PC,GETSI        ;GET THE WINDOW
 2810  014412  103001                                  BCC     3$              ;BR IF BIT IS A SPACE
 2811  014414  104006                                  HLT     6               ;ERROR BIT WAS A MARK
 2812  014416                                  3$:
 2813  014416  005203                                  INC     R3              ;NEXT BIT
 2814  014420  022703  000010                          CMP     #10,R3          ;DONE YET?
 2815  014424  001357                                  BNE     1$              ;BR IF NO
 2816  014426  104415  000014                          DATACLK,        14      ;CLOCK TRANSMITTER 14 MORE TICKS
 2817  014432  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2818  014434  021264                                  021264                  ;PORT4=LU-13
 2819  014436  032761  000040  000004                  BIT     #BIT5,4(R1)     ;RTS SHOULD BE CLEAR NOW
 2820  014444  001401                                  BEQ     4$              ;BR IF YES
 2821  014446  104034                                  HLT     34              ;ERROR, RTS NOT CLEAR
 2822  014450  104400                          4$:     SCOPE                   ;SCOPE THIS TEST
 2823
 2824
 2825                                                  ;*************************** TEST 21 ****************************
 2826                                                  ;*DDCMP TRANSMITTER TEST
 2827                                                  ;*SINGLE CLOCK THE CHARACTER 252
 2828                                                  ;*VERIFY EACH BIT POSITION AS IT
 2829                                                  ;*PASSES THE BIT WINDOW (SI BIT)
 2830                                                  ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
 2831                                                  ;;************************************************************
 2832
 2833                                                  ;  TEST 21
 2834                                                  ;--------------
 2835  014452  012737  000021  001226          TST21:  MOV     #21,TSTNO
 2836  014460  012737  014634  001216                  MOV     #TST22,NEXT
 2837                                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
 2838  014466  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
 2839  014470  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 2840  014474  004737  026276                          JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2841  014500  012761  000001  000004                  MOV     #1,4(R1)        ;SET BIT0 IN PORT4
 2842  014506  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2843  014510  122111                                  122111                  ;SET SOM!
 2844  014512  012705  000252                          MOV     #252,R5 ;LOAD CHARACTER IN R5 FOR TYPEOUT
 2845  014516  004737  026276                          JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2846  014522  010561  000004                          MOV     R5,4(R1)        ;LOAD PORT4 WITH CHARACTER
 2847  014526  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2848  014530  122110                                  122110                  ;LOAD OUT DATA
```

```
 2849  014532  004737  026144                          JSR     PC,OCOR         ;WAIT FOR OCOR TO SET
 2850  014536  005003                                  CLR     R3              ;CLEAR BIT COUNTER
 2851  014540  010502                                  MOV     R5,R2           ;LOAD CHARACTER IN R2
 2852  014542  104415  000002                          DATACLK,        2       ;2 TICKS TO SET UP TRANSMITTER
 2853  014546  104415  000001                  1$:     DATACLK,        1       ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
 2854  014552  106002                                  RORB    R2              ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
 2855  014554  103005                                  BCC     2$              ;BR IF CARRY CLEAR
 2856  014556  004737  026112                          JSR     PC,GETSI        ;GET THE WINDOW
 2857  014562  103406                                  BCS     3$              ;BR IF BIT IS A MARK
 2858  014564  104006                                  HLT     6               ;ERROR BIT WAS A SPACE
 2859  014566  000404                                  BR      3$              ;CONTINE WITH TEST
 2860  014570  004737  026112                  2$:     JSR     PC,GETSI        ;GET THE WINDOW
 2861  014574  103001                                  BCC     3$              ;BR IF BIT IS A SPACE
 2862  014576  104006                                  HLT     6               ;ERROR BIT WAS A MARK
 2863  014600                                  3$:
 2864  014600  005203                                  INC     R3              ;NEXT BIT
 2865  014602  022703  000010                          CMP     #10,R3          ;DONE YET?
 2866  014606  001357                                  BNE     1$              ;BR IF NO
 2867  014610  104415  000014                          DATACLK,        14      ;CLOCK TRANSMITTER 14 MORE TICKS
 2868  014614  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2869  014616  021264                                  021264                  ;PORT4=LU-13
 2870  014620  032761  000040  000004                  BIT     #BIT5,4(R1)     ;RTS SHOULD BE CLEAR NOW
 2871  014626  001401                                  BEQ     4$              ;BR IF YES
 2872  014630  104034                                  HLT     34              ;ERROR, RTS NOT CLEAR
 2873  014632  104400                          4$:     SCOPE                   ;SCOPE THIS TEST
 2874
 2875
 2876                                                  ;************************** TEST 22 **************************
 2877                                                  ;*DDCMP TRANSMITTER TEST
 2878                                                  ;*SINGLE CLOCK THE CHARACTER 377
 2879                                                  ;*VERIFY EACH BIT POSITION AS IT
 2880                                                  ;*PASSES THE BIT WINDOW (SI BIT)
 2881                                                  ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
 2882                                                  ;:**********************************************************
 2883
 2884                                                  ;  TEST 22
 2885                                                  ;--------------
 2886  014634  012737  000022  001226          TST22:  MOV     #22,TSTNO
 2887  014642  012737  015016  001216                  MOV     #TST23,NEXT
 2888                                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
 2889  014650  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
 2890  014652  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 2891  014656  004737  026276                          JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2892  014662  012761  000001  000004                  MOV     #1,4(R1)        ;SET BIT0 IN PORT4
 2893  014670  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2894  014672  122111                                  122111                  ;SET SOM!
 2895  014674  012705  000377                          MOV     #377,R5 ;LOAD CHARACTER IN R5 FOR TYPEOUT
 2896  014700  004737  026276                          JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2897  014704  010561  000004                          MOV     R5,4(R1)        ;LOAD PORT4 WITH CHARACTER
 2898  014710  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2899  014712  122110                                  122110                  ;LOAD OUT DATA
 2900  014714  004737  026144                          JSR     PC,OCOR         ;WAIT FOR OCOR TO SET
 2901  014720  005003                                  CLR     R3              ;CLEAR BIT COUNTER
 2902  014722  010502                                  MOV     R5,R2           ;LOAD CHARACTER IN R2
 2903  014724  104415  000002                          DATACLK,        2       ;2 TICKS TO SET UP TRANSMITTER
 2904  014730  104415  000001                  1$:     DATACLK,        1       ;SHIFT NEXT BIT IN THE WINDOW (SI BIT)
```

```
 2905  014734  106002                          RORB    R2              ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
 2906  014736  103005                          BCC     2$              ;BR IF CARRY CLEAR
 2907  014740  004737  026112                  JSR     PC,GETSI        ;GET THE WINDOW
 2908  014744  103406                          BCS     3$              ;BR IF BIT IS A MARK
 2909  014746  104006                          HLT     6               ;ERROR BIT WAS A SPACE
 2910  014750  000404                          BR      3$              ;CONTINE WITH TEST
 2911  014752  004737  026112          2$:     JSR     PC,GETSI        ;GET THE WINDOW
 2912  014756  103001                          BCC     3$              ;BR IF BIT IS A SPACE
 2913  014760  104006                          HLT     6               ;ERROR BIT WAS A MARK
 2914  014762                          3$:
 2915  014762  005203                          INC     R3              ;NEXT BIT
 2916  014764  022703  000010                  CMP     #10,R3          ;DONE YET?
 2917  014770  001357                          BNE     1$              ;BR IF NO
 2918  014772  104415  000014                  DATACLK,        14      ;CLOCK TRANSMITTER 14 MORE TICKS
 2919  014776  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2920  015000  021264                          021264                  ;PORT4←LU-13
 2921  015002  032761  000040  000004          BIT     #BIT5,4(R1)     ;RTS SHOULD BE CLEAR NOW
 2922  015010  001401                          BEQ     4$              ;BR IF YES
 2923  015012  104034                          HLT     34              ;ERROR, RTS NOT CLEAR
 2924  015014  104400                  4$:     SCOPE                   ;SCOPE THIS TEST
 2925
 2926
 2927                                          ;************************** TEST 23 **************************
 2928                                          ;*DDCMP TRANSMITTER TEST
 2929                                          ;*SINGLE CLOCK A BINARY COUNT PATTERN
 2930                                          ;*VERIFY EACH BIT POSITION AS IT
 2931                                          ;*PASSES THE BIT WINDOW (SI BIT)
 2932                                          ;*ON AN ERROR, R3 CONTAINS BIT POSITION OF FAILURE
 2933                                          ;*AND R5 CONTAINS THE CHARACTER THAT FAILED
 2934                                          ;:************************************************************
 2935
 2936                                          ;  TEST 23
 2937                                          ;--------------
 2938  015016  012737  000023  001226  TST23:  MOV     #23,TSTNO
 2939  015024  012737  015224  001216          MOV     #TST24,NEXT
 2940                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
 2941  015032  104412                          MSTCLR                  ;MASTER CLEAR DMC11
 2942  015034  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 2943  015040  005003                          CLR     R3              ;R3 CONTAINS BIT COUNT
 2944  015042  005004                          CLR     R4              ;R4 CONTAINS CHAR TO BE LOADED IN SILO
 2945  015044  005005                          CLR     R5              ;R5 CONTAINS CHARACTER CURRENTLY BEING SHIFTED O
 2946  015046  004737  026276                  JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2947  015052  012761  000001  000004          MOV     #1,4(R1)        ;SET BIT0 IN PORT4
 2948  015060  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2949  015062  122111                          122111                  ;SET SOM!
 2950  015064  004737  026276                  JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2951  015070  010461  000004                  MOV     R4,4(R1)        ;LOAD PORT4 WITH CHARACTER
 2952  015074  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2953  015076  122110                          122110                  ;LOAD OUT DATA
 2954  015100  005204                          INC     R4              ;INCREMENT TO NEXT CHARACTER
 2955  015102  004737  026276                  JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
 2956  015106  010461  000004                  MOV     R4,4(R1)        ;LOAD PORT4 WITH CHARACTER
 2957  015112  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 2958  015114  122110                          122110                  ;LOAD OUT DATA
 2959  015116  004737  026144                  JSR     PC,OCOR         ;WAIT FOR OCOR TO SET
 2960  015122  104415  000002                  DATACLK,        2       ;2 TICKS TO SET UP TRANSMITTER
```

```
2961  015126  005003                          4$:   CLR     R3              ;CLEAR BIT COUNTER
2962  015130  010502                                MOV     R5,R2           ;LOAD CHARACTER IN R2
2963  015132  104415  000001                  1$:   DATACLK,        1       ;SHIFT NEXT BIT IN THE WINDOW (1 BIT)
2964  015136  106002                                RORB    R2              ;SHIFT NEXT SOFTWARE BIT IN TO CARRY
2965  015140  103005                                BCC     2$              ;BR IF CARRY CLEAR
2966  015142  004737  026112                       JSR     PC,GETSI        ;GET THE WINDOW
2967  015146  103406                                BCS     3$              ;BR IF BIT IS A MARK
2968  015150  104006                                HLT     6               ;ERROR BIT WAS A SPACE
2969  015152  000404                                BR      3$              ;CONTINE WITH TEST
2970  015154  004737  026112                  2$:   JSR     PC,GETSI        ;GET THE WINDOW
2971  015160  103001                                BCC     3$              ;BR IF BIT IS A SPACE
2972  015162  104006                                HLT     6               ;ERROR BIT WAS A MARK
2973  015164                                  3$:
2974  015164  005203                                INC     R3              ;NEXT BIT
2975  015166  022703  000010                       CMP     #10,R3          ;DONE YET?
2976  015172  001357                                BNE     1$              ;BR IF NO
2977  015174  005204                                INC     R4              ;NEXT CHARACTER
2978  015176  004737  026276                       JSR     PC,OUTRDY       ;WAIT FOR OUT-READY
2979  015202  010461  000004                       MOV     R4,4(R1)        ;LOAD PORT4 WITH CHARACTER
2980  015206  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
2981  015210  122110                                122110                  ;LOAD OUT DATA
2982  015212  005205                                INC     R5              ;NEXT CHARACTER
2983  015214  022705  000400                       CMP     #400,R5         ;DONE YET?
2984  015220  001342                                BNE     4$              ;BR IF NO
2985  015222  104400                          5$:   SCOPE                   ;SCOPE THIS TEST
2986
2987
2988                                                ;************************** TEST 24 **************************
2989                                                ;*DDCMP STRIP SYNC TEST
2990                                                ;*SET LU LOOP, SINGLE STEP 5 SYNCS,
2991                                                ;*VERIFY THAT IN ACTIVE DOES NOT SET
2992                                                ;:************************************************************
2993
2994                                                ;  TEST 24
2995                                                ;--------------
2996  015224  012737  000024  001226        TST24:  MOV     #24,TSTNO
2997  015232  012737  015312  001216                MOV     #TST25,NEXT
2998                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
2999  015240  104412                                MSTCLR                  ;MASTER CLEAR DMC11
3000  015242  012711  004000                       MOV     #BIT11,(R1)     ;SET LU LOOP
3001  015246  012702  000012                       MOV     #12,R2          ;SAVE LU REG FOR TYPEOUT
3002  015252  004737  026162                       JSR     PC,SYNC         ;SINGLE CLOCK 5 SYNC CHARACTERS
3003  015256  000005                               5
3004  015260  104415  000054                       DATACLK,        54
3005  015264  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3006  015266  021244                                021244                  ;PORT4←LU12
3007  015270  016104  000004                       MOV     4(R1),R4        ;PUT "FOUND" IN R4
3008  015274  042704  000277                       BIC     #277,R4         ;CLEAR UNWANTED BITS
3009  015300  005005                                CLR     R5              ;PUT "EXPECTED" IN R5
3010  015302  120504                                CMPB    R5,R4           ;IS ACTIVE CLEAR?
3011  015304  001401                                BEQ     1$              ;BR IF YES
3012  015306  104040                                HLT     40              ;ERROR ACTIVE IS NOT CLEAR
3013  015310  104400                          1$:   SCOPE                   ;SCOPE THIS TEST
3014
2015
2016                                                ;************************** TEST 25 **************************
```

```
3017                                                    ;*DDCMP IN ACTIVE TEST
3018                                                    ;*SET LU LOOP, SINGLE STEP 5 SYNCS AND A NON-SYNC (301)
3019                                                    ;*VERIFY THAT IN ACTIVE IS SET
3020                                                    ;;**************************************************************
3021
3022                                                    ;  TEST 25
3023                                                    ;--------------
3024  015312  012737  CJ0025  001226          TST25:   MOV     #25,TSTNO
3025  015320  012737  015402  001216                   MOV     #TST26,NEXT
3026                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
3027  015326  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
3028  015330  012711  004000                           MOV     #BIT11,(R1)     ;SET LU LOOP
3029  015334  012702  000012                           MOV     #12,R2          ;SAVE LU REG FOR TYPEOUT
3030  015340  004737  026162                           JSR     PC,SYNC         ;SINGLE CLOCK 5 SYNC CHARACTERS
3031  015344  000005                                   5
3032  015346  104415  000064                           DATACLK,        64
3033  015352  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3034  015354  021244                                   021244                  ;PORT4←LU12
3035  015356  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
3036  015362  042704  000277                           BIC     #277,R4         ;CLEAR UNWANTED BITS
3037  015366  012705  000100                           MOV     #BIT6,R5                ;PUT "EXPECTED" IN R5
3038  015372  120504                                   CMPB    R5,R4           ;IS ACTIVE SET?
3039  015374  001401                                   BEQ     1$              ;BR IF YES
3040  015376  104040                                   HLT     40              ;ERROR ACTIVE IS NOT SET
3041  015400  104400                          1$:      SCOPE                   ;SCOPE THIS TEST
3042
3043
3044                                                    ;************************** TEST 26 **************************
3045                                                    ;*DDCMP IN ACTIVE TEST
3046                                                    ;*SET LU LOOP, SINGLE STEP 1 SYNC AND A NON-SYNC (301)
3047                                                    ;*VERIFY THAT IN ACTIVE DOES NOT SET
3048                                                    ;;**************************************************************
3049
3050                                                    ;  TEST 26
3051                                                    ;--------------
3052  015402  012737  000026  001226          TST26:   MOV     #26,TSTNO
3053  015410  012737  015470  001216                   MOV     #TST27,NEXT
2054                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
3055  015416  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
3056  015420  012711  004000                           MOV     #BIT11,(R1)     ;SET LU LOOP
3057  015424  012702  000012                           MOV     #12,R2          ;SAVE LU REG FOR TYPEOJT
3058  015430  004737  026162                           JSR     PC,SYNC         ;SINGLE CLOCK 1 SYNC CHARACTERS
3059  015434  000001                                   1
3060  015436  104415  000024                           DATACLK,        24
3061  015442  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3062  015444  021244                                   021244                  ;PORT4←LU12
3063  015446  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
3064  015452  042704  000277                           BIC     #277,R4         ;CLEAR UNWANTED BITS
3065  015456  005005                                   CLR     R5              ;PUT "EXPECTED" IN R5
3066  015460  120504                                   CMPB    R5,R4           ;IS ACTIVE CLEAR?
3067  015462  001401                                   BEQ     1$              ;BR IF YES
3068  015464  104040                                   HLT     40              ;ERROR ACTIVE IS NOT CLEAR
3069  015466  104400                          1$:      SCOPE                   ;SCOPE THIS TEST
3070
3071
3072                                                    ;************************** TEST 27 **************************
```

```
3073                                                    ;*DDCMP IN ACTIVE TEST
3074                                                    ;*SET LU LOOP, SINGLE STEP 2 SYNCS AND A NON-SYNC (301)
3075                                                    ;*VERIFY THAT IN ACTIVE IS SET
3076                                                    ;:*****************************************************************
3077
3078                                                    ;  TEST 27
3079                                                    ;--------------
3080  015470  012737  000027  001226          TST27:   MOV     #27,TSTNO
3081  015476  012737  015560  001216                   MOV     #TST30,NEXT
3082                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
3083  015504  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
3084  015506  012711  004000                           MOV     #BIT11,(R1)     ;SET LU LOOP
3085  015512  012702  000012                           MOV     #12,R2          ;SAVE LU REG FOR TYPEOUT
3086  015516  004737  026162                           JSR     PC,SYNC         ;SINGLE CLOCK 2 SYNC CHARACTERS
3087  015522  000002                                   2
3088  015524  104415  000034                           DATACLK,        34
3089  015530  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3090  015532  021244                                   021244                  ;PORT4←LU12
3091  015534  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
3092  015540  042704  000277                           BIC     #277,R4         ;CLEAR UNWANTED BITS
3093  015544  012705  000100                           MOV     #BIT6,R5                ;PUT "EXPECTED" IN R5
3094  015550  120504                                   CMPB    R5,R4           ;IS ACTIVE SET?
3095  015552  001401                                   BEQ     1$              ;BR IF YES
3096  015554  104040                                   HLT     40              ;ERROR ACTIVE IS NOT SET
3097  015556  104400                          1$:      SCOPE                   ;SCOPE THIS TEST
3098
3099
3100                                                    ;************************** TEST 30 **************************
3101                                                    ;*IN CLEAR TEST
3102                                                    ;*SYNC UP RECEIVER AND TRANSMIT A CHARACTER
3103                                                    ;*WAIT FOR IN RDY, THEN SET IN CLEAR
3104                                                    ;*VERIFY THAT IN ACTIVE AND IN RDY ARE CLEARED
3105                                                    ;:*****************************************************************
3106
3107                                                    ;  TEST 30
3108                                                    ;--------------
3109  015560  012737  000030  001226          TST30:   MOV     #30,TSTNO
3110  015566  012737  015732  001216                   MOV     #TST31,NEXT
3111                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
3112  015574  104412                                   MSTCLR                  ;MASTER CLEAR DMC11
3113  015576  012702  000012                           MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
3114  015602  012711  004000                           MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
3115  015606  004737  026330                           JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
3116  015612  000301                                   30'                     ;AND A NON-SYNC  (301)
3117  015614  104415  000053                           DATACLK,        53      ;SINGLE CLOCK THE DATA
3118  015620  104416  000002                           TIMER,  2               ;WAIT FOR INRDY
3119  015624  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3120  015626  021244                                   021244                  ;PORT4←LU 12
3121  015630  016104  000004                           MOV     4(R1),R4        ;PUT "FOUND" IN R4
3122  015634  042704  000357                           BIC     #357,R4         ;CLEAR UNWANTED BITS
3123  015640  012705  000020                           MOV     #BIT4,R5                ;PUT "EXPECTED" IN R5
3124  015644  120504                                   CMPB    R5,R4           ;IS INRDY SET?
3125  015646  001401                                   BEQ     1$
3126  015650  104040                                   HLT     40              ;ERROR, INRDY IS NOT SET
3127  015652                                  1$:
3128  015652  012761  000200  000004                   MOV     #BIT7,4(R1)     ;LOAD PORT4
```

```
                                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
                                                122112                  ;SET IN CLEAR
                                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
                                                021244                  ;PORT4=LU 12
                                                MOV     4(R1),R4        ;PUT "FOUND" IN R4
                                                BIC     #277,R4         ;CLEAR UNWANTED BITS
                                                CLR     R5              ;PUT "EXPECTED" IN R5
                                                CMPB    R5,R4           ;IS IN ACTIVE CLEAR?
                                                BEQ     2$
                                                HLT     40              ;ERROR, IN ACTIVE IS NOT CLEAR
                                        2$:
                                                MOV     4(R1),R4        ;PUT "FOUND" IN R4
                                                BIC     #357,R4         ;CLEAR UNWANTED BITS
                                                CLR     R5              ;PUT "EXPECTED" IN R5
                                                CMPB    R5,R4           ;IS INRDY CLEARED?
                                                BEQ     3$
                                                HLT     40              ;ERROR, INRDY IS NOT CLEARED
                                        3$:     SCOPE                   ;SCOPE THIS TEST



                                                ;*************************** TEST 31 ****************************
                                                ;*DDCMP BASIC RECEICER TEST
                                                ;*SYNC UP RECEIVER AND SINGLE CLOCK THE CHARACTER 3
                                                ;*VERIFY THAT IN RDY IS SET, AND THAT THE CHARACTER WAS RECEIVED
                                                ;;*************************************************************

                                                ;  TEST 31
                                                ;--------------
 015736  012737  000031  001226         TS*31:  MOV     #31,TSTNO
 015740  012737  016346  001216                 MOV     #TST32,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
 015744  104412                                 MSTCLR                  ;MASTER CLEAR DMC11
 015746  012702  000012                         MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
 015752  012711  004000                         MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 015756  004737  026330                         JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
 015762  000000                                 0                       ;AND THE CHARACTER 0
 015764  104415  000053                         DATACLK,        53      ;SINGLE CLOCK THE DATA
 015770  104416  000002                         TIMER,  2               ;WAIT FOR INRDY
 015774  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 016000  021244                                 021244                  ;PORT4=LU 12
 016002  016104  000004                         MOV     4(R1),R4        ;PUT "FOUND" IN R4
 016006  042704  000357                         BIC     #357,R4         ;CLEAR UNWANTED BITS
 016012  012705  000020                         MOV     #BIT4,R5                ;PUT "EXPECTED" IN R5
 016016  120504                                 CMPB    R5,R4           ;IS INRDY SET?
 016020  001401                                 BEQ     1$
 016022  104040                                 HLT     40              ;ERROR, INRDY IS NOT SET
                                        1$:
 016024  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 016026  021204                                 021204                  ;PORT4=IN DATA
 016030  016104  000004                         MOV     4(R1),R4        ;PUT "FOUND" IN R4
 016034  005005                                 CLR     R5              ;PUT "EXPECTED" IN R5
 016036  120504                                 CMPB    R5,R4           ;WAS A 0 RECEIVED?
 016040  001401                                 BEQ     2$
 016042  104010                                 HLT     10              ;ERROR, RECEIVED DATA IS WRONG
 016044  104433                         2$:     SCOPE                   ;SCOPE THIS TEST
```

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

                                                        ;  TEST 32
                                                        ;-------------
016046  012737  000032  001226          TST32:  MOV     #32,TSTNO
016054  012737  016164  001216                  MOV     #TST33,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
016062  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
016064  012702  000012                          MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
016070  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
016074  004737  026330                          JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
016100  000125                                  125                     ;AND THE CHARACTER 125
016102  104415  000053                          DATACLK,        53      ;SINGLE CLOCK THE DATA
016106  104416  000002                          TIMER,  2               ;WAIT FOR INRDY
016112  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016114  021244                                  021244                  ;PORT4=LU 12
016116  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
016122  042704  000357                          BIC     #357,R4         ;CLEAR UNWANTED BITS
016126  012705  000020                          MOV     #BIT4,R5                ;PUT "EXPECTED" IN R5
016132  120504                                  CMPB    R5,R4           ;IS INRDY SET?
016134  001401                                  BEQ     1$
016136  104040                                  HLT     40              ;ERROR, INRDY IS NOT SET
016140                                  1$:
016140  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016142  021204                                  021204                  ;PORT4=IN DATA
016144  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
016150  012705  000125                          MOV     #125,R5         ;PUT "EXPECTED" IN R5
016154  120504                                  CMPB    R5,R4           ;WAS A 125 RECEIVED?
016156  001401                                  BEQ     2$
016160  104010                                  HLT     10              ;ERROR, RECEIVED DATA IS WRONG
016162  104400                          2$:     SCOPE                   ;SCOPE THIS TEST


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

                                                        ;  TEST 33
                                                        ;-------------
016164  012737  000033  001226          TST33:  MOV     #33,TSTNO
016172  012737  016302  001216                  MOV     #TST34,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
016200  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
016202  012702  000012                          MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
016206  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
016212  004737  026330                          JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
016216  000252                                  252                     ;AND THE CHARACTER 252
016220  104415  000053                          DATACLK,        53      ;SINGLE CLOCK THE DATA
016224  104416  000002                          TIMER,  2               ;WAIT FOR INRDY
```

```
016230  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016232  021244                          021244                  ;PORT4←LU 12
016234  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
016240  042704  000357                  BIC     #357,R4         ;CLEAR UNWANTED BITS
016244  012705  000020                  MOV     #BIT4,R5                ;PUT "EXPECTED" IN R5
016250  120504                          CMPB    R5,R4           ;IS INRDY SET?
016252  001401                          BEQ     1$
016254  104040                          HLT     40              ;ERROR, INRDY IS NOT SET
016256                          1$:
016256  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016260  021204                          021204                  ;PORT4←IN DATA
016262  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
016266  012705  000252                  MOV     #252,R5         ;PUT "EXPECTED" IN R5
016272  120504                          CMPB    R5,R4           ;WAS A 252 RECEIVED?
016274  001401                          BEQ     2$
016276  104010                          HLT     10              ;ERROR, RECEIVED DATA IS WRONG
016300  104420                  2$:     SCOPE                   ;SCOPE THIS TEST


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


                                        ;  TEST 34
                                        ;--------------
016302  012737  000034  001226  TST34:  MOV     #34,TSTNO
016310  012737  016420  001216          MOV     #TST35,NEXT

                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
016316  104412                          MSTCLR                  ;MASTER CLEAR DMC11
016320  012702  000012                  MOV     #12,R2          ;SAVE REG ADDRESS IN R2 FOR TYPEOUT
016324  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
016330  004737  026330                  JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
016334  000377                          377                     ;AND THE CHARACTER 377
016336  104415  000053                  DATACLK,        53      ;SINGLE CLOCK THE DATA
016342  104416  000002                  TIMER,  2               ;WAIT FOR INRDY
016346  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016350  021244                          021244                  ;PORT4←LU 12
016352  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
016356  042704  000357                  BIC     #357,R4         ;CLEAR UNWANTED BITS
016362  012705  000020                  MOV     #BIT4,R5                ;PUT "EXPECTED" IN R5
016366  120504                          CMPB    R5,R4           ;IS INRDY SET?
016370  001401                          BEQ     1$
016372  104040                          HLT     40              ;ERROR, INRDY IS NOT SET
016374                          1$:
016374  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016376  021204                          021204                  ;PORT4←IN DATA
016400  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
016404  012705  000377                  MOV     #377,R5         ;PUT "EXPECTED" IN R5
016410  120504                          CMPB    R5,R4           ;WAS A 377 RECEIVED?
016412  001401                          BEQ     2$
016414  104010                          HLT     10              ;ERROR, RECEIVED DATA IS WRONG
016416  104420                  2$:     SCOPE                   ;SCOPE THIS TEST
```

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

                                        ;  TEST 35
                                        ;--------------
016420  012737  000035  001226  TST35:  MOV     #35,TSTNO
016426  012737  016550  001216          MOV     #TST36,NEXT
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
016434  104412                          MSTCLR                  ;MASTER CLEAR DMC11
016436  005037  026746                  CLR     SCHAR           ;START BINARY COUNT AT ZERO
016442  005037  026750                  CLR     STUFLG          ;CLEAR BITSTUFF FLAG
016446  005002                          CLR     R2              ;R2 IS "EXPECTED" DATA
016450  012703  000073                  MOV     #73,R3          ;R3 IS CHARACTER COUNT
016454  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
016460  004737  026506                  JSR     PC,SILOLD       ;LOAD SILO WITH COUNT PATTERN
016464  104415  000043                  DATACLK,        43      ;SYNC RECEIVER AND GET IT ACTIVE
016470  104415  000730          1$:     DATACLK,        730     ;CLOCK IN 73 CHARACTERS
016474  004737  026752          4$:     JSR     PC,INRDY        ;WAIT FOR INRDY
016500  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
016502  021204                          021204                  ;PORT4=IN DATA
016504  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
016510  010205                          MOV     R2,R5           ;PUT "EXPECTED" IN R5
016512  120504                          CMPB    R5,R4           ;IS DATA CORRECT?
016514  001401                          BEQ     2$              ;BR IF YES
016516  104010                          HLT     10              ;DATA ERROR
016520  005202                  2$:     INC     R2              ;NEXT CHARACTER
016522  022702  000400                  CMP     #400,R2         ;ALL DONE?
016526  001407                          BEQ     3$              ;BR IF YES
016530  005303                          DEC     R3              ;DECREMENT CHARACTER COUNT
016532  001360                          BNE     4$              ;BR IF SILO NOT EMPTY
016534  004737  026506                  JSR     PC,SILOLD       ;LOAD SILO WITH MORE OF COUNT PATTERN
016540  012703  000073                  MOV     #73,R3          ;RELOAD CHARACTER COUNT
016544  000751                          BR      1$              ;CONTINUE
016546  104400                  3$:     SCOPE                   ;SCOPE THIS TEST


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

                                        ;  TEST 36
                                        ;--------------
016550  012737  000036  001226  TST36:  MOV     #36,TSTNO
016556  012737  016710  001216          MOV     #TST37,NEXT
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
016564  104412                          MSTCLR                  ;MASTER CLEAR DMC11
016566  005037  026746                  CLR     SCHAR           ;START BINARY COUNT AT ZERO
016572  005037  026750                  CLR     STUFLG          ;CLEAR BITSTUFF FLAG
016576  005002                          CLR     R2              ;R2 IS "EXPECTED" DATA
```

```
  3353  016600  012703  000073                        MOV     #73,R3          ;R3 IS CHARACTER COUNT
  3354  016604  005011                                CLR     (R1)            ;CLEAR LU LOOP IN MAINT REG
  3355  016606  012761  000040  000004                MOV     #BIT5,4(R1)     ;LOAD PORT4
  3356  016614  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  3357  016616  122112                                122112                  ;SET LU LOOP IN LU REG 12
  3358  016620  004737  026506                        JSR     PC,SILOLD       ;LOAD SILO WITH COUNT PATTERN
  3359  016624  104415  000043                        DATACLK,        43      ;SYNC RECEIVER AND GET IT ACTIVE
  3360  016630  104415  000730                1$:     DATACLK,        730     ;CLOCK IN 73 CHARACTERS
  3361  016634  004737  026752                4$:     JSR     PC,INRDY        ;WAIT FOR INRDY
  3362  016640  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  3363  016642  021204                                021204                  ;PORT4←IN DATA
  3364  016644  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
  3365  016650  010205                                MOV     R2,R5           ;PUT "EXPECTED" IN R5
  3366  016652  120504                                CMPB    R5,R4           ;IS DATA CORRECT?
  3367  016654  001401                                BEQ     2$              ;BR IF YES
  3368  016656  104010                                HLT     10              ;DATA ERROR
  3369  016660  005202                        2$:     INC     R2              ;NEXT CHARACTER
  3370  016662  022702  000400                        CMP     #400,R2         ;ALL DONE?
  3371  016666  001407                                BEQ     3$              ;BR IF YES
  3372  016670  005303                                DEC     R3              ;DECREMENT CHARACTER COUNT
  3373  016672  001360                                BNE     4$              ;BR IF SILO NOT EMPTY
  3374  016674  004737  026506                        JSR     PC,SILOLD       ;LOAD SILO WITH MORE OF COUNT PATTERN
  3375  016700  012703  000073                        MOV     #73,R3          ;RELOAD CHARACTER COUNT
  3376  016704  000751                                BR      1$              ;CONTINUE
  3377  016706  104400                        3$:     SCOPE                   ;SCOPE THIS TEST
  3378
  3379
  3380                                          ;*************************** TEST 37 ****************************
  3381                                          ;*TRANSMITTER MARK TEST
  3382                                          ;*SINGLE CLOCK 3 SYNCS AND A 301 AND 20 EXTRA
  3383                                          ;*CLOCK TICKS, VERIFY THAT A 301, A 377 AND A 377
  3384                                          ;*WERE RECEIVED INDICATING THAT THE TRANSMITTER WENT
  3385                                          ;*TO A MARK STATE FOR 16 BITS WHEN OUT SILO WAS EMPTY
  3386                                          ;;************************************************************
  3387
  3388                                          ;  TEST 37
  3389                                          ;--------------
  3390  016710  012737  000037  001226    TST37:  MOV     #37,TSTNO
  3391  016716  012737  017050  001216            MOV     #TST40,NEXT
  3392                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
  3393  016724  104412                                MSTCLR                  ;MASTER CLEAR DMC11
  3394  016726  012711  004000                        MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
  3395  016732  004737  026330                        JSR     PC,CHAR         ;LOAD SILO WITH 3 SYNCS
  3396  016736  000301                                301                     ;AND A 301
  3397  016740  104415  000073                        DATACLK,        73      ;CLOCK THE 301 IN AND 20 EXTRA TICKS
  3398  016744  004737  026752                        JSR     PC,INRDY        ;WAIT FOR INRDY
  3399  016750  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  3400  016752  021204                                021204                  ;PORT4←IN DATA
  3401  016754  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
  3402  016760  012705  000301                        MOV     #301,R5         ;PUT "EXPECTED" IN R5
  3403  016764  120504                                CMPB    R5,R4           ;WAS A 301 RECEIVED?
  3404  016766  001401                                BEQ     1$
  3405  016770  104010                                HLT     10              ;ERROR FIRST CHARACTER INCORRECT
  3406  016772  004737  026752                1$:     JSR     PC,INRDY        ;WAIT FOR INRDY
  3407  016776  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  3408  017000  021204                                021204                  ;PORT4←IN DATA
```

```
 3439  017002  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
 3440  017006  012705  000377                        MOV     #377,R5         ;PUT "EXPECTED" IN R5
 3441  017012  120504                                CMPB    R5,R4           ;WAS A 377 RECEIVED?
 3442  017014  001401                                BEQ     2$
 3443  017016  104010                                HLT     10              ;ERROR, 377 WAS NOT RECEIVED
 3444  017020  004737  026752                2$:     JSR     PC,INRDY        ;WAIT FOR INRDY
 3445  017024  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 3446  017026  021204                                021204                  ;PORT4←IN DATA
 3447  017030  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
 3448  017034  012705  000377                        MOV     #377,R5         ;PUT "EXPECTED" IN R5
 3449  017040  120504                                CMPB    R5,R4           ;WAS A 377 RECEIVED?
 3450  017042  001401                                BEQ     3$
 3451  017044  104010                                HLT     10              ;ERROR, 177 WAS NOT RECEIVED
 3452  017046  104400                3$:     SCOPE                           ;SCOPE THIS TEST
 3453
 3454
 3455                                          ;************************** TEST 40 **************************
 3456                                          ;*CABLE TURNAROUND TEST
 3457                                          ;*CLEAR LINE UNIT LOOP, SET DTR
 3458                                          ;*VERIFY THAT RING AND MODEM READY ARE SET
 3459                                          ;*CLEAR DTR, VERIFY THAT RING AND MRDY ARE CLEARED
 3460                                          ;;************************************************************
 3461
 3462                                          ;  TEST 40
 3463                                          ;--------------
 3464  017050  012737  000040  001226  TST40:  MOV     #40,TSTNO
 3465  017056  012737  017246  001216          MOV     #TST41,NEXT
 3466                                                                  ;R1 CONTAINS BASE DMC11 ADDRESS
 3467  017064  104412                                MSTCLR                  ;MASTER CLEAR DMC11
 3468  017066  032737  020000  001366                BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
 3469  017074  001004                                BNE     .+12            ;BR IF YES (DO TEST EVEN IF NO LOOP-BACK CONN)
 3470  017076  032737  040000  001366                BIT     #BIT14,STAT1    ;IS TURNAROUND CONNECTOR ON?
 3471  017104  001457                                BEQ     2$              ;SKIP TEST IF NO
 3472  017106  005011                                CLR     (R1)            ;CLEAR LINE UNIT LOOP
 3473  017110  012761  000100  000004                MOV     #100,4(R1)      ;LOAD PORT4
 3474  017116  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 3475  017120  122113                                122113                  ;SET DTR
 3476  017122  104416  000002                        TIMER,  2               ;WAIT
 3477  017126  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 3478  017130  021264                                021264                  ;PORT4←LU13
 3479  017132  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
 3480  017136  042704  000023                        BIC     #23,R4          ;CLEAR UNWANTED BITS
 3481  017142  012705  000310                        MOV     #310,R5         ;PUT "EXPECTED" IN R5
 3482  017146  032737  020000  001366                BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
 3483  017154  001402                                BEQ     .+6             ;BR IF NO
 3484  017156  042705  000200                        BIC     #BIT7,R5        ;NO RING ON M8202
 3485  017162  120504                                CMPB    R5,R4           ;ARE RING AND MRDY SET?
 3486  017164  001401                                BEQ     1$
 3487  017166  104011                                HLT     11              ;ERROR, RING OR MRDY NOT SET
 3488  017170  005061  000004                1$:     CLR     4(R1)           ;CLEAR PORT4
 3489  017174  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 3490  017176  122113                                122113                  ;CLEAR DTR
 3491  017200  104416  000002                        TIMER,  2
 3492  017204  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 3493  017206  021264                                021264                  ;PORT4←LU13
 3494  017210  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
```

```
 3465  017214  042704  000023                      BIC     #23,R4          ;CLEAR UNWANTED BITS
 3466  017220  005005                              CLR     R5              ;PUT "EXPECTED" IN R5
 3467  017222  032737  020000  001366              BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
 3468  017230  001402                              BEQ     .+6             ;BR IF NO
 3469  017232  052705  000010                      BIS     #BIT3,R5        ;MRDY SET ON M8202
 3470  017236  120504                              CMPB    R5,R4           ;ARE RING AND MRDY CLEAR?
 3471  017240  001401                              BEQ     2$
 3472  017242  104011                              HLT     11              ;ERROR, RING OR MRDY NOT CLEAR
 3473  017244  104400                      23:     SCOPE                   ;SCOPE THIS TEST
 3474
 3475
 3476                                              ;*************************** TEST 41 ****************************
 3477                                              ;*CABLE TURNAROUND TEST
 3478                                              ;*CLEAR LINE UNIT LOOP, LOAD OUT DATA SILO
 3479                                              ;*VERIFY THAT ALL MODEM SIGNALS ARE SET
 3480                                              ;;************************************************************
 3481
 3482                                              ;  TEST 41
 3483                                              ;--------------
 3484  017246  012737  000041  001236      TST41:  MOV     #41,TSTNO
 3485  017254  012737  017426  001216              MOV     #TST42,NEXT
 3486                                                                      ;R1 CONTAINS BASE DMC11 ADDRESS
 3487  017262  104412                              MSTCLR                  ;MASTER CLEAR DMC11
 3488  017264  032737  020000  001366              BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
 3489  017272  001004                              BNE     .+12            ;BR IF YES (DO TEST EVEN IF NO LOOP-BACK CONN)
 3490  017274  032737  040000  001366              BIT     #BIT14,STAT1    ;IS TURNAROUND CONNECTOR ON?
 3491  017302  001450                              BEQ     1$              ;SKIP TEST IF NO
 3492  017304  012711  004000                      MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 3493  017310  012761  000100  000004              MOV     #100,   4(R1)           ;LOAD PORT4
 3494  017316  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 3495  017320  122113                              122113                  ;CLEAR ALL MODEM SIGNALS,EXCEPT DTR
 3496  017322  104415  000002                      TIMER,  2               ;WAIT
 3497  017326  012761  000001  000004              MOV     #1,4(R1)        ;LOAD PORT4
 3498  017334  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCT  , ROMCLK PC=5304
 3499  017336  122111                              122111                  ;SET SOM
 3500  017340  004537  027412                      JSR     R5,MESLD        ;FILL OUT DATA SILO
 3501  017344  027674                              MESDAT                  ;WITH 64 CHARACTERS
 3502  017346  000100                              64.
 3503  017350  012700  000050                      MOV     #50,R0          ;PREPARE FOR DELAY
 3504  017354  005011                              CLR     (R1)            ;CLEAR LINE UNIT LOOP
 3505  017356                              2$:
 3506  017356  104414                              ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 3507  017360  021264                              021264                  ;PORT4=LU13
 3508  017362  016104  000004                      MOV     4(R1),R4        ;PUT "FOUND" IN R4
 3509  017366  042704  000023                      BIC     #23,R4          ;CLEAR UNWANTED BITS
 3510  017372  012705  000354                      MOV     #354,R5         ;PUT "EXPECTED" IN R5
 3511  017376  032737  020000  001366              BIT     #BIT13,STAT1    ;IS LINE UNIT M8202?
 3512  017404  001402                              BEQ     .+6             ;BR IF NO
 3513  017406  042705  000200                      BIC     #BIT7,R5        ;NO RING ON M8202
 3514  017412  120504                              CMPB    R5,R4           ;COMPARE EXPECTED AND FOUND
 3515  017414  001403                              BEQ     1$              ;BR IF OK
 3516  017416  005300                              DEC     R0              ;DEC DELAY COUNT
 3517  017420  001356                              BNE     2$              ;BR IF NOT ZERO
 3518  017422  104011                              HLT     11              ;ERROR, ALL SIGNALS ARE NOT SET
 3519  017424  104400                      1$:     SCOPE                   ;SCOPE THIS TEST
 3520
```

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

                                                        ;  TEST 42
                                                        ;--------------
017426  012737  000042  001236          TST42:  MOV     #42,TSTNO
017434  012737  017742  001316                  MOV     #TST43,NEXT
017442  012737  017456  001220                  MOV     #64$,LOCK

                                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
017450  104412                                  MSTCLR                          ;MASTER CLEAR DMC11
017452  012711  004000                          MOV     #BIT11,(R1)             ;SET L/B LOOP
017456  004737  027454                  64$:    JSR     PC,CLRIO                ;CLEAR BCC REGISTERS
017462  005000                                  CLR     R0                      ;START SHIFT COUNTER AT ZERO
017464  012737  120001  027110                  MOV     #CRC16,XPOLY            ;LOAD POLYNOMIAL FOR SOFTWARE BCC
017472  012737  000000  017532                  MOV     #0,66$                  ;LOAD CHAR FOR SOFTWARE BCC
017500  005037  017534                          CLR     67$                     ;CLEAR OLD SOFTWARE BCC
017504  004737  027114                          JSR     PC,BCCLD                ;LOAD OUT SILO WITH 2 SYNCS
017510  000000                                  0                               ;AND THE CHARACTER 0
017512  104415  000002                          DATACLK,        21              ;GET TRANSMITTER ACTIVE
017516  104415  000001                  65$:    DATACLK,        1               ;SHIFT BCC ONCE
017522  005200                                  INC     R0                      ;BUMP SHIFT COUNT
017524  004537  027004                          JSR     R5,SIMBCC               ;CALCULATE SOFTWARE BCC LSB
017530  000001                                  1                               ;ONE SHIFT
017532  000000                  66$:    0                               ;DATA CHARACTER
017534  000000                  67$:    0                               ;OLD BCC
017536  103405                          BCS     68$                     ;BR IF SOFT BCC LSB IS SET
017540  004737  027226                  JSR     PC,GETQO                ;GET HARDWARE TRANSMITTER BCC LSB
017544  103006                          BCC     69$                     ;BR IF HARD BCC LSB IS CLEAR
017546  104012                          HLT     12                      ;ERROR, BCC LSB IS SET
017550  000404                          BR      69$                     ;CONTINUE
017552  004737  027226          69$:    JSR     PC,GETQO                ;GET HARDWARE TRANSMITTER BCC LSB
017556  103001                          BCS     69$                     ;BR IF HARD BCC LSB IS SET
017560  104016                          HLT     16                      ;ERROR, HARD BCC LSB IS CLEAR
017562                          69$:
017562  006037  017532                  ROR     66$                     ;SHIFT SOFT DATA
017566  013737  027112  017534          MOV     CALBCC,67$              ;LOAD OLD SOFT BCC
017574  020027  000010                  CMP     #10,R0                  ;DONE YET?
017600  001046                          BNE     65$                     ;BR IF NOT DONE
017602  000401                          SCOP1                           ;SCOPE SUBTEST (SW09=1)
017604  012737  017612  001220          MOV     #71$,LOCK               ;NEW SCOPE1
017612  004737  027454          71$:    JSR     PC,CLRIO                ;CLEAR BCC REGISTERS
017616  005000                          CLR     R0                      ;START SHIFT COUNTER AT ZERO
017620  012737  120001  027110          MOV     #CRC16,XPOLY            ;LOAD POLYNOMIAL FOR SOFTWARE BCC
017626  012737  000000  017666          MOV     #0,73$                  ;LOAD CHAR FOR SOFTWARE BCC
017634  005037  017670                  CLR     74$                     ;CLEAR OLD SOFTWARE BCC
017640  004737  027114                  JSR     PC,BCCLD                ;LOAD OUT SILO WITH 2 SYNCS
017644  000000                          0                               ;AND THE CHARACTER 0
017646  104415  000032                  DATACLK,        32              ;GET RECEIVER ACTIVE
017652  104415  000001          72$:    DATACLK,        1               ;SHIFT BCC ONCE
017656  005200                          INC     R0                      ;BUMP SHIFT COUNT
017660  004537  027004                  JSR     R5,SIMBCC               ;CALCULATE SOFTWARE BCC LSB
```

J06


```
3577  017664  000001                          73$:    1                       ;ONE SHIFT
3578  017666  000000                                  0                       ;DATA CHARACTER
3579  017670  000000                          74$:    0                       ;OLD BCC
3580  017672  103405                                  BCS     75$             ;BR IF SOFT BCC LSB IS SET
3581  017674  004737  027240                          JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
3582  017700  103006                                  BCC     76$             ;BR IF HARD BCC LSB IS CLEAR
3583  017702  104013                                  HLT     13              ;ERROR, BCC LSB IS SET
3584  017704  000404                                  BR      76$             ;CONTINUE
3585  017706  004737  027240                  75$:    JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
3586  017712  103401                                  BCS     76$             ;BR IF HARD BCC LSB IS SET
3587  017714  104017                                  HLT     17              ;ERROR, BCC LSB IS CLEAR
3588  017716                                  76$:
3589  017716  006037  017666                          ROR     73$             ;SHIFT SOFT DATA
3590  017722  013737  027112  017670                  MOV     CALBCC,74$      ;LOAD OLD SOFT BCC
3591  017730  022700  000010                          CMP     #10,R0          ;DONE YET?
3592  017734  001346                                  BNE     72$             ;BR IF NOT DONE
3593  017736  104401                                  SCOP1                   ;SCOPE SUBTEST (SW09=1)
3594  017740  104400                          77$:    SCOPE                   ;SCOPE THIS TEST
3595
3596
3597                                                  ;************************** TEST 43 **************************
3598                                                  ;*TEST OF CRC OPERATION
3599                                                  ;*USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
3600                                                  ;*377, VERIFY THE LSB OF THE BCC ON EACH SHIFT
3601                                                  ;*TEST TRANSMITTER FIRST THEN THE RECEIVER BCC
3602                                                  ;;*********************************************************
3603
3604                                                  ;  TEST 43
3605                                                  ;--------------
3606  017742  012737  000043  001226          TST43:  MOV     #43,TSTNO
3607  017750  012737  020256  001216                  MOV     #TST44,NEXT
3608  017756  012737  017772  001220                  MOV     #64$,LOCK
3609                                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
3610  017764  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
3611  017766  012711  004000                          MOV     #BIT11,(R1)     ;SET LU LOOP
3612  017772  004737  027454                  64$:    JSR     PC,CLRIC        ;CLEAR BCC REGISTERS
3613  017776  005000                                  CLR     R0              ;START SHIFT COUNTER AT ZERO
3614  020000  012737  120001  027110                  MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
3615  020006  012737  000377  020046                  MOV     #377,66$;       ;LOAD CHAR FOR SOFTWARE BCC
3616  020014  005037  020050                          CLR     67$             ;CLEAR OLD SOFTWARE BCC
3617  020020  004737  027114                          JSR     PC,BCCLD        ;LOAD OUT SILO WITH 2 SYNCS
3618  020024  000377                                  377                     ;AND THE CHARACTER 377
3619  020026  104415  000021                          DATACLK,        21      ;GET TRANSMITTER ACTIVE
3620  020032  104415  000001                  65$:    DATACLK,        1       ;SHIFT BCC ONCE
3621  020036  005200                                  INC     R0              ;BUMP SHIFT COUNT
3622  020040  004537  027004                          JSR     R5,SIMBCC       ;CALCULATE SOFTWARE BCC LSB
3623  020044  000001                                  1                       ;ONE SHIFT
3624  020046  000000                          66$:    0                       ;DATA CHARACTER
3625  020050  000000                          67$:    0                       ;OLD BCC
3626  020052  103405                                  BCS     68$             ;BR IF SOFT BCC LSB IS SET
3627  020054  004737  027226                          JSR     PC,GETQO        ;GET HARDWARE TRANSMITTER BCC LSB
3628  020060  103006                                  BCC     69$             ;BR IF HARD BCC LSB IS CLEAR
3629  020062  104012                                  HLT     12              ;ERROR, BCC LSB IS SET
3630  020064  000404                                  BR      69$             ;CONTINUE
3631  020066  004737  027226                  68$:    JSR     PC,GETQO        ;GET HARDWARE TRANSMITTER BCC LSB
3632  020072  103401                                  BCS     69$             ;BR IF HARD BCC LSB IS SET
```

```
3633  020074  104016                                  HLT     16              ;ERROR, HARD BCC LSB IS CLEAR
3634  020076                                  69$:
3635  020076  006037  020046                          ROR     66$             ;SHIFT SOFT DATA
3636  020102  013737  027112  020050                  MOV     CALBCC,67$      ;LOAD OLD SOFT BCC
3637  020110  022700  000010                          CMP     #10,R0          ;DONE YET?
3638  020114  001346                                  BNE     65$             ;BR IF NOT DONE
3639  020116  104401                                  SCOP1                   ;SCOPE SUBTEST (SW09=1)
3640  020120  012737  020126  001220                  MOV     #71$,LOCK       ;NEW SCOPE1
3641  020126  004737  027454                  71$:    JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
3642  020132  005000                                  CLR     R0              ;START SHIFT COUNTER AT ZERO
3643  020134  012737  120001  027110                  MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
3644  020142  012737  000377  020202                  MOV     #377,73$;       ;LOAD CHAR FOR SOFTWARE BCC
3645  020150  005037  020204                          CLR     74$             ;CLEAR OLD SOFTWARE BCC
3646  020154  004737  027114                          JSR     PC,BCCLD        ;LOAD OUT SILO WITH 2 SYNCS
3647  020160  000377                                  377                     ;AND THE CHARACTER 377
3648  020162  104415  000032                          DATACLK,        32      ;GET RECEIVER ACTIVE
3649  020166  104415  000001                  72$:    DATACLK,        1       ;SHIFT BCC ONCE
3650  020172  005200                                  INC     R0              ;BUMP SHIFT COUNT
3651  020174  004537  027004                          JSR     R5,SIMBCC       ;CALCULATE SOFTWARE BCC LSB
3652  020200  000001                                  1                       ;ONE SHIFT
3653  020202  000000                  73$:            0                       ;DATA CHARACTER
3654  020204  000000                  74$:            0                       ;OLD BCC
3655  020206  103405                                  BCS     75$             ;BR IF SOFT BCC LSB IS SET
3656  020210  004737  027240                          JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
3657  020214  103006                                  BCC     76$             ;BR IF HARD BCC LSB IS CLEAR
3658  020216  104013                                  HLT     13              ;ERROR, BCC LSB IS SET
3659  020220  000404                                  BR      76$             ;CONTINUE
3660  020222  004737  027240                  75$:    JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
3661  020226  103401                                  BCS     76$             ;BR IF HARD BCC LSB IS SET
3662  020230  104017                                  HLT     17              ;ERROR, BCC LSB IS CLEAR
3663  020232                                  75$:
3664  020232  006037  020202                          ROR     73$             ;SHIFT SOFT DATA
3665  020236  013737  027112  020204                  MOV     CALBCC,74$      ;LOAD OLD SOFT BCC
3666  020244  022700  000010                          CMP     #10,R0          ;DONE YET?
3667  020250  001346                                  BNE     72$             ;BR IF NOT DONE
3668  020252  104401                                  SCOP1                   ;SCOPE SUBTEST (SW09=1)
3669  020254  104400                  77$:            SCOPE                   ;SCOPE THIS TEST
3670
3671
3672                                                  ;************************** TEST 44 **************************
3673                                                  ;*TEST OF CRC OPERATION
3674                                                  ;*USING THE CRC16 POLYNOMIAL, SINGLE CLOCK THE CHARACTER
3675                                                  ;*125, VERIFY THE LSB OF THE BCC ON EACH SHIFT
3676                                                  ;*TEST TRANSMITTER FIRST THEN THE RECEIVER BCC
3677                                                  ;;*************************************************************
3678
3679                                                  ;  TEST 44
3680                                                  ;-------------
3681  020256  012737  000044  001226          TST44:  MOV     #44,TSTNO
3682  020264  012737  020572  001216                  MOV     #TST45,NEXT
3683  020272  012737  020306  001220                  MOV     #64$,LOCK
3684                                                                          ;R1 CONTAINS BASE DMC11 ADDRESS
3685  020300  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
3686  020302  012711  004000                          MOV     #BIT11,(R1)     ;SET LU LOOP
3687  020306  004737  027454                  64$:    JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
3688  020312  005000                                  CLR     R0              ;START SHIFT COUNTER AT ZERO
```

```
3689  020314  012737  120001  027110                  MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
3690  020322  012737  000125  020362                  MOV     #125.66$.       ;LOAD CHAR FOR SOFTWARE BCC
3691  020330  005037  020364                          CLR     67$             ;CLEAR OLD SOFTWARE BCC
3692  020334  004737  027114                          JSR     PC,BCCLD        ;LOAD OUT SILO WITH 2 SYNCS
3693  020340  000125                                  125                     ;AND THE CHARACTER 125
3694  020342  104415  000021                          DATACLK,        21      ;GET TRANSMITTER ACTIVE
3695  020346  104415  000001              55$:        DATACLK,        1       ;SHIFT BCC ONCE
3696  020352  005200                                  INC     R0              ;BUMP SHIFT COUNT
3697  020354  004537  027004                          JSR     R5,SIMBCC       ;CALCULATE SOFTWARE BCC LSB
3698  020360  000001                                  1                       ;ONE SHIFT
3699  020362  000000              66$:        0                               ;DATA CHARACTER
3700  020364  000000              67$:        0                               ;OLD BCC
3701  020366  103405                          BCS     68$                     ;BR IF SOFT BCC LSB IS SET
3702  020370  004737  027226                  JSR     PC,GETQ0                ;GET HARDWARE TRANSMITTER BCC LSB
3703  020374  103006                          BCC     69$                     ;BR IF HARD BCC LSB IS CLEAR
3704  020376  104012                          HLT     12                      ;ERROR, BCC LSB IS SET
3705  020400  000404                          BR      69$                     ;CONTINUE
3706  020402  004737  027226              68$:        JSR     PC,GETQ0        ;GET HARDWARE TRANSMITTER BCC LSB
3707  020406  103401                          BCS     69$                     ;BR IF HARD BCC LSB IS SET
3708  020410  104016                          HLT     16                      ;ERROR, HARD BCC LSB IS CLEAR
3709  020412                              69$:
3710  020412  006037  020362                  ROR     66$                     ;SHIFT SOFT DATA
3711  020416  013737  027112  020364          MOV     CALBCC,67$              ;LOAD OLD SOFT BCC
3712  020424  022700  000010                  CMP     #10,R0                  ;DONE YET?
3713  020430  001346                          BNE     65$                     ;BR IF NOT DONE
3714  020432  104401                          SCOP1                           ;SCOPE SUBTEST (SW09=1)
3715  020434  012737  020442  001220          MOV     #71$,LOOK               ;NEW SCOPE1
3716  020442  004737  027454              71$:        JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
3717  020446  005000                          CLR     R0                      ;START SHIFT COUNTER AT ZERO
3718  020450  012737  120001  027110          MOV     #CRC16,XPOLY            ;LOAD POLYNOMIAL FOR SOFTWARE BCC
3719  020456  012737  000125  020516          MOV     #125.73$;               ;LOAD CHAR FOR SOFTWARE BCC
3720  020464  005037  020520                  CLR     74$                     ;CLEAR OLD SOFTWARE BCC
3721  020470  004737  027114                  JSR     PC,BCCLD                ;LOAD OUT SILO WITH 2 SYNCS
3722  020474  000125                          125                             ;AND THE CHARACTER 125
3723  020476  104415  000032                  DATACLK,        32              ;GET RECEIVER ACTIVE
3724  020502  104415  000001              72$:        DATACLK,        1       ;SHIFT BCC ONCE
3725  020506  005200                          INC     R0                      ;BUMP SHIFT COUNT
3726  020510  004537  027004                  JSR     R5,SIMBCC               ;CALCULATE SOFTWARE BCC LSB
3727  020514  000001                          1                               ;ONE SHIFT
3728  020516  000000              73$:        0                               ;DATA CHARACTER
3729  020520  000000              74$:        0                               ;OLD BCC
3730  020522  103405                          BCS     75$                     ;BR IF SOFT BCC LSB IS SET
3731  020524  004737  027240                  JSR     PC,GETQI                ;GET HARDWARE RECEIVER BCC LSB
3732  020530  103006                          BCC     76$                     ;BR IF HARD BCC LSB IS CLEAR
3733  020532  104013                          HLT     13                      ;ERROR, BCC LSB IS SET
3734  020534  000404                          BR      76$                     ;CONTINUE
3735  020536  004737  027240              75$:        JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
3736  020542  103401                          BCS     76$                     ;BR IF HARD BCC LSB IS SET
3737  020544  104017                          HLT     17                      ;ERROR, BCC LSB IS CLEAR
3738  020546                              76$:
3739  020546  006037  020516                  ROR     73$                     ;SHIFT SOFT DATA
3740  020552  013737  027112  020520          MOV     CALBCC,74$              ;LOAD OLD SOFT BCC
3741  020560  022700  000010                  CMP     #10,R0                  ;DONE YET?
3742  020564  001346                          BNE     72$                     ;BR IF NOT DONE
3743  020566  104401                          SCOP1                           ;SCOPE SUBTEST (SW09=1)
3744  020570  104400              77$:        SCOPE                           ;SCOPE THIS TEST
```

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

                                                ;  TEST 45
                                                ;--------------
020572  012737  000045  001226        TST45:  MOV     #45,TSTNO
020600  012737  021106  001216                MOV     #TST46,NEXT
020606  012737  020622  001220                MOV     #64$,LOCK
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
020614  104412                                MSTCLR                  ;MASTER CLEAR DMC11
020616  012711  004000                        MOV     #BIT11,(R1)     ;SET LU LOOP
020622  004737  027454              64$:      JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
020626  005000                                CLR     R0              ;START SHIFT COUNTER AT ZERO
020630  012737  120001  027110                MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
020636  012737  000252  020676                MOV     #252,66$;       ;LOAD CHAR FOR SOFTWARE BCC
020644  005037  020700                        CLR     67$             ;CLEAR OLD SOFTWARE BCC
020650  004737  027114                        JSR     PC,BCCLD        ;LOAD OUT SILO WITH 2 SYNCS
020654  000252                                252                     ;AND THE CHARACTER 252
020656  104415  000021                        DATACLK,        21      ;GET TRANSMITTER ACTIVE
020662  104415  000001              55$:      DATACLK,        1       ;SHIFT BCC ONCE
020666  005200                                INC     R0              ;BUMP SHIFT COUNT
020670  004537  027004                        JSR     R5,SIMBCC       ;CALCULATE SOFTWARE BCC LSB
020674  000001                                1                       ;ONE SHIFT
020676  000000              66$:      0                               ;DATA CHARACTER
020700  000000              67$:      0                               ;OLD BCC
020702  103405                                BCS     68$             ;BR IF SOFT BCC LSB IS SET
020704  004737  027226                        JSR     PC,GETQO        ;GET HARDWARE TRANSMITTER BCC LSB
020710  103006                                BCC     69$             ;BR IF HARD BCC LSB IS CLEAR
020712  104012                                HLT     12              ;ERROR, BCC LSB IS SET
020714  000404                                BR      69$             ;CONTINUE
020716  004737  027226              68$:      JSR     PC,GETQO        ;GET HARDWARE TRANSMITTER BCC LSB
020722  103401                                BCS     69$             ;BR IF HARD BCC LSB IS SET
020724  104016                                HLT     16              ;ERROR, HARD BCC LSB IS CLEAR
020726                              69$:
020726  006037  020676                        ROR     66$             ;SHIFT SOFT DATA
020732  013737  027112  020700                MOV     CALBCC,67$      ;LOAD OLD SOFT BCC
020740  022700  000010                        CMP     #10,R0          ;DONE YET?
020744  001346                                BNE     65$             ;BR IF NOT DONE
020746  104401                                SCOP1                   ;SCOPE SUBTEST (SW09=1)
020750  012737  020756  001220                MOV     #71$,LOCK       ;NEW SCOPE1
020756  004737  027454              71$:      JSR     PC,CLRIO        ;CLEAR BCC REGISTERS
020762  005000                                CLR     R0              ;START SHIFT COUNTER AT ZERO
020764  012737  120001  027110                MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFTWARE BCC
020772  012737  000252  021032                MOV     #252,73$;       ;LOAD CHAR FOR SOFTWARE BCC
021000  005037  021034                        CLR     74$             ;CLEAR OLD SOFTWARE BCC
021004  004737  027114                        JSR     PC,BCCLD        ;LOAD OUT SILO WITH 2 SYNCS
021010  000252                                252                     ;AND THE CHARACTER 252
021012  104415  000032                        DATACLK,        32      ;GET RECEIVER ACTIVE
021016  104415  000001              72$:      DATACLK,        1       ;SHIFT BCC ONCE
021022  005200                                INC     R0              ;BUMP SHIFT COUNT
```

```
3801  021024  004537  027004                        JSR     R5,SIMBCC       ;CALCULATE SOFTWARE BCC LSB
3802  021030  000001                                1                       ;ONE SHIFT
3803  021032  000000                        73$:    0                       ;DATA CHARACTER
3804  021034  000000                        74$:    0                       ;OLD BCC
3805  021036  103405                                BCS     75$             ;BR IF SOFT BCC LSB IS SET
3806  021040  004737  027240                        JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
3807  021044  103006                                BCC     76$             ;BR IF HARD BCC LSB IS CLEAR
3808  021046  104013                                HLT     13              ;ERROR, BCC LSB IS SET
3809  021050  000404                                BR      76$             ;CONTINUE
3810  021052  004737  027240                75$:    JSR     PC,GETQI        ;GET HARDWARE RECEIVER BCC LSB
3811  021056  103401                                BCS     76$             ;BR IF HARD BCC LSB IS SET
3812  021060  104017                                HLT     17              ;ERROR, BCC LSB IS CLEAR
3813  021062                                76$:
3814  021062  006037  021032                        ROR     73$             ;SHIFT SOFT DATA
3815  021066  013737  027112  021034                MOV     CALBCC,74$      ;LOAD OLD SOFT BCC
3816  021074  022700  000010                        CMP     #10,R0          ;DONE YET?
3817  021100  001346                                BNE     72$             ;BR IF NOT DONE
3818  021102  104401                                SCOP1                   ;SCOPE SUBTEST (SW09=1)
3819  021104  104400                        77$:    SCOPE                   ;SCOPE THIS TEST
3820
3821
3822                                                ;*************************** TEST 46 ****************************
3823                                                ;*TRANSMITTER CRC TEST
3824                                                ;*USING THE CRC16 POLYNOMINAL, SINGLE CLOCK A BINARY
3825                                                ;*COUNT PATTERN, VERIFY THE LSB OF THE TRANSMITTER BCC ON EACH SHIFT
3826                                                ;*****************************************************************
3827
3828                                                ;  TEST 46
3829                                                ;---------------
3830  021106  012737  000046  001226        TST46:  MOV     #46,TSTNO
3831  021114  012737  021344  001216                MOV     #TST47,NEXT
3832                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
3833  021122  104412                                MSTCLR                  ;MASTER CLEAR DMC11
3834  021124  012711  004000                        MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
3835  021130  005003                                CLR     R3              ;ZERO BIT COUNT
3836  021132  005004                                CLR     R4              ;R4 CONTAINS CHAR TO BE LOADED IN SILO
3837  021134  005005                                CLR     R5              ;R5 CONTAINS CHAR CURRENTLY BEING SHIFTED OUT
3838  021136  005037  021240                        CLR     4$              ;CLEAR SOFT BCC
3839  021142  012737  120001  027110                MOV     #CRC16,XPOLY    ;LOAD POLYNOMINAL
3840  021150  004737  027256                        JSR     PC,SYNLD        ;LOAD SILO WITH 2 SYNCS, SOM SET
3841  021154  010461  000004                        MOV     R4,4(R1)        ;PORT4<-CHAR
3842  021160  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3843  021162  122110                                122110                  ;LOAD OUT DATA
3844  021164  005204                                INC     R4              ;INCREMENT TO NEXT CHARACTER
3845  021166  010461  000004                        MOV     R4,4(R1)        ;PORT4<-CHAR
3846  021172  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3847  021174  122110                                122110                  ;LOAD OUT DATA
3848  021176  005204                                INC     R4              ;INCREMENT TO NEXT CHARACTER
3849  021200  010461  000004                        MOV     R4,4(R1)        ;PORT4<-CHAR
3850  021204  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
3851  021206  122110                                122110                  ;LOAD OUT DATA
3852  021210  004737  026144                        JSR     PC,OCOR         ;WAIT FOR OCOR
3853  021214  104415  000021                        DATACLK,21              ;CLOCK DATA
3854  021220  010537  021236                1$:     MOV     R5,3$           ;LOAD CHAR FOR SOFT CRC
3855  021224  104415  000001                2$:     DATACLK,1               ;SHIFT BCC ONCE
3856  021230  004537  027004                        JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
```

```
                                                        1                       ;SOFT SHIFT COUNT
                                                3$:     0                       ;SOFT CHARACTER
                                                4$:     0                       ;OLD SOFT BCC
                                                        BCS     5$              ;BR IF SOFT BCC LSB IS SET
                                                        JSR     PC,GETQO                ;GET HARDWARE TRANSMITTER BCC LSB
                                                        BCC     6$              ;BR IF OK (CLEARED.
                                                        HLT     20              ;ERROR, BCC LSB WAS SET
                                                        BR      6$              ;CONTINUE WITH TEST
                                                5$:     JSR     PC,GETQO                ;GET HARDWARE TRANSMITTER BCC LSB
                                                        BCS     6$              ;BR IF OK (SET)
                                                        HLT     21              ;ERROR, BCC LSB WAS CLEAR

                                                6$:
021266  006037  021236                            ROR     3$              ;SHIFT SOFT DATA
021272  013737  027112  021240                    MOV     CALBCC,4$       ;LOAD OLD SOFT BCC
021300  005203                                    INC     R3              ;INCREMENT BIT COUNTER
021302  022703  000010                            CMP     #10,R3          ;DONE A FULL CHARACTER YET?
021306  001346                                    BNE     2$              ;BR IF NO
021310  005033                                    CLR     R3              ;RESTART BIT COUNTER
021312  005204                                    INC     R4              ;INCREMENT DATA FOR SILO
021314  022704  000400                            CMP     #400,R4         ;DONE BINARY COUNT YET?
021320  003424                                    BLE     9$              ;BR IF YES
021322  010461  000004                            MOV     R4,4(R1)        ;PORT4←DATA
021326  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021330  122110                                    122110                  ;LOAD OUT DATA
021332  005205                                9$:     INC     R5              ;INCREMENT DATA
021334  022705  000400                            CMP     #400,R5         ;DONE BINARY PATTERN YET?
021340  001327                                    BNE     1$              ;BR IF NO
021342  104400                                7$:     SCOPE                   ;SCOPE THIS TEST


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

                                                ;  TEST 47
                                                ;--------------
021344  012737  000047  001226            TST47:  MOV     #47,TSTNO
021352  012737  021602  001216                    MOV     #TST5C,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
021360  104412                                    MSTCLR                  ;MASTER CLEAR DMC11
021362  012711  004000                            MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
021366  005003                                    CLR     R3              ;ZERO BIT COUNT
021370  005004                                    CLR     R4              ;R4 CONTAINS CHAR TO BE LOADED IN SILO
021372  005005                                    CLR     R5              ;R5 CONTAINS CHAR CURRENTLY BEING SHIFTED OUT
021374  005037  021476                            CLR     4$              ;CLEAR SOFT BCC
021400  012737  120001  027110                    MOV     #CRC16,XPOLY    ;LOAD POLYNOMINAL
021406  004737  027256                            JSR     PC,SYNLD        ;LOAD SILO WITH 2 SYNCS, SOM SET
021412  010461  000004                            MOV     R4,4(R1)        ;PORT4←CHAR
021416  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021420  122110                                    122110                  ;LOAD OUT DATA
021422  005204                                    INC     R4              ;INCREMENT TO NEXT CHARACTER
021424  010461  000004                            MOV     R4,4(R1)        ;PORT4←CHAR
021430  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
                                                122110                  ;LOAD OUT DATA
                                                INC     R4              ;INCREMENT TO NEXT CHARACTER
                                                MOV     R4,4(R1)        ;PORT4=CHAR
                                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
                                                122110                  ;LOAD OUT DATA
                                                JSR     PC,OCOR         ;WAIT FOR OCOR
                                                DATACLK,32              ;CLOCK DATA
                                        1$:     MOV     R5,3$           ;LOAD CHAR FOR SOFT CRC
                                        2$:     DATACLK,1               ;SHIFT BCC ONCE
                                                JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
                                                1                       ;SOFT SHIFT COUNT
                                        3$:     0                       ;SOFT CHARACTER
                                        4$:     0                       ;OLD SOFT BCC
                                                BCS     5$              ;BR IF SOFT BCC LSB IS SET
                                                JSR     PC,GETQI                ;GET HARDWARE RECEIVER BCC LSB
                                                BCC     6$              ;BR IF OK (CLEARED)
                                                HLT     22              ;ERROR, BCC LSB WAS SET
                                                BR      6$              ;CONTINUE WITH TEST
                                        5$:     JSR     PC,GETQI                ;GET HARDWARE RECEIVER BCC LSB
                                                BCS     6$              ;BR IF OK (SET)
                                                HLT     23              ;ERROR, BCC LSB WAS CLEAR

                                        6$:
021524  006037  021474                        ROR     3$              ;SHIFT SOFT DATA
021530  013737  027112  021476                MOV     CALBCC,4$       ;LOAD OLD SOFT BCC
021536  005203                                INC     R3              ;INCREMENT BIT COUNTER
021540  022703  000010                        CMP     #10,R3          ;DONE A FULL CHARACTER YET?
021544  001346                                BNE     2$              ;BR IF NO
021546  005003                                CLR     R3              ;RESTART BIT COUNTER
021550  005204                                INC     R4              ;INCREMENT DATA FOR SILO
021552  022704  000400                        CMP     #400,R4         ;DONE BINARY COUNT YET?
021556  003404                                BLE     9$              ;BR IF YES
021560  010461  000004                        MOV     R4,4(R1)        ;PORT4=DATA
021564  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
021566  122110                                122110                  ;LOAD OUT DATA
021570  005204                        9$:     INC     R5              ;INCREMENT DATA
021572  022705  000400                        CMP     #400,R5         ;DONE BINARY PATTERN YET?
021576  001321                                BNE     1$              ;BR IF NO
021600  104400                        7$:     SCOPE                   ;SCOPE THIS TEST


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

                                                ;  TEST 50
                                                ;--------------
021602  012737  000050  001226        TST50:  MOV     #50,TSTNO
021610  012737  022134  001216                MOV     #TST51,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
021616  104412                                MSTCLR                  ;MASTER CLEAR DMC11
```

```
 3969                                                   ;LOAD OUT DATA SILO
 3970
 3971  021620  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 3972  021624  012704  027674                          MOV     #MESDAT,R4      ;LOAD POINTER TO DATA
 3973  021630  005037  021724                          CLR     10$             ;CLEAR SOFT BCC
 3974  021634  012700  000004                          MOV     #4,R0           ;LOAD CHARACTER COUNT
 3975  021640  004737  027256                          JSR     PC,SYNLD        ;LOAD 2 SYNCS IN OUT SILO
 3976  021644  004737  026276                          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 3977  021650  004537  027412                          JSR     R5,MESLD        ;LOAD SILO WITH 4 CHAR MESS
 3978  021654  027674                                  MESDAT                  ;ADDRESS OF MESSAGE
 3979  021656  000004                                  4                       ;NUMBER OF CHARACTERS
 3980  021660  004737  027366                          JSR     PC,EOM          ;LOAD GARBAGE CHARACTER, WITH EOM SET
 3981  021664  004737  026144                          JSR     PC,OCOR         ;WAIT FOR OCOR
 3982  021670  005003                                  CLR     R3              ;CLEAR BIT COUNTER
 3983  021672  104415  000022                          DATACLK,22              ;CLOCK DATA
 3984  021676  112405                          12$:    MOVB    (R4)+,R5        ;LOAD R5 WITH CHAR
 3985  021700  010502                                  MOV     R5,R2           ;LOAD R2 WITH CHAR
 3986
 3987                                                   ;CHECK FIRST FOUR CHARACTER MESSAGE
 3988                                                   ;IN THE BIT WINDOW (0.125,252.377)
 3989
 3990  021702  012737  120001  027110                  MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
 3991  021710  012705  021722                          MOV     R5,67$          ;LOAD SOFT CHAR FOR BCC
 3992  021714  004537  027034                          JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
 3993  021720  000010                                  10                      ;SHIFT COUNT
 3994  021722  000000                          67$:    0                       ;CHARACTER
 3995  021724  000000                          10$:    0                       ;OLD BCC
 3996  021726  013737  027112  021724                  MOV     CALBCC,10$      ;LOAD SOFT BCC FOR NEXT SHIFT
 3997  021734  104415  000001                  64$:    DATACLK,1               ;SHIFT DATA IN TO BIT WINDOW
 3998  021740  106002                                  RORB    R2              ;SHIFT SOFT DATA
 3999  021742  103005                                  BCC     65$             ;BR IF A SPACE
 4000  021744  004737  026112                          JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4001  021750  103406                                  BCS     66$             ;BR IF OK (MARK)
 4002  021752  104006                                  HLT     6               ;ERROR, BIT WINDOW WAS A SPACE
 4003  021754  000404                                  BR      66$             ;CONTINUE
 4004  021756  004737  026112                  65$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4005  021762  103001                                  BCC     66$             ;BR IF OK (SPACE)
 4006  021764  104006                                  HLT     6               ;ERROR, BIT WINDOW WAS A MARK
 4007  021766                                  66$:
 4008  021766  005203                                  INC     R3              ;BUMP BIT COUNTER
 4009  021770  022703  000010                          CMP     #10,R3          ;DONE FULL 8 BITS YET
 4010  021774  001357                                  BNE     64$             ;BR IF NO
 4011  021776  005003                                  CLR     R3              ;CLEAR BIT COUNTER
 4012  022000  005300                                  DEC     R0              ;DEC CHARACTER COUNT
 4013  022002  001335                                  BNE     12$             ;BR IF NOT DONE YET
 4014
 4015                                                   ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW
 4016
 4017  022004  013700  027112                          MOV     CALBCC,R0       ;PUT BCC IN R0
 4018  022010  104415  000001                  68$:    DATACLK,1               ;SHIFT HARDWARE BCC
 4019  022014  006000                                  ROR     R0              ;SHIFT SOFT BCC
 4020  022016  103005                                  BCC     69$             ;BR IF CARRY CLEAR
 4021  022020  004737  026112                          JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4022  022024  103406                                  BCS     70$             ;BR IF OK (MARK)
 4023  022026  104014                                  HLT     14              ;ERROR, CRC WRONG (SPACE)
 4024  022030  000404                                  BR      70$             ;CONTINUE
```

```
 4025  022032  004737  026112          64$:  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4026  022036  103001                        BCC     70$             ;BR IF OK (SPACE)
 4027  022040  104014                        HLT     14              ;ERROR, CRC WRONG (MARK)
 4028  022042                          70$:
 4029  022042  005203                        INC     R3              ;BUMP BIT COUNTER
 4030  022044  022703  000020                CMP     #20,R3          ;FINISHED BCC YET?
 4031  022050  001357                        BNE     68$             ;BR IF NO
 4032  022052  005003                        CLR     R3              ;CLEAR BIT COUNTER
 4033
 4034                                        ;CHECK TO SEE IF TRANSMITTER IS MARKING
 4035
 4036  022054  104415  000001          2$:   DATACLK,        1       ;CLOCK TRANSMITTER
 4037  022060  004737  026112                JSR     PC,GETSI        ;LOOK AT WINDOW
 4038  022064  103401                        BCS     3$              ;IT SHOULD BE MARKING
 4039  022066  104024                        HLT     24              ;ERROR, BIT WAS A SPACE
 4040  022070  005203                  3$:   INC     R3              ;BUMP BIT COUNTER
 4041  022072  022703  000007                CMP     #7,R3           ;DONE YET
 4042  022076  001366                        BNE     2$              ;BR IF NO
 4043  022100  104415  000010                DATACLK,        10      ;GIVE ENOUGH TICKS TO CLEAR OUT ACTIVE
 4044  022104  005003                        CLR     R3              ;CLEAR BIT COUNTER
 4045  022106  104415  000001          4$:   DATACLK,        1       ;SHIFT OUT NEXT BIT
 4046  022112  004737  026112                JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4047  022116  103401                        BCS     .+4             ;BR IF IT IS A MARK
 4048  022120  104024                        HLT     24              ;ERROR, TRANSMITTER IS NOT MARKING
 4049  022122  005203                        INC     R3              ;INC BIT COUNT
 4050  022124  022703  000020                CMP     #20,R3          ;DONE YET?
 4051  022130  001366                        BNE     4$              ;BR IF NO
 4052  022132  104400                  5$:   SCOPE                   ;SCOPE THIS TEST
 4053
 4054
 4055                                        ;*************************** TEST 51 ****************************
 4056                                        ;*RECEIVER DDCMP CRC TEST
 4057                                        ;*THIS TEST CLOCKS A FOUR CHARACTER MESSAGE WITH BCC
 4058                                        ;*AND VERIFYS CORRECT DATA RECEPTION AND BCC MATCH
 4059                                        ;*THE FOUR CHARACTER MESSAGE IS 0,125,252,377
 4060                                        ;;************************************************************
 4061
 4062                                        ;  TEST 51
 4063                                        ;--------------
 4064  022134  012737  000051  001226  TST51: MOV     #51,TSTNO
 4065  022142  012737  022336  001216        MOV     #TST52,NEXT
 4066                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
 4067  022150  104412                        MSTCLR                  ;MASTER CLEAR DMC11
 4068  022152  012711  004000                MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 4069  022156  012702  027674                MOV     #MESDAT,R2      ;LOAD POINTER TO DATA
 4070  022162  012700  000004                MOV     #4,R0           ;LOAD CHARACTER COUNT
 4071  022166  004737  027256                JSR     PC,SYNLD        ;LOAD 2 SYNCS IN OUT SILO
 4072  022172  004737  026276                JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 4073  022176  004537  027412                JSR     R5,MESLD        ;LOAD SILO WITH 4 CHAR MESS
 4074  022202  027674                        MESDAT                  ;ADDRESS OF MESSAGE
 4075  022204  000004                        4                       ;NUMBER OF CHARACTERS
 4076  022206  004737  027366                JSR     PC,EOM          ;LOAD GARBAGE CHARACTER, WITH EOM SET
 4077  022212  004737  026144                JSR     PC,OCOR         ;WAIT FOR OCOR
 4078  022216  104415  000114                DATACLK,114             ;CLOCK DATA
 4079  022222  004737  026752          3$:   JSR     PC,INRDY        ;WAIT FOR INRDY
 4080  022226  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
 4088  022230  021204                                021204                  ;GET IN DATA
 4089  022232  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
 4090  022236  112205                                MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
 4091  022240  120504                                CMPB    R5,R4           ;COMPARE RECEIVED DATA
 4092  022242  001401                                BEQ     1$              ;BR IF OK
 4093  022244  104010                                HLT     10              ;DATA ERROR
 4094  022246  005300                         1$:    DEC     R0              ;DEC CHARACTER COUNT
 4095  022250  001364                                BNE     3$              ;BR IF NOT DONE YET
 4096
 4097                                                ;CHECK TO SEE THAT IN BCC MATCH IS SET
 4098
 4099  022252  004737  026752                        JSR     PC,INRDY        ;WAIT FOR INRDY
 4100  022256  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4101  022260  021204                                021204                  ;GET FIRST HALF OF CRC
 4102  022262  116137  000004  001252                MOVB    4(R1),TEMP3     ;PUT IN TEMP3
 4103  022270  042737  177400  001252                BIC     #177400,TEMP3   ;CLEAR HI BYTE
 4104  022276  004737  026752                        JSR     PC,INRDY        ;WAIT FOR INRDY
 4105  022302  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4106  022304  021244                                021244
 4107  022306  016104  000004                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
 4108  022312  042704  000376                        BIC     #376,R4         ;CLEAR UNWANTED BITS
 4109  022316  012705  000001                        MOV     #1,R5           ;PUT "EXPECTED" IN R5
 4110  022322  120504                                CMPB    R5,R4           ;IS IN BCC MATCH SET?
 4111  022324  001401                                BEQ     25$
 4112  022326  104015                                HLT     15              ;IN BCC MATCH ERROR
 4113  022330                                 25$:
 4114  022330  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4115  022332  021204                                021204                  ;GET LAST HALF
 4116  022334  104400                         2$:    SCOPE                   ;SCOPE THIS TEST
 4117
 4118
 4119                                                ;*************************** TEST 52 ****************************
 4120                                                ;*DDCMP EOM FUNCTION TEST
 4121                                                ;*THIS TEST LOADS OUT SILO WITH: 2 SYNCS,4 CHAR MESSAGE,EOM
 4122                                                ;*4 CHARACTER MESS,EOM. THE DATA STREAM IS CHECKED TO BE
 4123                                                ;*4 CHAR,BCC,4 CHAR,BCC,MARKS. THIS TEST VERIFYS THAT
 4124                                                ;*THE CHARCTERS LOADED WITH EOM SET ARE LOST
 4125                                                ;*ALL DATA AND BCC'S ARE CHECKED IN THE BIT WINDOW
 4126                                                ;*THE FOUR CHARACTER MESSAGE IS 0,125,252,377
 4127                                                ;*RECEIVED DATA IS VERIFIED, AND IN BCC MATCH IS CHECKED
 4128                                                ;:************************************************************
 4129
 4130                                                ;  TEST 52
 4131                                                ;--------------
 4132  022336  012737  000052  001226         TST52: MOV     #52,TSTNO
 4133  022344  012737  023436  001216                MOV     #TST53,NEXT
 4134                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
 4135  022352  104412                                MSTCLR                  ;MASTER CLEAR DMC11
 4136
 4137                                                ;LOAD OUT DATA SILO
 4138
 4139  022354  012711  004000                        MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 4140  022360  012704  027674                        MOV     #MESDAT,R4      ;LOAD POINTER TO DATA
 4141  022364  005037  022474                        CLR     10$             ;CLEAR SOFT BCC
 4142  022370  012700  000004                        MOV     #4,R0           ;LOAD CHARACTER COUNT
 4143  022374  004737  027256                        JSR     PC,SYNLD        ;LOAD 2 SYNCS IN OUT SILO
```

```
  4137  022400  004737  026276                        JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
  4138  022404  004537  027412                        JSR     R5,MESLD        ;LOAD SILO WITH 4 CHAR MESS
  4139  022410  027674                                MESDAT                  ;ADDRESS OF MESSAGE
  4140  022412  000004                                4                       ;NUMBER OF CHARACTERS
  4141  022414  004737  027366                        JSR     PC,EOM          ;LOAD GARBAGE CHARACTER, WITH EOM SET
  4142  022420  004537  027412                        JSR     R5,MESLD        ;LOAD FOUR MORE CHARACTERS
  4143  022424  027674                                MESDAT                  ;ADDRESS OF MESSAGE
  4144  022426  000004                                4                       ;NUMBER OF CHACTERS
  4145  022430  004737  027366                        JSR     PC,EOM          ;SET EOM
  4146  022434  004737  026144                        JSR     PC,OCOR         ;WAIT FOR OCOR
  4147  022440  005003                                CLR     R3              ;CLEAR BIT COUNTER
  4148  022442  104415  000022                        DATACLK,22              ;CLOCK DATA
  4149  022446  112405                        12$:    MOVB    (R4)+,R5        ;LOAD R5 WITH CHAR
  4150  022450  010502                                MOV     R5,R2           ;LOAD R2 WITH CHAR
  4151
  4152                                                ;CHECK FIRST FOUR CHARACTER MESSAGE
  4153                                                ;IN THE BIT WINDOW (0,125,252,377)
  4154
  4155  022452  012737  120001  027110                MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
  4156  022460  010537  022472                        MOV     R5,67$          ;LOAD SOFT CHAR FOR BCC
  4157  022464  004537  027004                        JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
  4158  022470  000010                                10                      ;SHIFT COUNT
  4159  022472  000000                        67$:    0                       ;CHARACTER
  4160  022474  000000                        10$:    0                       ;OLD BCC
  4161  022476  013737  027112  022474                MOV     CALBCC,10$      ;LOAD SOFT BCC FOR NEXT SHIFT
  4162  022504  104415  000001                64$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
  4163  022510  106002                                RORB    R2              ;SHIFT SOFT DATA
  4164  022512  103005                                BCC     65$             ;BR IF A SPACE
  4165  022514  004737  026112                        JSR     PC,GETSI        ;LOOK AT BIT WINDOW
  4166  022520  103406                                BCS     66$             ;BR IF OK (MARK)
  4167  022522  104006                                HLT     6               ;ERROR, BIT WINDOW WAS A SPACE
  4168  022524  000404                                BR      66$             ;CONTINUE
  4169  022526  004737  026112                65$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
  4170  022532  103001                                BCC     66$             ;BR IF OK (SPACE)
  4171  022534  104006                                HLT     6               ;ERROR, BIT WINDOW WAS A MARK
  4172  022536                                66$:
  4173  022536  005203                                INC     R3              ;BUMP BIT COUNTER
  4174  022540  022703  000010                        CMP     #10,R3          ;DONE FULL 8 BITS YET
  4175  022544  001357                                BNE     64$             ;BR IF NO
  4176  022546  005003                                CLR     R3              ;CLEAR BIT COUNTER
  4177  022550  005300                                DEC     R0              ;DEC CHARACTER COUNT
  4178  022552  001335                                BNE     12$             ;BR IF NOT DONE YET
  4179
  4180                                                ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW
  4181
  4182  022554  013700  027112                        MOV     CALBCC,R0       ;PUT BCC IN R0
  4183  022560  104415  000001                68$:    DATACLK,1               ;SHIFT HARDWARE BCC
  4184  022564  006000                                ROR     R0              ;SHIFT SOFT BCC
  4185  022566  103005                                BCC     69$             ;BR IF CARRY CLEAR
  4186  022570  004737  026112                        JSR     PC,GETSI        ;LOOK AT BIT WINDOW
  4187  022574  103406                                BCS     70$             ;BR IF OK (MARK)
  4188  022576  104014                                HLT     14              ;ERROR, CRC WRONG (SPACE)
  4189  022600  000404                                BR      70$             ;CONTINUE
  4190  022602  004737  026112                69$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
  4191  022606  103001                                BCC     70$             ;BR IF OK (SPACE)
  4192  022610  104014                                HLT     14              ;ERROR, CRC WRONG (MARK)
```

```
 4193  022612                                          70$:
 4194  022612  005203                                        INC     R3              ;BUMP BIT COUNTER
 4195  022614  022703  000020                                CMP     #20,R3          ;FINISHED BCC YET?
 4196  022620  001357                                      BNE     68$             ;BR IF NO
 4197  022622  005003                                      CLR     R3              ;CLEAR BIT COUNTER
 4198  022624  012700  000004                            MOV     #4,R0           ;RESET CHARACTER COUNTER
 4199  022630  012704  027674                            MOV     #MESDAT,R4      ;LOAD MESSAGE POINTER
 4200  022634  005037  022666                            CLR     11$             ;CLR SOFT BCC
 4201  022640  112405                                  13$:    MOVB    (R4)+,R5        ;LOAD CHAR IN R5
 4202  022642  010502                                      MOV     R5,R2           ;LOAD CHAR IN R2
 4203
 4204                                                    ;CHECK SECOND MESSAGE IN THE BIT WINDOW (0,125,252,377)
 4205
 4206  022644  012737  120001  027113                    MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
 4207  022652  010537  022664                            MOV     R5,76$          ;LOAD SOFT CHAR FOR BCC
 4208  022656  004537  027204                            JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
 4209  022662  000010                                    10                      ;SHIFT COUNT
 4210  022664  000000                                  76$:    0                       ;CHARACTER
 4211  022666  000000                                  11$:    0                       ;OLD BCC
 4212  022670  013737  027112  022666                    MOV     CALBCC,11$      ;LOAD SOFT BCC FOR NEXT SHIFT
 4213  022676  104415  000001                          73$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
 4214  022702  106002                                      RORB    R2              ;SHIFT SOFT DATA
 4215  022704  103005                                      BCC     74$             ;BR IF A SPACE
 4216  022706  004737  026112                            JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4217  022712  103406                                      BCS     75$             ;BR IF OK (MARK)
 4218  022714  104006                                      HLT     6               ;ERROR, BIT WINDOW WAS A SPACE
 4219  022716  000404                                      BR      75$             ;CONTINUE
 4220  022720  004737  026112                          74$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4221  022724  103001                                      BCC     75$             ;BR IF OK (SPACE)
 4222  022726  104006                                      HLT     6               ;ERROR, BIT WINDOW WAS A MARK
 4223  022730                                          75$:
 4224  022730  005203                                      INC     R3              ;BUMP BIT COUNTER
 4225  022732  022703  000010                            CMP     #10,R3          ;DONE FULL 8 BITS YET
 4226  022736  001357                                      BNE     73$             ;BR IF NO
 4227  022740  005003                                      CLR     R3              ;CLEAR BIT COUNTER
 4228  022742  005300                                      DEC     R0              ;DEC CHARACTER COUNT
 4229  022744  001335                                      BNE     13$             ;BR IF NOT DONE YET
 4230
 4231
 4232                                                    ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW
 4233  022746  013700  027112                            MOV     CALBCC,R0       ;PUT BCC IN R0
 4234  022752  104415  000001                          77$:    DATACLK,1               ;SHIFT HARDWARE BCC
 4235  022756  006000                                      ROR     R0              ;SHIFT SOFT BCC
 4236  022760  103005                                      BCC     78$             ;BR IF CARRY CLEAR
 4237  022762  004737  026112                            JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4238  022766  103406                                      BCS     79$             ;BR IF OK (MARK)
 4239  022770  104014                                      HLT     14              ;ERROR, CRC WRONG (SPACE)
 4240  022772  000404                                      BR      79$             ;CONTINUE
 4241  022774  004737  026112                          78$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4242  023000  103001                                      BCC     79$             ;BR IF OK (SPACE)
 4243  023002  104014                                      HLT     14              ;ERROR, CRC WRONG (MARK)
 4244  023004                                          79$:
 4245  023004  005203                                      INC     R3              ;BUMP BIT COUNTER
 4246  023006  022703  000020                            CMP     #20,R3          ;FINISHED BCC YET?
 4247  023012  001357                                      BNE     77$             ;BR IF NO
 4248  023014  005003                                      CLR     R3              ;CLEAR BIT COUNTER
```

```
                                                        ;CHECK TO SEE IF TRANSMITTER IS MARKING.

023216  104415  000001        2$:     DATACLK,        1       ;CLOCK TRANSMITTER
023220  004737  026112                JSR     PC,GETSI        ;LOOK AT WINDOW
023224  103401                        BCS     3$              ;IT SHOULD BE MARKING
023226  104024                        HLT     24              ;ERROR, BIT WAS A SPACE
023230  005203                3$:     INC     R3              ;BUMP BIT COUNTER
023232  022703  000007                CMP     #7,R3           ;DONE YET
023236  001366                        BNE     2$              ;BR IF NO
023240  104415  000010                DATACLK,        10      ;GIVE ENOUGH TICKS TO CLEAR OUT ACTIVE
023244  005003                        CLR     R3              ;CLEAR BIT COUNTER
023246  104415  000001        4$:     DATACLK,        1       ;SHIFT OUT NEXT BIT
023250  004737  026112                JSR     PC,GETSI        ;LOOK AT BIT WINDOW
023254  103401                        BCS     .+4             ;BR IF IT IS A MARK
023256  104024                        HLT     24              ;ERROR, TRANSMITTER IS NOT MARKING
023260  005203                        INC     R3              ;INC BIT COUNT
023262  022703  000020                CMP     #20.R3          ;DONE YET?
023266  001366                        BNE     4$              ;BR IF NO

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

023272  104415  000001                DATACLK,        1       ;GET LAST BIT IN RECEIVER
023274  012703  000004                MOV     #4,R3           ;R3=CHARACTER COUNT
023300  012702  027674                MOV     #MESDAT,R2      ;LOAD MESSAGE POINTER IN R2
023304  004737  026752        40$:    JSR     PC,INRDY        ;WAIT FOR INRDY
023310  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023312  021204                        021204
023314  016104  000004                MOV     4(R1),R4        ;PUT "FOUND" IN R4
023320  112205                        MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
023322  120504                        CMPB    R5,R4           ;IS RECEIVED DATA CORRECT?
023324  001401                        BEQ     41$             ;BR IF YES
023326  104010                        HLT     10              ;RECEIVE DATA ERROR
023330  005303                41$:    DEC     R3              ;DEC CHARACTER COUNT
023332  001364                        BNE     40$             ;BR IF NOT DONE YET

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

023334  004737  026752                JSR     PC,INRDY        ;WAIT FOR INRDY
023340  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023342  021204                        021204                  ;GET FIRST HALF OF CRC
023344  116137  000004  001252        MOVB    4(R1),TEMP3     ;PUT IN TEMP3
023352  042737  177400  001252        BIC     #177400,TEMP3   ;CLEAR HI BYTE
023360  004737  026752                JSR     PC,INRDY        ;WAIT FOR INRDY
023364  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
023366  021244                        021244
023370  016104  000004                MOV     4(R1),R4        ;PUT "FOUND" IN R4
023374  042704  000376                BIC     #376,R4         ;CLEAR UNWANTED BITS
023400  012705  000001                MOV     #1,R5           ;PUT "EXPECTED" IN R5
023404  120504                        CMPB    R5,R4           ;IS IN BCC MATCH SET?
023406  001401                        BEQ     50$
023410  104015                        HLT     15              ;IN BCC MATCH ERROR
023412                        50$:
023412  104414                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

```
 4305  023220  021204                                  021204                          ;GET LAST HALF
 4306  023222  116137  000004  001251                  MOVB    4(R1),TEMP2+1           ;PUT IN TEMP3
 4307  023230  042737  000377  001250                  BIC     #377,TEMP2              ;CLEAR LO BYTE
 4308  023236  053737  001250  001252                  BIS     TEMP2,TEMP3             ;16 BIT BCC NOW IN TEMP3
 4309  023244  023737  027112  001252                  CMP     CALBCC,TEMP3            ;IS IT CORRECT?
 4310  023252  001401                                  BEQ     42$                     ;BR IF OK
 4311  023254  104027                                  HLT     27
 4312
 4313                                                  ;CHECK TO SEE THAT SECOND FOUR CHARACTER MESSAGE
 4314                                                  ;WAS RECEIVED CORRECTLY (0,125,252,377)
 4315
 4316  023256  012703  000004                42$:     MOV     #4,R3                   ;R3=CHARACTER COUNT
 4317  023262  012702  027674                         MOV     #MESDAT,R2              ;LOAD MESSAGE POINTER IN R2
 4318  023266  004737  026752                43$:     JSR     PC,INRDY                ;WAIT FOR INRDY
 4319  023272  104414                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4320  023274  021204                                  021204
 4321  023276  016104  000004                         MOV     4(R1),R4                ;PUT "FOUND" IN R4
 4322  023302  112205                                  MOVB    (R2)+,R5                ;PUT "EXPECTED" IN R5
 4323  023304  120504                                  CMPB    R5,R4                   ;IS RECEIVED DATA CORRECT?
 4324  023306  001401                                  BEQ     44$                     ;BR IF YES
 4325  023310  104010                                  HLT     10                      ;RECEIVE DATA ERROR
 4326  023312  005303                44$:     DEC     R3                      ;DEC CHARACTER COUNT
 4327  023314  001364                                  BNE     43$                     ;BR IF NOT DONE YET
 4328
 4329                                                  ;CHECK TO SEE THAT IN BCC MATCH IS SET
 4330                                                  ;AND THAT THE BCC WAS RECEIVED CORRECTLY
 4331
 4332  023316  004737  026752                         JSR     PC,INRDY                ;WAIT FOR INRDY
 4333  023322  104414                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4334  023324  021204                                  021204                          ;GET FIRST HALF OF CRC
 4335  023326  116137  000004  001252                  MOVB    4(R1),TEMP3             ;PUT IN TEMP3
 4336  023334  042737  177400  001252                  BIC     #177400,TEMP3           ;CLEAR HI BYTE
 4337  023342  004737  026752                         JSR     PC,INRDY                ;WAIT FOR INRDY
 4338  023346  104414                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4339  023350  021244                                  021244
 4340  023352  016104  000004                         MOV     4(R1),R4                ;PUT "FOUND" IN R4
 4341  023356  042704  000376                         BIC     #376,R4                 ;CLEAR UNWANTED BITS
 4342  023362  012705  000001                         MOV     #1,R5                   ;PUT "EXPECTED" IN R5
 4343  023366  120504                                  CMPB    R5,R4                   ;IS IN BCC MATCH SET?
 4344  023370  001401                                  BEQ     51$
 4345  023372  104015                                  HLT     15                      ;IN BCC MATCH ERROR
 4346  023374                                51$:
 4347  023374  104414                                  ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4348  023376  021204                                  021204                          ;GET LAST HALF
 4349  023400  116137  000004  001251                  MOVB    4(R1),TEMP2+1           ;PUT IN TEMP2
 4350  023406  042737  000377  001250                  BIC     #377,TEMP2              ;CLEAR LO BYTE
 4351  023414  053737  001250  001252                  BIS     TEMP2,TEMP3             ;16 BIT BCC NOW IN TEMP3
 4352  023422  023737  027112  001252                  CMP     CALBCC,TEMP3            ;IS IT CORRECT?
 4353  023430  001401                                  BEQ     5$                      ;BR IF OK
 4354  023432  104027                                  HLT     27
 4355  023434  104400                5$:      SCOPE                           ;SCOPE THIS TEST
 4356
 4357
 4358                                                  ;********** TEST 53 **********
 4359                                                  ;*DDCMP EOM FUNCTION TEST
 4360                                                  ;*THIS TEST LOADS OUT SILO WITH: 2 SYNCS,4 CHAR MESSAGE,EOM
```

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

                                        ;  TEST 53
                                        ;--------------
023436  012737  000053  001226  TST53:  MOV     #53,TSTNO
023444  012737  024636  001216          MOV     #TST54,NEXT
                                                                ;R1 CONTAINS BASE DMC11 ADDRESS
023452  104412                          MSTCLR                  ;MASTER CLEAR DMC11

                                        ;LOAD OUT DATA SILO

023454  012711  004000                  MOV     #3IT11,(R1)     ;SET LINE UNIT LOOP
023460  012704  027674                  MOV     #MESDAT,R4      ;LOAD POINTER TO DATA
023464  005037  023600                  CLR     10$             ;CLEAR SOFT BCC
023470  012700  000004                  MOV     #4,R0           ;LOAD CHARACTER COUNT
023474  004737  027256                  JSR     PC,SYNLD        ;LOAD 2 SYNCS IN OUT SILO
023500  004737  026276                  JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
023504  004537  027412                  JSR     R5,MESLD        ;LOAD SILO WITH 4 CHAR MESS
023510  027674                          MESDAT                  ;ADDRESS OF MESSAGE
023512  000004                          4                       ;NUMBER OF CHARACTERS
023514  004737  027366                  JSR     PC,EOM          ;LOAD GARBAGE CHARACTER, WITH EOM SET
023520  004737  027336                  JSR     PC,SOM          ;LOAD GARBAGE CHAR WITH SOM SET
023524  004537  027412                  JSR     R5,MESLD        ;LOAD FOUR MORE CHARACTERS
023530  027674                          MESDAT                  ;ADDRESS OF MESSAGE
023532  000004                          4                       ;NUMBER OF CHACTERS
023534  004737  027366                  JSR     PC,EOM          ;SET EOM
023540  004737  026144                  JSR     PC,OCOR         ;WAIT FOR OCOR
023544  005003                          CLR     R3              ;CLEAR BIT COUNTER
023546  104415  000022                  DATACLK,22              ;CLOCK DATA
023552  112405                  12$:    MOVB    (R4)+,R5        ;LOAD R5 WITH CHAR
023554  010502                          MOV     R5,R2           ;LOAD R2 WITH CHAR

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

023556  012737  120001  027110          MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
023564  010537  023576                  MOV     R5,67$          ;LOAD SOFT CHAR FOR BCC
023570  004537  027004                  JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
023574  000010                          10                      ;SHIFT COUNT
023576  000000                  67$:    0                       ;CHARACTER
023600  000000                  10$:    0                       ;OLD BCC
023602  013737  027112  023600          MOV     CALBCC,10$      ;LOAD SOFT BCC FOR NEXT SHIFT
023610  104415  000001          64$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
023614  106002                          RORB    R2              ;SHIFT SOFT DATA
023616  103005                          BCC     65$             ;BR IF A SPACE
023620  004737  026112                  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
023624  103406                          BCS     66$             ;BR IF OK (MARK)
023626  104006                          HLT     6               ;ERROR, BIT WINDOW WAS A SPACE
023630  000404                          BR      66$             ;CONTINUE
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4417  023632  004737  026112          65$:  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
4418  023636  103001                        BCC     66$             ;BR IF OK (SPACE)
4419  023640  104006                        HLT     6               ;FRROR, BIT WINDOW WAS A MARK
4420  023642                          66$:
4421  023642  005203                        INC     R3              ;BUMP BIT COUNTER
4422  023644  022703  000010                CMP     #10,R3          ;DONE FULL 8 BITS YET
4423  023650  001357                        BNE     64$             ;BR IF NO
4424  023652  005003                        CLR     R3              ;CLEAR BIT COUNTER
4425  023654  005300                        DEC     R0              ;DEC CHARACTER COUNT
4426  023656  001335                        BNE     12$             ;BR IF NOT DONE YET
4427
4428                                        ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW
4429
4430  023660  013700  027112                MOV     CALBCC,R0       ;PUT BCC IN R0
4431  023664  104415  000001          68$:  DATACLK,1               ;SHIFT HARDWARE BCC
4432  023670  006000                        ROR     R0              ;SHIFT SOFT BCC
4433  023672  103005                        BCC     69$             ;BR IF CARRY CLEAR
4434  023674  004737  026112                JSR     PC,GETSI        ;LOOK AT BIT WINDOW
4435  023700  103406                        BCS     70$             ;BR IF OK (MARK)
4436  023702  104014                        HLT     14              ;ERROR, CRC WRONG (SPACE)
4437  023704  000404                        BR      70$             ;CONTINUE
4438  023706  004737  026112          69$:  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
4439  023712  103001                        BCC     70$             ;BR IF OK (SPACE)
4440  023714  104014                        HLT     14              ;ERROR, CRC WRONG (MARK)
4441  023716                          70$:
4442  023716  005203                        INC     R3              ;BUMP BIT COUNTER
4443  023720  022703  000020                CMP     #20,R3          ;FINISHED BCC YET?
4444  023724  001357                        BNE     68$             ;BR IF NO
4445  023726  005003                        CLR     R3              ;CLEAR BIT COUNTER
4446
4447                                        ;CHECK CHARACTER LOADED WITH SOM (000), IN THE BIT WINDOW
4448
4449  023730  005005                        CLR     R5              ;CHARACTER LOADED WITH SOM
4450  023732  010502                        MOV     R5,R2           ;LOAD R2 WITH CHAR
4451  023734  104415  000001          32$:  DATACLK,        1       ;CLOCK TRANSMITTER
4452  023740  106002                        RORB    R2              ;SHIFT SOFT DATA
4453  023742  103005                        BCC     30$             ;BR IF SPACE
4454  023744  004737  026112                JSR     PC,GETSI        ;LOOK AT BIT WINDOW
4455  023750  103406                        BCS     31$             ;BR IF OK (MARK)
4456  023752  104006                        HLT     6               ;ERROR,BIT WINDOW WAS A SPACE
4457  023754  000404                        BR      31$             ;CONTINUE
4458  023756  004737  026112          30$:  JSR     PC,GETSI        ;LOOK AT BIT WINDOW
4459  023762  103001                        BCC     31$             ;BR IF OK (SPACE)
4460  023764  104006                        HLT     6               ;ERROR,BIT WINDOW WAS A MARk
4461  023766  005203                  31$:  INC     R3              ;BUMP BIT COUNTER
4462  023770  022703  000010                CMP     #10,R3          ;DONE CHARACTER YET?
4463  023774  001357                        BNE     32$             ;BR IF NO
4464  023776  005003                        CLR     R3              ;RESET BIT COUNTER
4465  024000  012700  000004                MOV     #4,R0           ;RESET CHARACTER COUNTER
4466  024004  012704  027674                MOV     #MESDAT,R4      ;LOAD MESSAGE POINTER
4467  024010  005037  024042                CLR     11$             ;CLR SOFT BCC
4468  024014  112405                  13$:  MOVB    (R4)+,R5        ;LOAD CHAR IN R5
4469  024016  010502                        MOV     R5,R2           ;LOAD CHAR IN R2
4470
4471                                        ;CHECK SECOND MESSAGE IN THE BIT WINDOW (0,125,252,377)
4472
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```
 4473  024020  012737  120001  027110                 MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL
 4474  024026  010537  024040                         MOV     R5,76$          ;LOAD SOFT CHAR FOR BCC
 4475  024032  004537  027004                         JSR     R5,SIMBCC       ;CALCULATE SOFT BCC
 4476  024036  000010                                 10                      ;SHIFT COUNT
 4477  024040  000000                         76$:    0                       ;CHARACTER
 4478  024042  000000                         11$:    0                       ;OLD BCC
 4479  024044  013737  027112  024042                 MOV     CALBCC,11$      ;LOAD SOFT BCC FOR NEXT SHIFT
 4480  024052  104415  000001                 73$:    DATACLK,        1       ;SHIFT DATA IN TO BIT WINDOW
 4481  024056  106002                                 RORB    R2              ;SHIFT SOFT DATA
 4482  024060  103005                                 BCC     74$             ;BR IF A SPACE
 4483  024062  004737  026112                         JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4484  024066  103406                                 BCS     75$             ;BR IF OK (MARK)
 4485  024070  104006                                 HLT     6               ;ERROR, BIT WINDOW WAS A SPACE
 4486  024072  000404                                 BR      75$             ;CONTINUE
 4487  024074  004737  026112                 74$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4488  024100  103001                                 BCC     75$             ;BR IF OK (SPACE)
 4489  024102  104006                                 HLT     6               ;ERROR, BIT WINDOW WAS A MARK
 4490  024104                                 75$:
 4491  024104  005203                                 INC     R3              ;BUMP BIT COUNTER
 4492  024106  022703  000010                         CMP     #10,R3          ;DONE FULL 8 BITS YET
 4493  024112  001357                                 BNE     73$             ;BR IF NO
 4494  024114  005003                                 CLR     R3              ;CLEAR BIT COUNTER
 4495  024116  005300                                 DEC     R0              ;DEC CHARACTER COUNT
 4496  024120  001325                                 BNE     13$             ;BR IF NOT DONE YET
 4497
 4498                                                 ;CHECK BCC FOR PRECEDING MESSAGE IN THE BIT WINDOW
 4499
 4500  024122  013700  027112                         MOV     CALBCC,R0       ;PUT BCC IN R0
 4501  024126  104415  000001                 77$:    DATACLK,1               ;SHIFT HARDWARE BCC
 4502  024132  006000                                 ROR     R0              ;SHIFT SOFT BCC
 4503  024134  103005                                 BCC     78$             ;BR IF CARRY CLEAR
 4504  024136  004737  026112                         JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4505  024142  103406                                 BCS     79$             ;BR IF OK (MARK)
 4506  024144  104014                                 HLT     14              ;ERROR, CRC WRONG (SPACE)
 4507  024146  000404                                 BR      79$             ;CONTINUE
 4508  024150  004737  026112                 78$:    JSR     PC,GETSI        ;LOOK AT BIT WINDOW
 4509  024154  103001                                 BCC     79$             ;BR IF OK (SPACE)
 4510  024156  104014                                 HLT     14              ;ERROR, CRC WRONG (MARK)
 4511  024160                                 79$:
 4512  024160  005203                                 INC     R3              ;BUMP BIT COUNTER
 4513  024162  022703  000020                         CMP     #20,R3          ;FINISHED BCC YET?
 4514  024166  001357                                 BNE     77$             ;BR IF NO
 4515  024170  005003                                 CLR     R3              ;CLEAR BIT COUNTER
 4516
 4517                                                 ;CHECK TO SEE IF TRANSMITTER IS MARKING
 4518
 4519  024172  104415  000001                 2$:     DATACLK,        1       ;CLOCK TRANSMITTER
 4520  024176  004737  026112                         JSR     PC,GETSI        ;LOOK AT WINDOW
 4521  024202  103401                                 BCS     3$              ;IT SHOULD BE MARKING
 4522  024204  104024                                 HLT     24              ;ERROR, BIT WAS A SPACE
 4523  024206  005203                         3$:     INC     R3              ;BUMP BIT COUNTER
 4524  024210  022703  000007                         CMP     #7,R3           ;DONE YET
 4525  024214  001[ c                                 BNE     2$              ;BR IF NO
 4526  024216  1044    000010                         DATACLK,        10      ;GIVE ENOUGH TICKS TO CLEAR OUT ACTIVE
 4527  024222  0050[3                                 CLR     R3              ;CLEAR BIT COUNTER
 4528  024224  104415  000001                 4$:     DATACLK,        1       ;SHIFT OUT NEXT BIT
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4529  024230  004737  026112                          JSR     PC,GETSI        ;LOOK AT BIT WINDOW
4530  024234  103401                                  BCS     .+4             ;BR IF IT IS A MARK
4531  024236  104024                                  HLT     24              ;ERROR, TRANSMITTER IS NOT MARKING
4532  024240  005203                                  INC     R3              ;INC BIT COUNT
4533  024242  022703  000020                          CMP     #20,R3          ;DONE YET?
4534  024246  001366                                  BNE     4$              ;BR IF NO
4535
4536                                                  ;CHECK TO SEE THAT FIRST FOUR CHARACTER MESSAGE
4537                                                  ;WAS RECEIVED CORRECTLY (0,125,252,377)
4538
4539  024250  104415  000001                          DATACLK,        1       ;GET LAST BIT IN RECEIVER
4540  024254  012703  000004                          MOV     #4,R3           ;R3=CHARACTER COUNT
4541  024260  012702  027674                          MOV     #MESDAT,R2      ;LOAD MESSAGE POINTER IN R2
4542  024264  004737  026752                  40$:    JSR     PC,INRDY        ;WAIT FOR INRDY
4543  024270  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4544  024272  021204                                  021204
4545  024274  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
4546  024300  112205                                  MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
4547  024302  120504                                  CMPB    R5,R4           ;IS RECEIVED DATA CORRECT?
4548  024304  001401                                  BEQ     41$             ;BR IF YES
4549  024306  104010                                  HLT     10              ;RECEIVE DATA ERROR
4550  024310  005303                          41$:    DEC     R3              ;DEC CHARACTER COUNT
4551  024312  001364                                  BNE     40$             ;BR IF NOT DONE YET
4552
4553                                                  ;CHECK TO SEE THAT IN BCC MATCH IS SET
4554                                                  ;AND THAT THE BCC WAS RECEIVED CORRECTLY
4555
4556  024314  004737  026752                          JSR     PC,INRDY        ;WAIT FOR INRDY
4557  024320  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4558  024322  021204                                  021204                  ;GET FIRST HALF OF CRC
4559  024324  116137  000004  001252                  MOVB    4(R1),TEMP3     ;PUT IN TEMP3
4560  024332  042737  177400  001252                  BIC     #177400,TEMP3   ;CLEAR HI BYTE
4561  024340  004737  026752                          JSR     PC,INRDY        ;WAIT FOR INRDY
4562  024344  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4563  024346  021244                                  021244
4564  024350  016104  000004                          MOV     4(R1),R4        ;PUT "FOUND" IN R4
4565  024354  042704  000376                          BIC     #376,R4         ;CLEAR UNWANTED BITS
4566  024360  012705  000001                          MOV     #1,R5           ;PUT "EXPECTED" IN R5
4567  024364  120504                                  CMPB    R5,R4           ;IS IN BCC MATCH SET?
4568  024366  001401                                  BEQ     50$
4569  024370  104015                                  HLT     15              ;IN BCC MATCH ERROR
4570  024372                                  50$:
4571  024372  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4572  024374  021204                                  021204                  ;GET LAST HALF
4573  024376  116137  000004  001251                  MOVB    4(R1),TEMP2+1   ;PUT IN TEMP2
4574  024404  042737  000377  001250                  BIC     #377,TEMP2      ;CLEAR LO BYTE
4575  024412  053737  001250  001252                  BIS     TEMP2,TEMP3     ;16 BIT BCC NOW IN TEMP3
4576  024420  023737  027112  001252                  CMP     CALBCC,TEMP3    ;IS IT CORRECT?
4577  024426  001401                                  BEQ     45$             ;BR IF OK
4578  024430  104027                                  HLT     27
4579
4580                                                  ;CHECK THAT CHARACTER LOADED WITH SOM WAS RECEIVED (000)
4581
4582  024432  004737  026752                  45$:    JSR     PC,INRDY        ;WAIT FOR INRDY
4583  024436  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
4584  024440  021204                                  021204                  ;GET RECEIVE DATA
```

```
                                                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
                                                        CLR     R5              ;PUT "EXPECTED" IN R5
                                                        CMPB    R5,R4           ;IS RECEVIED DATA CORRECT?
                                                        BEQ     42$             ;BR IF YES
                                                        HLT     10              ;RECEIVE DATA ERROR

                                                        ;CHECK TO SEE THAT SECOND FOUR CHARACTER MESSAGE
                                                        ;WAS RECEIVED CORRECTLY (0.125.252.377)

                                                42$:    MOV     #4,R3           ;R3=CHARACTER COUNT
                                                        MOV     #MESDAT,R2      ;LOAD MESSAGE POINTER IN R2
                                                43$:    JSR     PC,INRDY        ;WAIT FOR INRDY
                                                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
                                                        021204
                                                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
                                                        MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
                                                        CMPB    R5,R4           ;IS RECEIVED DATA CORRECT?
                                                        BEQ     44$             ;BR IF YES
                                                        HLT     10              ;RECEIVE DATA ERROR
                                                44$:    DEC     R3              ;DEC CHARACTER COUNT
                                                        BNE     43$             ;BR IF NOT DONE YET

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

                                                        JSR     PC,INRDY        ;WAIT FOR INRDY
                                                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
                                                        021204                  ;GET FIRST HALF OF CRC
                                                        MOVB    4(R1),TEMP3     ;PUT IN TEMP3
                                                        BIC     #177400,TEMP3   ;CLEAR HI BYTE
                                                        JSR     PC,INRDY        ;WAIT FOR INRDY
                                                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
                                                        021244
                                                        MOV     4(R1),R4        ;PUT "FOUND" IN R4
                                                        BIC     #375,R4         ;CLEAR UNWANTED BITS
                                                        MOV     #1,R5           ;PUT "EXPECTED" IN R5
                                                        CMPB    R5,R4           ;IS IN BCC MATCH SET?
                                                        BEQ     51$
                                                        HLT     15              ;IN BCC MATCH ERROR
                                                51$:
                                                        ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5324
                                                        021204                  ;GET LAST HALF
                                                        MOVB    4(R1),TEMP2+1   ;PUT IN TEMP2
                                                        BIC     #377,TEMP2      ;CLEAR LO BYTE
                                                        BIS     TEMP2,TEMP3     ;16 BIT BCC NOW IN TEMP3
                                                        CMP     CALBCC,TEMP3    ;IS IT CORRECT?
                                                        BEQ     5$              ;BR IF Ok
                                                        HLT     27
                                                5$:     SCOPE                   ;SCOPE THIS TEST


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

```
                                                        ;*4 CHARACTER MESSAGE WAS RECEIVED AND THAT RTS IS CLEAR
                                                        ;;*************************.*************************************

                                                        ;  TEST 54
                                                        ;-------------
024636  012737  000054  001226          TST54:  MOV     #54,TSTNO
024644  012737  025070  001216                  MOV     #TST55,NEXT
                                                                        ;R1 CONTAINS BASE DMC11 ADDRESS
024652  104412                                  MSTCLR                  ;MASTER CLEAR DMC11
024654  012711  004000                          MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
024660  012702  027674                          MOV     #MESDAT,R2      ;R2 POINTS TO MESSAGE
024664  012700  000004                          MOV     #4,R0           ;R0 = CHAR COUNT
024670  004737  027256                          JSR     PC,SYNLD        ;LOAD SILO WITH TWO SYNCS
024674  004737  026276                          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
024700  004537  027412                          JSR     R5,MESLD        ;LOAD MESSAGE IN SILO
024704  027674                                  MESDAT                  ;START OF MESSAGE
024706  000004                                  4                       ;CHARACTER COUNT
024710  004737  026144                          JSR     PC,OCOR         ;WAIT FOR OCOR
024714  104415  000065                          DATACLK,        65      ;CLOCK DATA (EMPTY SILO)
024720  004537  027412                          JSR     R5,MESLD        ;PUT MORE CHARACTERS IN SILO
024724  027674                                  MESDAT
024726  000004                                  4
024730  004737  026144                          JSR     PC,OCOR
024734  104415  000005                          DATACLK,        5       ;CLOCK UNTIL RTS IS CLEARED
024740  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024742  021264                                  021264                  ;GET RTS
024744  032761  000040  000004                  BIT     #BIT5,4(R1)     ;IS IT CLEAR?
024752  001401                                  BEQ     5$              ;BR IF YES
024754  104034                                  HLT     34              ;ERROR, RTS NOT CLEAR
024756  104415  000041                  5$:     DATACLK,        41      ;CLOCK XMITTER SOME MORE
024762  004737  026752                  1$:     JSR     PC,INRDY        ;OK LETS CHECK WHAT WAS RECEIVED
024766  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
024770  021204                                  021204                  ;GET RECEIVE DATA
024772  016104  000004                          MOV     4(R1),R4        ;PUT IT IN R4
024776  112205                                  MOVB    (R2)+,R5        ;R5 = "EXPECTED"
025000  120504                                  CMPB    R5,R4           ;IS DATA CORRECT?
025002  001401                                  BEQ     2$              ;BR IF OK
025004  104010                                  HLT     10              ;DATA ERROR
025006  005300                          2$:     DEC     R0              ;DEC CHAR COUNT
025010  001364                                  BNE     1$              ;BR IF NOT DONE YET
025012  004737  026752                  3$:     JSR     PC,INRDY        ;WAIT FOR INRDY
025016  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025020  021204                                  021204                  ;GET RECEIVE DATA
025022  016104  000004                          MOV     4(R1),R4        ;PUT IT IN "FOUND"
025026  012705  000377                          MOV     #377,R5         ;R5 = "EXPECTED"
025032  120504                                  CMPB    R5,R4           ;SHOULD SEE 377
025034  001401                                  BEQ     4$              ;BR IF OK
025036  104010                                  HLT     10              ;ERROR, TRANSMITTER DID NOT ABORT
025040  004737  026752                  4$:     JSR     PC,INRDY        ;WAIT FOR INRDY
025044  104414                                  ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
025046  021204                                  021204                  ;GET RECEIVE DATA
025050  016104  000004                          MOV     4(R1),R4        ;PUT IT IN "FOUND"
025054  012705  000177                          MOV     #177,R5         ;R5 = "EXPECTED"
025060  120504                                  CMPB    R5,R4           ;SHOULD SEE 177
025062  001401                                  BEQ     10$             ;BR IF OK
025064  104010                                  HLT     10              ;ERROR, TRANSMITTER DID NOT ABORT
```

```
 4697  025066                                  10$:
 4698  025066  104400                                SCOPE                   ;SCOPE THIS TEST
 4699
 4700
 4701                                            ;*************************** TEST 55 ****************************
 4702                                            ;*HALF DUPLEX TEST
 4703                                            ;*SET LINE UNIT LOOP AND HALF DUPLEX, SEND SYNCS AND A
 4704                                            ;*MESSAGE. VERIFY THAT IN-ACTIVE AND IN-READY ARE CLEAR
 4705                                            ;;*************************************************************
 4706
 4707                                            ;  TEST 55
 4708                                            ;--------------
 4709  025070  012737  000055  001226  TST55:  MOV     #55,TSTNO
 4710  025076  012737  025206  001216           MOV     #TST56,NEXT
 4711                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
 4712  025104  104412                          MSTCLR                  ;MASTER CLEAR DMC11
 4713  025106  012702  000012                  MOV     #12,R2          ;SAVE R2 FOR TYPEOUT
 4714  025112  012711  004000                  MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 4715  025116  012761  000020  000004          MOV     #BIT4,4(R1)     ;LOAD PORT4
 4716  025124  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5324
 4717  025126  122113                          122113                  ;SET H/D BIT
 4718  025130  004737  027256                  JSR     PC,SYNLD        ;LOAD 2 SYNCS
 4719  025134  004737  026276                  JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 4720  025140  004537  027412                  JSR     R5,MESLD        ;LOAD 4 CHAR MESSAGE
 4721  025144  027674                          MESDAT                  ;ADDRESS OF MESSAGE
 4722  025146  000004                          4                       ;CHARACTER COUNT
 4723  025150  004737  026144                  JSR     PC,OCOR         ;WAIT FOR OCOR
 4724  025154  104415  000073                  DATACLK,        73      ;SEND MESSAGE
 4725  025160  104414                          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4726  025162  021244                          021244                  ;READ LU-12
 4727  025164  016104  000004                  MOV     4(R1),R4        ;PUT "FOUND" IN R4
 4728  025170  042704  000257                  BIC     #257,R4         ;CLEAR UNWANTED BITS
 4729  025174  005005                          CLR     R5              ;R5 = "EXPECTED"
 4730  025176  120504                          CMPB    R5,R4           ;IN-ACTIVE AND IN-RDY SHOULD BE CLEAR
 4731  025200  001401                          BEQ     1$              ;BR IF OK
 4732  025202  104035                          HLT     35              ;ERROR BOTH ARE NOT CLEAR
 4733  025204  104400                  1$:     SCOPE
 4734
 4735
 4736                                            ;*************************** TEST 56 ****************************
 4737                                            ;*DDCMP CABLE DATA TEST
 4738                                            ;*THIS TEST LOADS OUT SILO WITH THE FOLLOWING:
 4739                                            ;*4 SYNCS,16 CHAR,EOM,16 CHAR,EOM,16 CHAR,EOM
 4740                                            ;*THE 16 CHARACTERS INCLUDE A FLOATING ONE AND ZERO
 4741                                            ;*THE DATA IS TRANSMITTED OVER THE CABLE USING THE INTERNAL CLOCK
 4742                                            ;*RECEIVED DATA IS VERIFIED AS IS IN BOC MARCH
 4743                                            ;*LOOP-BACK CONNECTOR MUST BE ON TO RUN THIS TEST
 4744                                            ;;*************************************************************
 4745
 4746                                            ;  TEST 56
 4747                                            ;--------------
 4748  025206  012737  000056  001226  TST56:  MOV     #56,TSTNO
 4749  025214  012737  025574  001216           MOV     #TST57,NEXT
 4750                                                                    ;R1 CONTAINS BASE DMC11 ADDRESS
 4751  025222  104412                          MSTCLR                  ;MASTER CLEAR DMC11
 4752  025224  032737  040000  001366          BIT     #BIT14,STAT1    ;SKIP TEST IF NO
```

```
 4753  025232  001557                                BEQ     3$              ;LOOPBACK CONNECTOR ON
 4754  025234  012711  004000                        MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 4755  025240  004737  027256                        JSR     PC,SYNLD        ;LOAD 2 SYNCS
 4756  025244  004737  027256                        JSR     PC,SYNLD        ;LOAD 2 MORE SYNCS
 4757  025250  012737  120001  027110                MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFT CRC CALC
 4758  025256  005037  025306                        CLR     6$              ;CLEAR OLD BCC
 4759  025262  012703  000020                        MOV     #16.,R3         ;CHARACTER COUNT
 4760  025266  012702  027700                        MOV     #FLTDAT,R2      ;R2= POINTER
 4761  025272  112237  025304          7$:           MOVB    (R2)+,5$        ;LOAD CHAR FOR SOFT BCC CALC.
 4762  025276  004537  027004                        JSR     R5,SIMBCC       ;CALC SOFT BCC
 4763  025302  000010                                10                      ;SHIFT COUNT
 4764  025304  000000                          5$:   0                       ;CHARACTER
 4765  025306  000000                          6$:   0                       ;OLD BCC
 4766  025310  013737  027112  025306                MOV     CALBCC,6$       ;LOAD OLD BCC
 4767  025316  005303                                DEC     R3              ;DEC COUNT
 4768  025320  001364                                BNE     7$              ;BR IF NOT DONE YET
 4769  025322  004537  027412                        JSR     R5,MESLD        ;LOAD SILO
 4770  025326  027700                                FLTDAT                  ;MESSAGE ADDRESS
 4771  025330  000020                                16.                     ;CHARACTER COUNT
 4772  025332  004737  027366                        JSR     PC,EOM          ;LOAD AN EOM
 4773  025336  004537  027412                        JSR     R5,MESLD        ;LOAD SILO
 4774  025342  027700                                FLTDAT                  ;MESSAGE ADDRESS
 4775  025344  000020                                16.                     ;CHARACTER COUNT
 4776  025346  004737  027366                        JSR     PC,EOM          ;LOAD AN EOM
 4777  025352  004537  027412                        JSR     R5,MESLD        ;LOAD SILO
 4778  025356  027700                                FLTDAT                  ;MESSAGE ADDRESS
 4779  025360  000020                                16.                     ;CHARACTER COUNT
 4780  025362  004737  027366                        JSR     PC,EOM          ;LOAD AN EOM
 4781  025366  004737  026144                        JSR     PC,OCOR         ;WAIT FOR OCOR
 4782  025372  005011                                CLR     (R1)            ;CLEAR LINE UNIT LOOP
 4783  025374  012700  000003                        MOV     #3,R0           ;R0 = MESSAGE COUNT
 4784  025400  012703  000020                        MOV     #16.,R3         ;R3= CHARACTER COUNT
 4785  025404  012702  027700                        MOV     #FLTDAT,R2      ;LOAD MESSAGE POINTER IN R2
 4786  025410  004737  026752          1$:           JSR     PC,INRDY        ;WAIT FOR INRDY
 4787  025414  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4788  025416  021204                                021204                  ;GET DATA FROM IN SILO
 4789  025420  016104  000004                        MOV     4(R1),R4        ;PUT CHARACTER IN "FOUND"
 4790  025424  112205                                MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
 4791  025426  120504                                CMPB    R5,R4           ;IS RECEIVED DATA CORRECT
 4792  025430  001401                                BEQ     2$              ;BR IF OK
 4793  025432  104025                                HLT     25              ;DATA ERROR
 4794  025434                                  2$:
 4795  025434  005303                                DEC     R3              ;DEC CHARACTER COUNT
 4796  025436  001364                                BNE     1$              ;BR IF NOT DONE THIS MESSAGE
 4797  025440  012703  000020                        MOV     #16.,R3         ;RESET CHARACTER COUNT
 4798
 4799                                                ;CHECK TO SEE THAT IN BCC MATCH IS SET
 4800                                                ;AND THAT THE BCC WAS RECEIVED CORRECTLY
 4801
 4802  025444  004737  026752                        JSR     PC,INRDY        ;WAIT FOR INRDY
 4803  025450  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4804  025452  021204                                021204                  ;GET FIRST HALF OF CRC
 4805  025454  116137  000004  001252                MOVB    4(R1),TEMP3     ;PUT IN TEMP3
 4806  025462  042737  177400  001252                BIC     #177400,TEMP3   ;CLEAR HI BYTE
 4807  025470  004737  026752                        JSR     PC,INRDY        ;WAIT FOR INRDY
 4808  025474  104414                                ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
```

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 4809  025476  021244                                          021244
 4810  025500  016104  000004                                 MOV     4(R1),R4        ;PUT "FOUND" IN R4
 4811  025504  042704  000376                                 BIC     #376,R4         ;CLEAR UNWANTED BITS
 4812  025510  012705  000001                                 MOV     #1,R5           ;PUT "EXPECTED" IN R5
 4813  025514  120504                                         CMPB    R5,R4           ;IS IN BCC MATCH SET?
 4814  025516  001401                                         BEQ     25$
 4815  025520  104015                                         HLT     15              ;IN BCC MATCH ERROR
 4816  025522                                          25$:
 4817  025522  104414                                         ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4818  025524  021204                                         021204                  ;GET LAST HALF
 4819  025526  116137  000004  001251                         MOVB    4(R1),TEMP2+1   ;PUT IN TEMP2
 4820  025534  042737  000377  001250                         BIC     #377,TEMP2      ;CLEAR LO BYTE
 4821  025542  053737  001250  001252                         BIS     TEMP2,TEMP3     ;16 BIT BCC NOW IN TEMP3
 4822  025550  023737  027112  001252                         CMP     CALBCC,TEMP3    ;IS IT CORRECT?
 4823  025556  001401                                         BEQ     4$              ;BR IF OK
 4824  025560  104027                                         HLT     27
 4825  025562  012702  027700                          4$:    MOV     #FLTDAT,R2      ;RESET MESSAGE POINTER
 4826  025566  005300                                         DEC     R0              ;DECREMENT COUNTER
 4827  025570  001337                                         BNE     1$              ;BR IF NOT DONE
 4828  025572  104400                                  3$:    SCOPE                   ;SCOPE THIS TEST
 4829
 4830                                                         ;************************** TEST 57 **************************
 4831                                                         ;*DDCMP CABLE DATA TEST
 4832                                                         ;*THIS TEST LOADS OUT SILO WITH THE FOLLOWING:
 4833                                                         ;*4 SYNCS,59 DATA CHARACTERS,EOM WITH GARBAGE CHARACTER
 4834                                                         ;*THE DATA IS TRANSMITTED OVER THE CABLE USING THE INTERNAL CLOCK
 4835                                                         ;*RECEIVED DATA IS VERIFIED AS IS IN BCC MATCH
 4836                                                         ;*LOOP-BACK CONNECTOR MUST BE ON TO RUN THIS TEST
 4837                                                         ;;*************************************************************
 4838
 4839                                                         ;  TEST 57
 4840                                                         ;--------------
 4841
 4842  025574  012737  000057  001226                  TST57: MOV     #57,TSTNO
 4843  025602  012737  003274  001216                         MOV     #.EOP,NEXT
 4844                                                                                 ;R1 CONTAINS BASE DMC11 ADDRESS
 4845  025610  104412                                         MSTCLR                  ;MASTER CLEAR DMC11
 4846  025612  032737  040000  001366                         BIT     #BIT14,STAT1    ;SKIP TEST IF NO
 4847  025620  001533                                         BEQ     3$              ;LOOPBACK CONNECTOR ON
 4848  025622  012711  004000                                 MOV     #BIT11,(R1)     ;SET LINE UNIT LOOP
 4849  025626  004737  027256                                 JSR     PC,SYNLD        ;LOAD 2 SYNCS
 4850  025632  004737  027256                                 JSR     PC,SYNLD        ;LOAD 2 MORE SYNCS
 4851  025636  012737  120001  027110                         MOV     #CRC16,XPOLY    ;LOAD POLYNOMIAL FOR SOFT CRC CALC
 4852  025644  005037  025674                                 CLR     6$              ;CLEAR OLD BCC
 4853  025650  012703  000073                                 MOV     #59.,R3         ;CHARACTER COUNT
 4854  025654  012702  027674                                 MOV     #MESDAT,R2      ;R2= POINTER
 4855  025660  112237  025672                          7$:    MOVB    (R2)+,5$        ;LOAD CHAR FOR SOFT BCC CALC.
 4856  025664  004537  027004                                 JSR     R5,SIMBCC       ;CALC SOFT BCC
 4857  025670  000010                                         10                      ;SHIFT COUNT
 4858  025672  000000                                  5$:    0                       ;CHARACTER
 4859  025674  000000                                  6$:    0                       ;OLD BCC
 4860  025676  013737  027112  025674                         MOV     CALBCC,6$       ;LOAD OLD BCC
 4861  025704  005303                                         DEC     R3              ;DEC COUNT
 4862  025706  001364                                         BNE     7$              ;BR IF NOT DONE YET
 4863  025710  004537  027412                                 JSR     R5,MESLD        ;LOAD SILO
 4864  025714  027674                                         MESDAT                  ;MESSAGE ADDRESS
```

```
 4865  025716  000073                                    59.                     ;CHARACTER COUNT
 4866  025720  004737  027366                            JSR     PC,EOM          ;LOAD AN EOM
 4867  025724  004737  026144                            JSR     PC,QCOR         ;WAIT FOR QCOR
 4868  025730  005011                                    CLR     (R1)            ;CLEAR LINE UNIT LOOP
 4869  025732  012700  000073                            MOV     #59.,R0         ;R0= CHARACTER COUNT
 4870  025736  012702  027674                            MOV     #MESDAT,R2      ;LOAD MESSAGE POINTER IN R2
 4871  025742  004737  026752                    1$:     JSR     PC,INRDY        ;WAIT FOR INRDY
 4872  025746  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4873  025750  021204                                    021204                  ;GET DATA FROM IN SILO
 4874  025752  016104  000004                            MOV     4(R1),R4        ;PUT CHARACTER IN "FOUND"
 4875  025756  112205                                    MOVB    (R2)+,R5        ;PUT "EXPECTED" IN R5
 4876  025760  120504                                    CMPB    R5,R4           ;IS RECEIVED DATA CORRECT
 4877  025762  001401                                    BEQ     2$              ;BR IF OK
 4878  025764  104025                                    HLT     25              ;DATA ERROR
 4879  025766                                    2$:
 4880  025766  005300                                    DEC     R0              ;DECREMENT COUNTER
 4881  025770  001364                                    BNE     1$              ;BR IF NOT DONE
 4882
 4883                                                    ;CHECK TO SEE THAT IN BCC MATCH IS SET
 4884                                                    ;AND THAT THE BCC WAS RECEIVED CORRECTLY
 4885
 4886  025772  004737  026752                            JSR     PC,INRDY        ;WAIT FOR INRDY
 4887  025776  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4888  026000  021204                                    021204                  ;GET FIRST HALF OF CRC
 4889  026002  116137  000004  001252                    MOVB    4(R1),TEMP3     ;PUT IN TEMP3
 4890  026010  042737  177400  001252                    BIC     #177400,TEMP3   ;CLEAR HI BYTE
 4891  026016  004737  026752                            JSR     PC,INRDY        ;WAIT FOR INRDY
 4892  026022  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4893  026024  021244                                    021244
 4894  026026  016104  000004                            MOV     4(R1),R4        ;PUT "FOUND" IN R4
 4895  026032  042704  000376                            BIC     #376,R4         ;CLEAR UNWANTED BITS
 4896  026036  012705  000001                            MOV     #1,R5           ;PUT "EXPECTED" IN R5
 4897  026042  120504                                    CMPB    R5,R4           ;IS IN BCC MATCH SET?
 4898  026044  001401                                    BEQ     25$
 4899  026046  104015                                    HLT     15              ;IN BCC MATCH ERROR
 4900  026050                                    25$:
 4901  026050  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4902  026052  021204                                    021204                  ;GET LAST HALF
 4903  026054  116137  000004  001251                    MOVB    4(R1),TEMP2+1   ;PUT IN TEMP2
 4904  026062  042737  000377  001250                    BIC     #377,TEMP2      ;CLEAR LO BYTE
 4905  026070  053737  001250  001252                    BIS     TEMP2,TEMP3     ;16 BIT BCC NOW IN TEMP3
 4906  026076  023737  027112  001252                    CMP     CALBCC,TEMP3    ;IS IT CORRECT?
 4907  026104  001401                                    BEQ     3$              ;BR IF OK
 4908  026106  104027                                    HLT     27
 4909  026110  104400                            3$:     SCOPE                   ;SCOPE THIS TEST
 4910                                  00300
 4911                                  00400
 4912                                  00500     ;SUBROUTINES
 4913                                  00600     ;-----------
 4914                                  00700
 4915  026112                          00800     GETSI:
 4916                                  00900             ;THIS SUBROUTINE READS LU 17, AND PUTS IT INTO NITCH.
 4917                                  01000             ;NITCH IS ROTATED LEFT UNTILL THE SI BIT IS IN CARRY
 4918                                  01100
 4919  026112  104414                                    ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4920  026114  021364                        01300       021364                  ;PORT4=LU 17
```

```
 4921  026116  017737  153270  026142  01400            MOV     @DMP04,NITCH    ;STORE LU 17
 4922  026124  106137  026142          01500            ROLB    NITCH
 4923  026130  106137  026142          01600            ROLB    NITCH
 4924  026134  106137  026142          01700            ROLB    NITCH           ;PUT SI IN THE CARRY BIT
 4925  026140  000207                  01800            RTS     PC
 4926  026142  000000                  01900    NITCH:  0
 4927                                  02000
 4928                                  02100
 4929  026144                          02200    OCOR:
 4930                                  02300            ;THIS SUBROUTINE SPINS ON OCOR
 4931                                  02400
 4932  026144  104414                  02500            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4933  026146  021364                  02600            021364                  ;PORT4←LU 17
 4934  026150  032777  000020  153234  02700            BIT     #BIT4,@DMP04    ;IS OCOR SET?
 4935  026156  001772                  02800            BEQ     OCOR            ;BR IF NO
 4936  026160  000207                  02900            RTS     PC              ;OK OCOR IS SET, GO BACK
 4937                                  03000
 4938                                  03100
 4939  026162                          03200    SYNC:
 4940                                  03300            ;THIS SUBROUNTINE LOADS THE SILO WITH THE NUMBER OF SYNC
 4941                                  03400            ;CHARACTERS PASSED TO IT IN THE WORD AFTER THE JSR CALL
 4942                                  03500            ;AND A NON-SYNC CHARACTER (301)
 4943                                  03600
 4944  026162  013637  001246          03700            MOV     @(SP)+,TEMP1    ;GET COUNT
 4945  026166  062706  000002          03800            ADD     #2,-(SP)        ;ADJUST STACK
 4946  026172  012761  000026  000004  03900            MOV     #26,4(R1)       ;LOAD PORT4
 4947  026200  104414                  04000            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4948  026202  122114                  04100            122114                  ;LOAD SYNC REGISTER
 4949  026204  004737  026276          04200    1$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 4950  026210  012761  000001  000004  04300            MOV     #1,4(R1)        ;LOAD PORT4
 4951  026216  104414                  04400            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4952  026220  122111                  04500            122111                  ;SET SOM
 4953  026222  012761  000026  000004  04600            MOV     #26,4(R1)       ;LOAD PORT4
 4954  026230  104414                  04700            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4955  026232  122110                  04800            122110                  ;LOAD OUT DATA
 4956  026234  005337  001246          04900            DEC     TEMP1           ;ALL DONE?
 4957  026240  001361                  05000            BNE     1$              ;BR IF NOT
 4958  026242  004737  026276          05100            JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 4959  026246  005061  000004          05200            CLR     4(R1)           ;LOAD PORT4
 4960  026252  104414                  05300            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4961  026254  122111                  05400            122111                  ;SET SOM
 4962  026256  012761  000301  000004  05500            MOV     #301,4(R1)      ;LOAD PORT4
 4963  026264  104414                  05600            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4964  026266  122110                  05700            122110                  ;LOAD OUT DATA
 4965  026270  004737  026144          05800            JSR     PC,OCOR         ;WAIT FOR OCOR
 4966  026274  000207                  05900            RTS     PC
 4967                                  06000
 4968                                  06100
 4969  026276                          06200    OUTRDY:
 4970                                  06300            ;THIS SUBROUTINE SPINS ON OUT READY
 4971                                  06400
 4972  026276  005037  001256          06500            CLR     TEMP5           ;CLEAR TIMER
 4973  026302                          06600    1$:
 4974  026302  104414                  06700            ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4975  026304  021224                  06800            021224                  ;PORT4←LU11
 4976  026306  032777  000020  153076  06900            BIT     #BIT4,@DMP04    ;IS OUT RDY SET?
```

```
 4977  026314  001004                    07000          BNE     2$              ;BR IF YES
 4978  026316  005237  001256            07100          INC     TEMP5           ;INC TIMER
 4979  026322  001367                    07200          BNE     1$              ;KEEP CHECKING IF NOT DONE
 4980  026324  104036                    07300          HLT     36              ;ERROR, OUT READY NOT SET
 4981  026326  000207                    07400    2$:   RTS     PC
 4982                                    07500
 4983                                    07600
 4984  026330                            07700    CHAR:
 4985                                    07800          ;THIS SUBROUTINE LOADS THE SILO WITH 3 SYNCS
 4986                                    07900          ;AND THE CHARACTER PASSED TO IT.
 4987                                    08000
 4988  026330  013637  001250            08100          MOV     @(SP)+,TEMP2    ;GET CHARACTER
 4989  026334  062746  000002            08200          ADD     #2,-(SP)        ;ADJUST STACK
 4990  026340  012737  000003  001246    08300          MOV     #3,TEMP1        ;SET FOR 3 SYNCS
 4991  026346  012761  000026  000004    08400          MOV     #26,4(R1)       ;LOAD PORT4
 4992  026354  104414                    08500          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4993  026356  122114                    08600          122114                  ;LOAD SYNC REGISTER
 4994  026360  004737  026276            08700    1$:   JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 4995  026364  012761  000001  000004    08800          MOV     #1,4(R1)        ;LOAD PORT4
 4996  026372  104414                    08900          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 4997  026374  122111                    09000          122111                  ;SET SOM
 4998  026376  012761  000026  000004    09100          MOV     #26,4(R1)       ;LOAD PORT4
 4999  026404  104414                    09200          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5000  026406  122110                    09300          122110                  ;LOAD OUT DATA
 5001  026410  005337  001246            09400          DEC     TEMP1           ;ALL DONE?
 5002  026414  001361                    09500          BNE     1$              ;BR IF NOT
 5003  026416  004737  026276            09600          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 5004  026422  013761  001250  000004    09700          MOV     TEMP2,4(R1)     ;LOAD PORT4
 5005  026430  104414                    09800          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5006  026432  122110                    09900          122110                  ;LOAD OUT DATA
 5007  026434  004737  026144            10000          JSR     PC,OCOR         ;WAIT FOR OCOR
 5008  026440  000207                    10100          RTS     PC
 5009                                    10200
 5010                                    10300
 5011  026442                            10400    CHARSD:
 5012                                    10500          ;THIS SUBROUTINE LOADS THE SILO WITH THE CHARACTER PASSED TO IT.
 5013                                    10600
 5014  026442  013637  001250            10700          MOV     @(SP)+,TEMP2    ;GET CHARACTER
 5015  026446  062746  000002            10800          ADD     #2,-(SP)        ;ADJUST STACK
 5016  026452  004737  026276            10900          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 5017  026456  013761  001250  000004    11000          MOV     TEMP2,4(R1)     ;LOAD PORT4
 5018  026464  104414                    11100          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5019  026466  122110                    11200          122110                  ;LOAD OUT DATA
 5020  026470  004737  026276            11300          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 5021  026474  104414                    11400          ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5022  026476  122110                    11500          122110                  ;LOAD GARBAGE CHAR
 5023  026500  004737  026144            11600          JSR     PC,OCOR         ;WAIT FOR OCOR
 5024  026504  000207                    11700          RTS     PC
 5025                                    11800
 5026                                    11900
 5027  026506                            12000    SILOLD:
 5028                                    12100          ;THIS SUBROUTINE FILLS THE OUT SILO
 5029                                    12200          ; WITH A BINARY COUNT PATTERN
 5030                                    12300
 5031  026506  012737  000073  001250    12400          MOV     #73,TEMP2       ;LOAD COUNT
 5032  026514  005737  026746            12500          TST     SCHAR           ;FIRST TIME HERE?
```

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 5033  026520  100470                  12600          BMI     4$              ;BR IF BITSTUFF
 5034  026522  001032                  12700          BNE     2$              ;BR IF NO
 5035  026524  062737  000002  001250  12800          ADD     #2,TEMP2        ;ADD 2 TO CHARACTER COUNT
 5036  026532  012737  000003  001246  12900          MOV     #3,TEMP1        ;SET FOR 3 SYNCS
 5037  026540  012761  000026  000004  13000          MOV     #26,4(R1)       ;LOAD PORT4
 5038  026546  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5039  026550  122114                  13200          122114                  ;LOAD SYNC REGISTER
 5040  026552  004737  026276          13300  1$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 5041  026556  012761  000001  000004  13400          MOV     #1,4(R1)        ;LOAD PORT4
 5042  026564  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5043  026566  122111                  13600          122111                  ;SET SOM
 5044  026570  012761  000026  000004  13700          MOV     #26,4(R1)       ;LOAD PORT4
 5045  026576  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5046  026600  122110                  13900          122110                  ;LOAD OUT DATA
 5047  026602  005337  001246          14000          DEC     TEMP1           ;ALL DONE?
 5048  026606  001361                  14100          BNE     1$              ;BR IF NOT
 5049  026610  004737  026276          14200  2$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
 5050  026614  013761  026746  000004  14300          MOV     SCHAR,4(R1)     ;LOAD PORT4
 5051  026622  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5052  026624  122110                  14500          122110                  ;LOAD OUT DATA
 5053  026626  005737  026750          14600          TST     STUFLG          ;BITSTUFF???
 5054  026632  001407                  14700          BEQ     6$              ;BR IF NO
 5055  026634  013737  026746  026646  14800          MOV     SCHAR,5$        ;IT IS SDLD SO CHECK BITSTUFFING
 5056  026642  004537  027474          14900          JSR     R5,STFFCL       ;ADD ANY BIT STUFF CLOCK TICKS
 5057  026646  000000                  15000  5$:     0                       ;CHARACTER
 5058  026650  000010                  15100          10                      ;CHIFT COUNT
 5059  026652  005237  026746          15200  6$:     INC     SCHAR           ;NEXT CHARACTER
 5060  026656  022737  000400  026746  15300          CMP     #400,SCHAR      ;ALL DONE?
 5061  026664  001403                  15400          BEQ     3$
 5062  026666  005337  001250          15500          DEC     TEMP2           ;DECREMENT COUNT
 5063  026672  001346                  15600          BNE     2$              ;BR IF NOT DONE
 5064  026674  004737  026144          15700  3$:     JSR     PC,OCOR         ;WAIT FOR OCOR
 5065  026700  000207                  15800          RTS     PC
 5066  026702  005037  026746          15900  4$:     CLR     SCHAR           ;START PATTERN AT ZERO
 5067  026706  012737  177777  026750  16000          MOV     #-1,STUFLG      ;SET BITSTUFF FLAG
 5068  026714  005037  027672          16100          CLR     BITCON          ;CLEAR STUFF COUNT
 5069  026720  062737  000002  001250  16200          ADD     #2,TEMP2        ;ADD 2 TO CHARACTER COUNT
 5070  026726  012761  000001  000004  16300          MOV     #1,4(R1)        ;SET BIT0 IN PORT4
 5071  026734  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5072  026736  122111                  16500          122111                  ;SET SOM!
 5073  026740  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5074  026742  122110                  16700          122110                  ;LOAD GARBAGE CHAR
 5075  026744  000721                  16800          BR      2$              ;GO LOAD SILO
 5076  026746  000000                  16900  SCHAR:  0
 5077  026750  000000                  17000  STUFLG: 0
 5078                                   17100
 5079                                   17200
 5080  026752                          17300  INRDY:
 5081                                   17400          ;THIS SUBROUTINE SPINS ON INRDY
 5082                                   17500
 5083  026752  005037  001246          17600          CLR     TEMP1
 5084  026756                          17700  1$:
 5085  026756  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
 5086  026760  021244                  17900          021244                  ;PORT4←LU12
 5087  026762  032777  000020  152422  18000          BIT     #BIT4,@DMP04    ;IS INRDY SET?
 5088  026770  001004                  18100          BNE     2$              ;BR IF YES
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  5089  026772  005237  001246          18200            INC     TEMP1           ;INC DELAY
  5090  026776  001367                  18300            BNE     1$              ;TRY AGAIN
  5091  027000  104037                  18400            HLT     37              ;ERROR,NO INRD'
  5092  027002  000207                  18500    2$:     RTS     PC              ;RETURN
  5093                                  19600
  5094                                  13700
  5095  027004                                   SIMBCC:
  5096                                           ;THIS SUBROUTINE CALCULATES THE CRC USING POLYNOMIAL GIVEN
  5097                                           ;IN XPOLY. THE CORRECT CRC IS RETURNED IN CALBCC, AND THE
  5098                                           ;STATE OF THE LSB OF THE BCC IS RETURNED IN THE C BIT.
  5099
  5100  027004  010046                          MOV     R0,-(SP)        ;SAVE R0 ON STACK
  5101  027006  012537  001246                  MOV     (R5)+,TEMP1     ;TEMP1 = SHIFT COUNT
  5102  027012  012537  001250                  MOV     (R5)+,TEMP2     ;TEMP2 = CHARACTER
  5103  027016  012537  027112                  MOV     (R5)+,CALBCC    ;CALBCC = OLD BCC
  5104  027022  013700  027112          1$:     MOV     CALBCC,R0       ;PUT OLD BCC IN R0
  5105  027026  000241                          CLC
  5106  027030  006037  027112                  ROR     CALBCC          ;SHIFT OLD BCC
  5107  027034  006037  001250                  ROR     TEMP2           ;SHIFT CHARACTER
  5108  027040  005500                          ADC     R0              ;ADD CHAR CARRY TO OLD BCC
  5109  027042  006000                          ROR     R0              ;PUT BIT0 TO CARRY BIT
  5110  027044  103011                          BCC     2$              ;CARRY IS FEEDBACK BIT
  5111  027046  013700  027110                  MOV     XPOLY,R0        ;IF FEEDBACK = 1
  5112  027052  043700  027112                  BIC     CALBCC,R0       ;EXCLUSIVLY OR XPOLY TO CALBCC
  5113  027056  043737  027110  027112          BIC     XPOLY,CALBCC
  5114  027064  050037  027112                  BIS     R0,CALBCC
  5115  027070  005337  001246          2$:     DEC     TEMP1           ;DEC SHIFT COUNT
  5116  027074  001352                          BNE     1$              ;BR IF NOT DONE
  5117  027076  013700  027112                  MOV     CALBCC,R0       ;PUT RESULT IN R0
  5118  027102  006000                          ROR     R0              ;SHIFT BIT0 TO CARRY
  5119  027104  012600                          MOV     (SP)+,R0        ;RESTORE R0
  5120  027106  000205                          RTS     R5              ;RETURN
  5121  027110  000000                  XPOLY:  0
  5122  027112  000000                  CALBCC: 0
  5123          000200                  LRC8=200
  5124          120001                  CRC16=120001
  5125          102010                  CRC.CCITT=102010
  5126
  5127
  5128  027114                                   BCCLD:
  5129                                  19400            ;THIS SUBROUTINE LOADS THE OUT SILO WITH 2 SYNCS
  5130                                  19500            ;WITH SOM SET, AND ONE CHARACTER PASSED TO IT
  5131                                  19600            ;WITH THE SOM BIT CLEAR (ENABLE CRC)
  5132                                  19700
  5133  027114  013637  001250          19800            MOV     @(SP)+,TEMP2    ;GET CHARACTER
  5134  027120  062746  000002          19900            ADD     #2,-(SP)        ;ADJUST STACK
  5135  027124  012737  000002  001246  20000            MOV     #2,TEMP1        ;SET FOR 2 SYNCS
  5136  027132  012761  000026  000004  20100            MOV     #26,4(R1)       ;LOAD PORT4
  5137  027140  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  5138  027142  122114                  20300            122114                  ;LOAD SYNC REGISTER
  5139  027144  004737  026276          20400    1$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
  5140  027150  012761  000001  000004  20500            MOV     #1,4(R1)        ;LOAD PORT4
  5141  027156  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
  5142  027160  122111                  20700            122111                  ;SET SOM
  5143  027162  012761  000026  000004  20800            MOV     #26,4(R1)       ;LOAD PORT4
  5144  027170  104414                                   ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
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5145  027172  122110                    21000          122110                  ;LOAD OUT DATA
5146  027174  005337  001246            21100          DEC     TEMP1           ;ALL DONE?
5147  027200  001361                    21200          BNE     1$              ;BR IF NOT
5148  027202  004737  026276            21300          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
5149  027206  013761  001250  000004    21400          MOV     TEMP2,4(R1)     ;LOAD PORT4
5150  027214  104414                    ROMCLK                                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5151  027216  122110                    21600          122110                  ;LOAD OUT DATA
5152  027220  004737  026144            21700          JSR     PC,CCOR         ;WAIT FOR CCOR
5153  027224  000207                    21800          RTS     PC
5154                                    21900
5155                                    22000
5156  027226                                    GETQO:
5157                                          ;THIS SUBROUTINE READS THE STATE OF THE TRANSMIT
5158                                          ;BCC LSB AND PUTS IT IN THE CARRY BIT
5159
5160  027226  104414                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5161  027230  021364                          021364                          ;PORT4←LU-17
5162  027232  106177  152154                  ROLB    @DMPC4                  ;PUT QO IN CARRY
5163  027236  000207                          RTS     PC                      ;RETURN
5164
5165
5166  027240                                    GETQI:
5167                                          ;THIS SUBROUTINE READS THE STATE OF THE RECEIVE
5168                                          ;BCC LSB AND PUTS IT IN THE CARRY BIT
5169
5170  027240  104414                          ROMCLK                          ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5171  027242  021364                          021364                          ;PORT4←LU-17
5172  027244  106177  152142                  ROLB    @DMPC4                  ;PUT QO IN CARRY
5173  027250  106177  152136                  ROLB    @DMPC4                  ;PUT QI IN CARRY
5174  027254  000207                          RTS     PC                      ;RETURN
5175
5176
5177  027256                          22300   SYNLD:
5178                                  22400           ;THIS SUBROUTINE LOADS OUT SILO WITH
5179                                  22500           ;2 SYNC CHARACTERS WITH SOM SET
5180                                  22600
5181  027256  012737  000002  001246  22700           MOV     #2,TEMP1        ;LOAD COUNTER FOR 2 SYNCS
5182  027264  012761  000026  000004  22800           MOV     #26,4(R1)       ;PORT4←26
5183  027272  104414                  ROMCLK                                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5184  027274  122114                  23000           122114                  ;LOAD SYNC REG
5185  027276  004737  026276          23100   1$:     JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
5186  027302  012761  000001  000004  23200           MOV     #1,4(R1)        ;LOAD PORT4
5187  027310  104414                  ROMCLK                                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5188  027312  122111                  23400           122111                  ;SET SOM
5189  027314  012761  000026  000004  23500           MOV     #26,4(R1)       ;PORT←26
5190  027322  104414                  ROMCLK                                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5191  027324  122110                  23700           122110                  ;LOAD OUT DATA WITH SYNC
5192  027326  005337  001246          23800           DEC     TEMP1           ;INCREMENT COUNTER
5193  027332  001361                  23900           BNE     1$              ;BR IF NOT DONE
5194  027334  000207                  24000           RTS     PC              ;RETURN
5195                                  24100
5196                                  24200
5197  027336                          24300   SOM:
5198                                  24400           ;THIS SUBROUTINE LOADS SOM AND OUT DATA WITH A
5199                                  24500           ;GARBAGE CHARACTER (0)
5200                                  24600
```

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5201  027336  004737  026276          24700          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
5202  027342  012761  000001  000004  24800          MOV     #1,4(R1)        ;PORT4←1
5203  027350  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5204  027352  122111                  25000          122111                  ;SET SOM
5205  027354  005061  000004          25100          CLR     4(R1)           ;CLEAR DATA CHAR
5206  027360  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5207  027362  122110                  25300          122110                  ;LOAD GARBAGE CHARACTER
5208  027364  000207                  25400          RTS     PC              ;RETURN
5209                                   25500
5210                                   25600
5211  027366                          25700  EOM:
5212                                   25800          ;THIS SUBROUTINE LOADS EOM AND OUT DATA WITH A
5213                                   25900          ;GARBAGE CHARACTER (2) TO ENABLE TRANSMISSION OF BCC
5214                                   26000
5215  027366  004737  026276          26100          JSR     PC,OUTRDY       ;WAIT FOR OUTRDY
5216  027372  012761  000002  000004  26200          MOV     #2,4(R1)        ;PORT4←2
5217  027400  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5218  027402  122111                  26400          122111                  ;SET EOM
5219  027404  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5220  027406  122110                  26600          122110                  ;LOAD GARBAGE CHARACTER
5221  027410  000207                  26700          RTS     PC              ;RETURN
5222                                   26800
5223                                   26900
5224  027412                          27000  MESLD:
5225                                   27100          ;THIS SUBROUTINE LOADS SILO WITH MESSAGE
5226                                   27200          ;THE FIRST ARUGUMENT IS THE ADDRESS OF THE MESSAGE
5227                                   27300          ;THE SECOND ARGUMENT IS THE NUMBER OF CHARACTERS IN THE MESSAGE
5228                                   27400
5229  027412  010046                  27500          MOV     R0,-(SP)        ;SAVE R0
5230  027414  012500                  27600          MOV     (R5)+,R0        ;R0=MESSAGE POINTER
5231  027416  012537  001246          27700          MOV     (R5)+,TEMP1     ;TEMP1=CHARACTER COUNT
5232  027422  004737  026276          27800  1$:     JSR     PC,OUTRDY       ;WAIT FOR OUT RDY
5233  027426  112061  000004          27900          MOVB    (R0)+,4(R1)     ;LOAD PORT4 WITH CHARACTER
5234  027432  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5235  027434  122110                  28100          122110                  ;LOAD OUT DATA SILO
5236  027436  005337  001246          28200          DEC     TEMP1           ;DEC CHAR COUNT
5237  027442  001367                  28300          BNE     1$              ;BR IF NOT DONE
5238  027444  004737  026144          28400          JSR     PC,OCOR         ;WAIT FOR OCOR
5239  027450  012600                  28500          MOV     (SP)+,R0        ;RESTORE R0
5240  027452  000205                  28600          RTS     R5              ;RETURN
5241                                   28700
5242                                   28800
5243  027454                          28900  CLRIO:
5244                                   29000          ;THIS SUBROUTINE SETS IN CLR AND OUT CLR TO
5245                                   29100          ;CLEAR THE TRANSMIT AND RECEIVE BCC REGISTERS
5246                                   29200
5247  027454  012761  000200  000004  29300          MOV     #BIT7,4(R1)     ;LOAD PORT4
5248  027462  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5249  027464  122112                  29500          122112                  ;SET IN CLR!
5250  027466  104414                                 ROMCLK                  ;NEXT WORD IS INSTRUCTION, ROMCLK PC=5304
5251  027470  122111                  29700          122111                  ;SET OUT CLR!
5252  027472  000207                  29800          RTS     PC              ;RETURN
5253                                   29900
5254                                   30000
5255  027474                          30100  STFFCL:
5256                                   30200          ;THIS SUBROUTINE ADDS ANY NECESSSARY BIT STUFF CLOCK TICKS
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5257                                            30300           ;FIRST ARGJMENT IS CHAR, SECOND ARGUMENT IS SHIFT COUNT.
5258                                            30400
5259  027474  010046                            30500           MOV     R0,-(SP)        ;SAVE R0
5260  027476  012500                            30600           MOV     (R5)+,R0        ;PUT CHAR IN R0
5261  027500  012537  001252                    30700           MOV     (R5)+,TEMP3     ;PUT SHIFT COUNT IN TEMP3
5262  027504  106000                            30800   1$:     RORB    R0              ;LOOK AT NEXT BIT
5263  027506  103403                            30900           BCS     2$              ;BR IF A MARK
5264  027510  005037  027672                    31000           CLR     BITCON          ;IT WAS A SPACE, CLEAR 1'S COUNTER
5265  027514  000412                            31100           BR      3$              ;CONTINUE
5266  027516  005237  027672                    31200   2$:     INC     BITCON          ;INC CONSECUTIVE 1'S COUNTER
5267  027522  022737  000005  027672            31300           CMP     #5,BITCON       ;IS IT 5 YET?
5268  027530  001004                            31400           BNE     3$              ;BR IF NO
5269  027532  005037  027672                    31500           CLR     BITCON          ;YES!  SO START AGAIN
5270  027536  104415  000001                    31600           DATACLK,        1       ;GIVE EXTRA TICK TO STUFF ZERO
5271  027542  005337  001252                    31700   3$:     DEC     TEMP3           ;DEC SHIFT COUNT
5272  027546  001356                            31800           BNE     1$              ;BR IF NOT DONE
5273  027550  012600                            31900           MOV     (SP)+,R0        ;RESTORE R0
5274  027552  000205                            32000           RTS     R5              ;RETURN
5275                                            32100
5276                                            32200
5277  027554                                    32300   STFFCK:
5278                                            32400           ;THIS SUBROUTINE CHECKS TO SEE IF TRANSMITTER
5279                                            32500           ;IS STUFFING ZEROS WHEN IT SHOULD. FIRST ARGUMENT
5280                                            32600           ;IS THE CHARACTER, SECOND ARGUMENT IS SHIFT COUNT.
5281                                            32700
5282  027554  010046                            32800           MOV     R0,-(SP)        ;SAVE R0
5283  027556  012500                            32900           MOV     (R5)+,R0        ;PUT CHAR IN R0
5284  027560  012537  001252                    33000           MOV     (R5)+,TEMP3     ;PUT SHIFT COUNT IN TEMP3
5285  027564  106000                            33100   1$:     RORB    R0              ;SHIFT OUT NEXT BIT
5286  027566  103403                            33200           BCS     2$              ;BR IF IT IS A MARK
5287  027570  005037  027672                    33300           CLR     BITCON          ;IT WAS A SPACE, CLEAR 1'S COUNTER
5288  027574  000416                            33400           BR      3$              ;CONTINUE
5289  027576  005237  027672                    33500   2$:     INC     BITCON          ;INC CONSECUTIVE I'S COUNTER
5290  027602  022737  000005  027672            33600           CMP     #5,BITCON       ;5 IN A ROW YET?
5291  027610  001010                            33700           BNE     3$              ;BR IF NO
5292  027612  005037  027672                    33800           CLR     BITCON          ;YES, SO START OVER
5293  027616  104415  000001                    33900           DATACLK,        1       ;EXTRA TICK TO STUFF ZERO
5294  027622  004737  026112                    34000           JSR     PC,GETSI        ;LOOK AT WINDOW
5295  027626  103001                            34100           BCC     3$              ;IS IT A ZERO, BR IF YES
5296  027630  104030                            34200           HLT     30              ;NO, ERROR ZERO WAS NOT STUFFED
5297  027632  005337  001252                    34300   3$:     DEC     TEMP3           ;DEC SHIFT COUNT
5298  027636  001352                            34400           BNE     1$              ;BR IF NOT DONE
5299  027640  012600                            34500           MOV     (SP)+,R0        ;RESTORE R0
5300  027642  000205                            34600           RTS     R5              ;RETURN
5301                                            34700
5302                                            34800
5303  027644                                    34900   CTSDLY:
5304                                            35000           ;THIS SUBROUTINE WASTES TIME UNTIL CTS SETS,
5305                                            35100           ;BUT HOPEFULLY NOT SO LONG THAT THE SILO RUNS OUT
5306                                            35200
5307  027644  010046                            35300           MOV     R0,-(SP)        ;SAVE R0
5308  027646  012700  000032                    35400           MOV     #32,R0          ;LOAD R0 WITH COUNT
5309  027652  027777  151326  151324            35500   1$:     CMP     @TKCSR,@TKCSR   ;WASTE TIME
5310  027660  005300                            35600           DEC     R0              ;DECREMENT COUNTER
5311  027662  001373                            35700           BNE     1$              ;DO IT AGAIN IF NOT = 0
5312  027664  012600                            35800           MOV     (SP)+,R0        ;RESTORE R0
```

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                                                 35900            RTS     PC              ;RETURN
                                                 36000
                                                 36100
                                                 36200    FLAG:  ↑B\C111:110>            ;FLAG CHARACTER
                                                 36300    BITCON: 0
                                                 36400    MESDAT: .BYTE   0,125,252,377
                                                 36500    FLTDAT: .BYTE   1,2,4,10,20,40,100,200,376,375,373,367,357,337,277,177
                                                 36600    STUFDT: .BYTE   100,140,160,170,3,300,174,176,177,1
                                                 36700            .BYTE   363,347,317,200,0,377,377,377,200,37
                                                 36800    .EVEN
000300  046377  047111  020105  00300    EM1:    .ASCIZ  <377>/LINE UNIT INITALIZATION TEST/
000400  046377  047111  020105  00400    EM2:    .ASCIZ  <377>↑LINE UNIT REGISTER READ/ONLY TEST↑
000445      377 044514  042516  00500    EM3:    .ASCIZ  <377>↑LINE UNIT REGISTER WRITE/READ TEST↑
000511      377 044514  042516  00600    EM4:    .ASCIZ  <377>/LINE UNIT INTERNAL CLOCK FAILURE/
000553      377 051124  047101  00700    EM5:    .ASCIZ  <377>/TRANSMITTER DATA ERROR/
000603      377 042522  042503  00800    EM6:    .ASCIZ  <377>/RECEIVER TEST/
000622  051377  041505  044505  00900    EM7:    .ASCIZ  <377>/RECEIVER DATA ERROR/
000647      377 047515  042504  01000    EM10:   .ASCIZ  <377> MODEM SIGNAL ERROR/
000673      377 051124  047101  01100    EM11:   .ASCIZ  <377>/TRANSMITTER CRC ERROR
000722  051377  041505  044505  01200    EM12:   .ASCIZ  <377>/RECEIVER CRC ERROR/
000746  044777  020116  041502  01300    EM13:   .ASCIZ  <377>/IN BCC MATCH ERROR SEU REG 12/
001006  052377  040522  051516  01400    EM14:   .ASCIZ  <377>/TRANSMITTER FAILED TO GO TO MARK STATE
001056  041777  041101  042514  01500    EM15:   .ASCIZ  <377>/CABLE DATA TEST/
001077      377 046106  043501  01600    EM16:   .ASCIZ  <377>/FLAG ERROR/
001113      377 051124  047101  01700    EM17:   .ASCIZ  <377>/TRANSMITTER FAILED TO STUFF A ZERO
001157      377 053523  052111  01800    EM20:   .ASCIZ  <377>/SWITCH PAC TEST/
001200  040777  047502  052122  01900    EM21:   .ASCIZ  <377>/ABORT ERROR/
001215      377 051124  047101  02000    EM22:   .ASCIZ  <377>/TRANSMITTER ERROR
001243  044377  046101  020106  02100    EM23:   .ASCIZ  <377>/HALF DUPLEX TEST
001262  047777  052125  051040  02200    EM24:   .ASCIZ  <377>/OUT READY NOT SET/
001305      377 047111  051040  02300    EM25:   .ASCIZ  <377>/IN READY NOT SET/
                                02400
000727      377 054105  042520  02500    DH1:    .ASCIZ  <377>/EXPECTED  FOUND/
000750  042777  050130  041505  02600    DH2:    .ASCIZ  <377>/EXPECTED  FOUND  LU-REGISTER
001036  041777  040510  040522  02700    DH3:    .ASCIZ  <377>/CHARACTER    BIT THAT FAILED
001044  041777  051117  042522  02800    DH4:    .ASCIZ  <377>/CORRECT CRC    BIT THAT FAILED
001104  042777  050130  041505  02900    DH5:    .ASCIZ  <377>/EXPECTED   FOUND   SHIFT
001136  042777  050130  041505  03000    DH6:    .ASCIZ  <377>/EXPECTED   FOUND   CHARACTER   SHIFT
001204  041377  047514  045503  03100    DH7:    .ASCIZ  <377>/BLOCK END NOT SET
001227      377 052122  020123  03200    DH10:   .ASCIZ  <377>/RTS DID NOT CLEAR
                                03300    .EVEN
                                03400
001252  000002                  03500    DT1:    2
001254      003     007         03600            .BYTE   3,7
```

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031256  001272                  03700           SAVR5
031260      003     002         03800           .BYTE   3,2
031262  001270                  03900           SAVR4
031264  000003                  04000   DT2:    3
031266      003     007         04100           .BYTE   3,7
031270  001272                  04200           SAVR5
031272      003     010         04300           .BYTE   3,10
031274  001270                  04400           SAVR4
031276      003     002         04500           .BYTE   3,2
031300  001264                  04600           SAVR2
031302  000002                  04700   DT3:    2
031304      003     017         04800           .BYTE   3,17
031306  001272                  04900           SAVR5
031310      002     002         05000           .BYTE   2,2
031312  001266                  05100           SAVR3
031314  000002                  05200   DT4:    2
031316      006     021         05300           .BYTE   6,21
031320  027112                  05400           CALB??
031322      002     002         05500   ;       .BYTE   2,2
031324  001266                  05600           SAVR3
031326  000003                  05700   DT5:    3
031330      001     011         05800           .BYTE   1,11
031332  001300                  05900           ZERO
031334      001     011         06000           .BYTE   1,11
031336  001302                  06100           ONE
031340      002     002         06200           .BYTE   2,2
031342  001260                  06300           SAVR0
031344  000003                  06400   DT6:    3
031346      001     011         06500           .BYTE   1,11
031350  001302                  06600           ONE
031352      001     011         06700           .BYTE   1,11
031354  001300                  06800           ZERO
031356      002     002         06900           .BYTE   2,2
031360  001260                  07000           SAVR0
031362  000004                  07100   DT7:    4
031364      001     011         07200           .BYTE   1,11
031366  001300                  07300           ZERO
031370      001     011         07400           .BYTE   1,11
031372  001302                  07500           ONE
031374      003     007         07600           .BYTE   3,7
031376  001272                  07700           SAVR5
031400      002     001         07800           .BYTE   2,1
031402  001266                  07900           SAVR3
031404  000004                  08000   DT10:   4
031406      001     011         08100           .BYTE   1,11
031410  001302                  08200           ONE
031412      001     011         08300           .BYTE   1,11
031414  001300                  08400           ZERO
031416      003     007         08500           .BYTE   3,7
031420  001272                  08600           SAVR5
031422      002     001         08700           .BYTE   2,1
031424  001266                  08800           SAVR3
031426  000002                  08900   DT11:   2
031430      003     007         09000           .BYTE   3,7
031432  027670                  09100           FLAG
031434      002     002         09200           .BYTE   2,2
```

D09


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031436  001266                  09300           SAVR3
031440  000002                  09400   DT12:   2
031442      006     004         09500           .BYTE   6.4
031444  027112                  09600           CALB00
031446      006     002         09700           .BYTE   6.2
031450  001252                  09800           TEMP3
                                09900
031452                          10000   .ERRTAB:
031452  000000                  10100           0
031454  000000                  10200           0
031456  000000                  10300           0
031460  027744                  10400   EM1
031462  030750                  10500   DH2     ;HLT    1
031464  031264                  10600   DT2
031466  030002                  10700   EM2
031470  030750                  10800   DH2     ;HLT    2
031472  031264                  10900   DT2
031474  030045                  11000   EM3
031476  030750                  11100   DH2     ;HLT    3
031500  031264                  11200   DT2
031502  030111                  11300   EM4
031504  000000                  11400   0       ;HLT    4
031506  000000                  11500   0
031510  030153                  11600   EM5
031512  030750                  11700   DH2     ;HLT    5
031514  031264                  11800   DT2
031516  030153                  11900   EM5
031520  031006                  12000   DH3     ;HLT    6
031522  031302                  12100   DT3
031524  030203                  12200   EM6
031526  030727                  12300   DH1     ;HLT    7
031530  031252                  12400   DT1
031532  030225                  12500   EM7
031534  030727                  12600   DH1     ;HLT    10
031536  031252                  12700   DT1
031540  030247                  12800   EM10
031542  030727                  12900   DH1     ;HLT    11
031544  031252                  13000   DT1
031546  030273                  13100   EM11
031550  031104                  13200   DH5     ;HLT    12
031552  031326                  13300   DT5
031554  030322                  13400   EM12
031556  031104                  13500   DH5     ;HLT    13
031560  031326                  13600   DT5
031562  030273                  13700   EM11
031564  031044                  13800   DH4     ;HLT    14
031566  031314                  13900   DT4
031570  030346                  14000   EM13
031572  000000                  14100   0       ;HLT    15
031574  000000                  14200   0
031576  030273                  14300   EM11
031600  031104                  14400   DH5     ;HLT    16
031602  031344                  14500   DT6
031604  030322                  14600   EM12
031606  031104                  14700   DH5     ;HLT    17
031610  031344                  14800   DT6
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031612  030273                  14900   EM11
031614  031136                  15000   DH6     ;HLT    20
031616  031362                  15100   DT7
031620  030273                  15200   EM11
031622  031136                  15300   DH6     ;HLT    21
031624  031404                  15400   DT10
031626  030322                  15500   EM12
031630  031136                  15600   DH6     ;HLT    22
031632  031362                  15700   DT7
031634  030322                  15800   EM12
031636  031136                  15900   DH6     ;HLT    23
031640  031404                  16000   DT10
031642  030406                  16100   EM14
031644  000000                  16200   0       ;HLT    24
031646  000000                  16300   0
031650  030456                  16400   EM15
031652  030727                  16500   DH1     ;HLT    25
031654  031252                  16600   DT1
031656  030477                  16700   EM16
031660  031006                  16800   DH3     ;HLT    26
031662  031426                  16900   DT11
031664  030322                  17000   EM12
031666  030727                  17100   DH1     ;HLT    27
031670  031440                  17200   DT12
031672  030513                  17300   EM17
031674  000000                  17400   0       ;HLT    30
031676  000000                  17500   0
031700  030557                  17600   EM20
031702  030727                  17700   DH1     ;HLT    31
031704  031252                  17800   DT1
031706  030600                  17900   EM21
031710  031204                  18000   DH7     ;HLT    32
031712  000000                  18100   0
031714  030600                  18200   EM21
031716  031006                  18300   DH3     ;HLT    33
031720  031302                  18400   DT3
031722  030615                  18500   EM22
031724  031227                  18600   DH10    ;HLT    34
031726  000000                  18700   0
031730  030640                  18800   EM23
031732  030750                  18900   DH2     ;HLT    35
031734  031264                  19000   DT2
031736  030662                  19100   EM24
031740  000000                  19200   0       ;HLT    36
031742  000000                  19300   0
031744  030705                  19400   EM25
031746  000000                  19500   0       ;HLT    37
031750  000000                  19600   0
031752  030203                  19700   EM6
031754  030750                  19800   DH2     ;HLT    40
031756  031264                  19900   DT2
031760  030153                  20000   EM5
031762  031104                  20100   DH5     ;HLT    41
031764  031326                  20200   DT5
031766  030346                  20300   EM13
031770  030727                  20400   DH1     ;HLT    42
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DCDMEA.P11      SUBROUTINES

        031772  031252                  20500   DT1
                                        20600
                                        20700
        031774                          20800   CORMAX:
                000001                  21300   .END
```

ADRCNT= 004301 1451* 1487* 1496*
AUDONE 002734 1159 1232*
AUSTRT 002446 1158* 1189 1236
AUTO.S 010360 1121 1939*
BCOLD 027114 3542 3571 3617 3646 3692 3721 3767 3796 5128*
BINWRD 004622 1537* 1540* 1541 1578*
BITCON 027672 5068* 5264* 5266* 5267 5269* 5287* 5289* 5290 5292* 5317*
BIT0 = 000001 693* 1726 1727
BIT1 = 000002 692* 1126 1720 1726 1727 2098
BIT10 = 002000 683* 2070 2081
BIT11 = 004000 682* 2602 2635 2679 2737 2788 2839 2890 2942 3000 3028 3056 3084
3114 3162 3199 3236 3273 3313 3394 3492 3536 3611 3686 3761 3834
3900 3971 4068 4132 4379 4650 4714 4754 4848
BIT12 = 010000 681* 2022 2096
BIT13 = 020000 680* 2025 2073 2100 2308 3438 3452 3467 3488 3511
BIT14 = 040000 679* 1354 2036 2038 2100 2111 3440 3490 4752 4846
BIT15 = 100000 678* 1080 1162 1165 2009 2076
BIT2 = 000004 691* 1126 1285 1727
BIT3 = 000010 690* 2102 2109 3469
BIT4 = 000020 689* 1710 1733 1735 2715 3123 3171 3208 3245 3282 4715 4934 4976
5087
BIT5 = 000040 688* 2213 2311 2658 2758 2819 2870 2921 3355 4667
BIT6 = 000100 687* 1715 1716 2104 3037 3093
BIT7 = 000200 686* 1716 1835 2213 2687 3128 3454 3513 5247
BIT8 = 000400 695* 2080 2091 2093 2106 2108 2114 2117 2174
BIT9 = 001000 684* 2078 2080 2088 2114 2117 2172 2174
BM 007000 1758* 2050
BRLVL 012026 2163 2179 2187 2199*
BRW 003640 1291 1377*
BRX 003642 1292 1378*
CALBCC 027112 3561 3590 3636 3665 3711 3740 3786 3815 3871 3937 3996 4017 4161
4182 4212 4233 4309 4352 4409 4430 4479 4500 4576 4630 4766 4822
4860 4906 5103* 5104 5106* 5112 5113* 5114* 5117 5122* 5335
CHAR 026330 3115 3163 3200 3237 3274 3395 4984*
CHARSD 026442 5021*
CHRCNT 004620 1535* 1538 1542 1558* 1576* 1577
CKSWR 007470 1307 1352 1383 1598 1785*
CKSWR1 007534 1795* 1807
CKSWR2 007546 1798*
CKSWR3 007552 1800*
CKSWR4 007556 1801* 1809 1816
CKSWR5 007662 1786 1790 1825*
CLKX 001242 769*
CLRIO 027454 3537 3566 3612 3641 3687 3716 3762 3791 5243*
CNERR 007233 1200 1752*
CNT.MA 001702 794 958* 1079 1081 1083 1863
CNVRT = 104411 831* 1197 1311 1313 1315 1317 1632 1634 1693 1798
CONERR 007171 1195 1758*
CONN 007040 1758* 2027
CONTAB 002710 1204 1217*
CONVRT= 104410 829* 1138 1203 1648 1961
CORMAX 031774 5335*
CRAM 006532 1758* 2000
CRC.CC= 102010 5125*
CRC16 = 120001 3539 3568 3614 3643 3689 3718 3764 3793 3839 3905 3990 4155 4206
4403 4473 4757 4851 5124*

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CREAM   001320            793*   1078*  1859*  1860   1862*  1866
CSR     006434           1758*   1965
CSRMAP  010362           1940*
CTSDLY  027644           5303*
CYCLE   007726           1293    1334   1335   1850*
DATABP  005124           1621*   1624   1646   1649*
DATACL= 104415            839*   2642   2686   2690   2750   2751   2765   2801   2802   2816   2852   2853   2857
                         2903    2904   2919   2960   2963   3004   3032   3060   3088   3117   3165   3202   3239
                         3276    3315   3316   3359   3360   3397   3544   3545   3573   3574   3619   3620   3648
                         3649    3694   3695   3723   3724   3769   3770   3798   3799   3853   3855   3919   3921
                         3983    3997   4018   4036   4043   4045   4078   4148   4162   4183   4213   4234   4252
                         4259    4261   4272   4396   4410   4431   4451   4480   4501   4519   4526   4528   4539
                         4659    4664   4670   4724   5270   5293
DATAHD  005112           1620*   1642   1645*
DELAY = 104413            835*
DEVADR  004276           1449*   1484   1494*
DEVTAB  002722           1173    1222*
DH1     030727           5335*
DH10    031227           5335*
DH2     030750           5335*
DH3     031006           5335*
DH4     031044           5335*
DH5     031104           5335*
DH6     031136           5335*
DH7     031204           5335*
DISPLA  001200            740*   1093*  1099*  1308*
DISPRE  000174            726*   1099
DMACTV  001306            787*   1116   1249*  1250   1850   1864   1946*  2129*  2135*  2136*  2140   2165
DMCM    007254           1208    1758*
DMCR00  001500            873*
DMCR01  001510            878*
DMCR02  001520            883*
DMCR03  001530            888*
DMCR04  001540            893*
DMCR05  001550            898*
DMCR06  001560            903*
DMCR07  001570            908*
DMCR10  001600            913*
DMCR11  001610            918*
DMCR12  001620            923*
DMCR13  001630            928*
DMCR14  001640            933*
DMCR15  001650            938*
DMCR16  001660            943*
DMCR17  001670            948*
DMCSR   001404            851*   1158*  1184   1221   1338   1375   1688   1734   1868*  1877   1926   2230*
DMCSRH  001406            862*   1715*  1716*  1720*  1726*  1727*  1733*  1735*  1877*  1878*  1879
DMCTL   001410            863*   1879*  1880*  1881
DMNUM   001310            788*   1074   1324   1944*  1959*  2121*  2122   2130   2132
DMP04   001412            864*   1704*  1710   1747   1752   1881*  1892*  1893   4921   4934   4976   5087   5162*
                         5172*   5173*
DMP06   001414            865*   1721*  1883*  1984*
DMRLVL  001376            858*   1886*  1887*  1888
DMRVEC  001374            857*   1341   1869*  1870*  1886
DMS100  001502            874*
DMS101  001512            879*
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DMS102  001522            984*
DMS103  001532            889*
DMS104  001542            894*
DMS105  001552            899*
DMS106  001562            904*
DMS107  001572            909*
DMS110  001602            914*
DMS111  001612            919*
DMS112  001622            924*
DMS113  001632            929*
DMS114  001642            934*
DMS115  001652            939*
DMS116  001662            944*
DMS117  001672            949*
DMS200  001504            975*
DMS201  001514            880*
DMS202  001524            985*
DMS203  001534            990*
DMS204  001544            895*
DMS205  001554            900*
DMS206  001564            905*
DMS207  001574            910*
DMS210  001604            915*
DMS211  001614            920*
DMS212  001624            925*
DMS213  001634            930*
DMS214  001644            935*
DMS215  001654            940*
DMS216  001664            945*
DMS217  001674            950*
DMS300  001506            876*
DMS301  001516            981*
DMS302  001526            886*
DMS303  001536            891*
DMS304  001546            896*
DMS305  001556            901*
DMS306  001566            906*
DMS307  001576            911*
DMS310  001606            916*
DMS311  001616            921*
DMS312  001626            926*
DMS313  001636            931*
DMS314  001646            936*
DMS315  001656            941*
DMS316  001666            946*
DMS317  001676            951*
DMTLVL  001402            860*   1890*   1891*
DMTVEC  001400            859*   1888*   1889*   1890
DM.END  001700            953*   1942
DM.MAP  001500            793     872*   1078    1131    1141    1235    1860    1862    1940    1945    2157
DT1     031252           5335*
DT10    031404           5335*
DT11    031426           5335*
DT12    031440           5335*
DT2     031264           5335*
DT3     031302           5335*
```

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DT4     031314          5335#
DT5     031326          5335#
DT6     031344          5335#
DT7     031362          5335#
EM1     027744          5335#
EM10    030247          5335#
EM11    030273          5335#
EM12    030322          5335#
EM13    030346          5335#
EM14    030406          5335#
EM15    030456          5335#
EM16    030477          5335#
EM17    030513          5335#
EM2     030002          5335#
EM20    030557          5335#
EM21    030600          5335#
EM22    030615          5335#
EM23    030640          5335#
EM24    030662          5335#
EM25    030705          5335#
EM3     030045          5335#
EM4     030111          5335#
EM5     030153          5335#
EM6     030203          5335#
EM7     030222          5335#
EOM     027366          3980    4076    4141    4145    4388    4393    4772    4776    4780    4866    5211#
ERCT00  001704           960#
ERCT01  001710           963#
ERCT02  001714           966#
ERCT03  001720           969#
ERCT04  001724           972#
ERCT05  001730           975#
ERCT06  001734           978#
ERCT07  001740           981#
ERCT10  001744           984#
ERCT11  001750           987#
ERCT12  001754           990#
ERCT13  001760           993#
ERCT14  001764           996#
ERCT15  001770           999#
ERCT16  001774          1002#
ERCT17  002000          1005#
ERR     002612          1182    1192#   1196
ERRCNT  001232           761#   1320    1347    1659*   1875*
ERRFLG  001325           800#   1076*   1306*   1368*   1609*   1622    1636*   1694*
ERRMSG  005100          1619*   1637    1640#
ERRPC   002702          1198    1214#
ERTABO  005224          1634    1668#
EXIT  = 000205           694#
EXITER  005160          1654    1659#
FLAG    027670          5316#   5335
FLOAT   002536          1175#   1181
FLTDAT  027700          4760    4770    4774    4778    4785    4825    5320#
FY      002562          1183#   1187
GETGI   027240          3581    3585    3656    3660    3731    3735    3806    3810    3927    3931    5166#
GETGO   027226          3552    3556    3627    3631    3702    3706    3777    3781    3961    3865    5156#
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GETSI   026112          2754    2758    2805    2809    2856    2860    2907    2911    2966    2970    4000    4004    4021
                        4025    4037    4046    4165    4169    4186    4190    4216    4220    4237    4241    4253    4262
                        4413    4417    4434    4438    4454    4458    4483    4487    4504    4508    4520    4529    4915*
                        5294
HALTS   005130          1605    1651*
HILIM   004274          1448*   1475    1493*
ICOUNT  001222           757*   1366    1371*
INBUF   007322          1418    1454    1773*
INCHAR  007666          1801    1829*
INIFLG  001324           799*   1102    1122    1129*
INRDY   026752          3317    3361    3398    3406    3414    4079    4092    4097    4275    4289    4294    4318    4332
                        4337    4542    4556    4561    4582    4596    4610    4615    4671    4681    4689    4786    4802
                        4807    4871    4886    4891    5080*
INSTER= 104404           821*   1469
INSTR = 104403           819*   1899    1951    1964    1973    2040    2049
INSTR2  004074          1425    1437*
INTTY   012042          1984    2001    2012    2029    2207*
KMCM    007264          1211    1758*
LIMITS  004222          1464    1475*
LINE    006742          1758*   2041
LOBITS  004300          1450*   1479    1495*   1496
LOCK    001220           756*   1370*   1386    1388    1628    2328*   2344*   2370*   2386*   2412*   2435*   2470*   2490*
                        3533*   3565*   3608*   3640*   3683*   3715*   3758*   3790*
LOKFLG  001326           801*
LOLIM   004272          1447*   1477    1492*
LPCNT   001224           758*   1365*   1366    1369*
LRC8  = 000200          5123*
LSTERR  001234           762*   1085*   1305*   1606    1608*   1695*
LUTYPE= ****** U         599    5095
MASKX   001244           770*
MASTEK  006066          1630    1758*
MCRLF   005574          1403    1526    1626    1627    1635    1758*   1898    1960
MCSRX   006016          1310    1758*
MDATA   007426          1556    1566    1777*
MEMLIM  001304           786*   1273*
MEPASS  005635          1309    1758*
MERRPC  006143          1633    1758*
MERRX   006043          1316    1758*
MERR2   005662          1758*   2142
MERR3   005731          1246    1758*
MESDAT  027674          3501    3972    3978    4069    4074    4133    4139    4143    4199    4274    4317    4380    4386
                        4391    4466    4541    4595    4651    4656    4661    4721    4954    4864    4970    5318*
MESLD   027412          3500    3977    4073    4138    4142    4395    4390    4655    4660    4720    4769    4773    4777
                        4863    5224*
MILK    001322           794*   1079*   1318    1858*   1863*   1867
MLOCK   005767          1287    1758*
MNEW    006070          1241    1758*
MODU    006630          1758*   2011
MPASSX  006032          1314    1758*
MPFAIL  005577          1692    1758*
MQM     005570          1433    1758*   1922    1997    2007    2020    2034
MR      005657          1296    1758*   1916
MRESET= 004000           694*
MSTCLR= 104412           833*   1697    2277    2301    2330    2372    2414    2472    2523    2545    2567    2601    2634
                        2678    2736    2787    2838    2889    2941    2999    3027    3055    3083    3112    3160    3197
                        3234    3271    3308    3349    3393    3437    3487    3535    3610    3695    3760    3833    3999
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                    3967    4067    4128    4375    4649    4712    4751    4845
MTITLE  001000       734*   1106
MTSTN   006054      1631    1758*   1900
MTSTPC  005755      1758*
MVECX   006024      1312    1758*
NEXT    001216       755*   1372    1664    2228*   2252*   2275*   2299*   2327*   2369*   2411*   2469*   2521*   2543*
                    2565*   2599*   2632*   2676*   2734*   2785*   2836*   2887*   2939*   2987*   3025*   3053*   3081*
                    3110*   3158*   3195*   3232*   3269*   3306*   3347*   3391*   3435*   3485*   3532*   3607*   3682*
                    3757*   3831*   3897*   3965*   4065*   4126*   4373*   4647*   4710*   4749*   4843*
NITCH   026142      4921*   4922*   4923*   4924*   4926*
NOACT   007100      1118    1758*   1852
NODEV   002606      1167    1190*
NUM     006374      1758*   1952
OCOR    026144      2641    2685    2747    2798    2849    2900    2959    3852    3918    3981    4077    4146    4394
                    4658    4663    4723    4781    4867    4929*   4935    4965    5007    5023    5064    5152    5238
OK      002600      1163    1166    1185    1188*   1213
ONE     001302       785*   5335
OUTRDY  026276      2738    2743    2789    2794    2840    2845    2891    2896    2946    2950    2955    2978    3976
                    4072    4137    4384    4654    4719    4949    4958    4969*   4994    5003    5016    5020    5040
                    5049    5139    5148    5185    5201    5215    5232
PACT00  001702       959*
PACT01  001706       962*
PACT02  001712       965*
PACT03  001716       968*
PACT04  001722       971*
PACT05  001726       974*
PACT06  001732       977*
PACT07  001736       980*
PACT10  001742       983*
PACT11  001746       986*
PACT12  001752       989*
PACT13  001756       992*
PACT14  001762       995*
PACT15  001766       998*
PACT16  001772      1001*
PACT17  001776      1004*
PARAM = 104405       823*   1901    1953    1966    1975    2042    2051
PARAM1  004142      1453*   1470
PARBIT= 040000       694*
PARERR  004216      1456    1458    1460    1469*   1476    1478    1480
PASCNT  001230       760*   1307*   1308    1319    1344    1874*
PC     =%000007      656*   1107*   1121*   1329*   1352*   1383*   1598*   1801*   1925*   1836*   1909    1909*   1984*
                    2001*   2012*   2028*   2197*   2214*   2641*   2685*   2738*   2743*   2747*   2754*   2758*   2789*
                    2794*   2798*   2805*   2809*   2840*   2845*   2849*   2856*   2860*   2891*   2896*   2900*   2907*
                    2911*   2946*   2950*   2955*   2959*   2966*   2970*   2978*   3002*   3030*   3058*   3086*   3115*
                    3163*   3200*   3237*   3274*   3314*   3317*   3330*   3358*   3361*   3374*   3395*   3399*   3406*
                    3414*   3537*   3542*   3552*   3556*   3566*   3571*   3581*   3595*   3612*   3617*   3627*   3631*
                    3641*   3646*   3656*   3660*   3687*   3692*   3702*   3706*   3716*   3721*   3731*   3735*   3762*
                    3767*   3777*   3781*   3791*   3796*   3806*   3810*   3840*   3952*   3861*   3865*   3906*   3918*
                    3927*   3931*   3975*   3976*   3980*   3981*   4000*   4004*   4021*   4025*   4037*   4046*   4071*
                    4072*   4076*   4077*   4079*   4092*   4097*   4136*   4137*   4141*   4145*   4146*   4165*   4169*
                    4186*   4190*   4216*   4220*   4237*   4241*   4253*   4262*   4275*   4289*   4294*   4318*   4332*
                    4337*   4383*   4384*   4388*   4389*   4393*   4394*   4413*   4417*   4434*   4438*   4454*   4459*
                    4483*   4487*   4504*   4508*   4520*   4529*   4542*   4556*   4561*   4582*   4596*   4610*   4615*
                    4653*   4654*   4658*   4663*   4671*   4681*   4689*   4719*   4719*   4723*   4755*   4756*   4772*
                    4776*   4780*   4781*   4786*   4802*   4807*   4849*   4950*   4966*   4967*   4971*   4986*   4991*
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                    4925*  4936*  4949*  4958*  4965*  4966*  4981*  4994*  5003*  5007*  5008*  5016*  5020*
                    5023*  5024*  5040*  5049*  5064*  5065*  5092*  5139*  5143*  5152*  5153*  5163*  5174*
                    5185*  5194*  5201*  5208*  5215*  5221*  5232*  5238*  5252*  5294*  5313*
PERFOR= 004537       694#
PFTAB   005232      1693   1699#
POPRO = 012600       670#  1658
POP1SP= 005726       668#
POP2SP= 022626       672#  1374
PRIO    006473      1758#  1983
PS    = 177776       661#  1071*  1284*  2169*  2179*
PUSHRO= 010046       669#  1655
PUSH1S= 005746       667#
PUSH2S= 024646       671#
QV.FLG  001327       802#  1077*  1323*  1363
RESREG  005126      1647   1650#
RESTAR  005252      1679   1685#
RESTRT  003444      1322   1326   1334#
RESOS = 104407       827#  1650
RETURN  001214       754#  1087*  1293*  1297   1334*  1372*  1376   1664*  1666   1698   1915*  1925*  1927
ROMCLK= 104414       837#  1705   1708   1745   1750   2232   2255   2279   2303   2333   2335   2346   2348
                    2375   2377   2386   2390   2420   2422   2441   2443   2477   2479   2495   2497   2524
                    2546   2570   2579   2604   2606   2610   2637   2639   2644   2654   2681   2683   2688
                    2692   2702   2712   2740   2745   2756   2791   2796   2817   2842   2847   2868   2893
                    2898   2919   2948   2952   2957   2980   3005   3033   3061   3089   3119   3129   3131
                    3167   3176   3204   3213   3241   3250   3278   3287   3318   3356   3362   3399   3407
                    3415   3444   3447   3459   3462   3494   3498   3506   3842   3846   3850   3880   3908
                    3912   3916   3946   4080   4093   4098   4107   4276   4290   4295   4304   4319   4333
                    4338   4347   4543   4557   4562   4571   4583   4597   4611   4616   4625   4665   4672
                    4682   4690   4716   4725   4787   4803   4808   4817   4872   4887   4892   4901   4919
                    4932   4947   4951   4954   4960   4963   4974   4992   4996   4999   5005   5018   5021
                    5038   5042   5045   5051   5071   5073   5085   5137   5141   5144   5150   5160   5170
                    5183   5187   5190   5203   5206   5217   5219   5234   5248   5250
RUN     001316       791#  1080*  1856*  1857*  1864
R0    =%000000       649#  1081*  1082*  1093   1141*  1158   1162   1165   1188*  1235*  1242*  1250*  1252*
                    1254*  1256   1257   1266*  1269   1270   1272*  1273   1278*  1279*  1280   1282*  1318*
                    1319*  1320*  1353   1359*  1373*  1510   1515*  1527   1543*  1547*  1557   1573*  1656*
                    1866*  1868   1869   1871   1872   1873   1876*  1882   1894   1887   1889   1891   1907*
                    1908   1911   1913   1915   1919   1920   2143*  2158*  2160*  2162   2175*  2416*  2418
                    2424   2433*  2436*  2437*  2439   2445   2453*  2455*  2474*  2476   2481   2488*  2491*
                    2492*  2494   2499   2505*  2507*  3503*  3516*  3538*  3546*  3562   3567*  3575*  3591
                    3613*  3621*  3637   3642*  3650*  3666   3688*  3696*  3712   3717*  3725*  3741   3763*
                    3771*  3787   3792*  3800*  3816   3974*  4012*  4017*  4019*  4070*  4087*  4135*  4177*
                    4182*  4184*  4198*  4228*  4233*  4275*  4382*  4425*  4430*  4432*  4465*  4495*  4500*
                    4502*  4652*  4679*  4783*  4826*  [illegible]*  4880*  5100   5104*  5108*  5109*  5111*  5112*
                    5114   5117*  5118*  5119*  5229   5230*  5233   5239*  5259   5260*  5262*  5273*  5282
                    5283*  5285*  5299*  5307   5308*  5310*  5312*
R1    =%000001       650#  1174   1175   1177*  1178*  1179*  1183   1184   1186*  1202   1253*  1254   1255*
                    1256   1325*  1329   1375*  1509   1516*  1528   1532*  1534   1535   1536   1537   1572*
                    1688*  1696*  1926*  2062*  2064*  2065   2067*  2068   2070*  2071*  2072*  2073*  2074
                    2078*  2079*  2080*  2081*  2082   2084   2087   2088*  2089*  2090*  2091*  2092*  2093*
                    2094   2098   2102   2104*  2105*  2106*  2107*  2108*  2109   2113*  2114*  2115   2116*
                    2117*  2118   2120*  2124*  2125*  2126*  2127   2132*  2133   2137*  2159*  2160   2161*
                    2162   2163   2170*  2171*  2172*  2173*  2174*  2182*  2234   2257   2291   2305   2332*
                    2338   2345*  2351   2374*  2380   2387*  2393   2418*  2419*  2426   2439*  2440*  2447
                    2476*  2482   2494*  2500   2526   2548   2572   2581   2602*  2603*  2612   2635*  2636*
                    2646   2656   2679*  2690*  2687*  2694   2704   2714   2737*  2739*  2744*  2769   2799*
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                    2790*  2795*  2819   2839*  2841*  2846*  2870   2890*  2892*  2897*  2921   2942*  2947*
                    2951*  2956*  2979*  3000*  3007   3028*  3035   3056*  3063   3084*  3091   3114*  3121
                    3128*  3133   3140   3162*  3169   3178   3199*  3206   3215   3236*  3243   3252   3273*
                    3280   3289   3313*  3320   3354*  3355*  3364   3394*  3401   3409   3417   3442*  3443*
                    3449   3458*  3464   3492*  3493*  3497*  3504*  3508   3536*  3611*  3686*  3761*  3834*
                    3841*  3845*  3849*  3879*  3900*  3907*  3911*  3915*  3945*  3971*  4068*  4082   4095
                    4100   4132*  4278   4292   4297   4306   4321   4335   4340   4349   4379*  4545   4559
                    4564   4573   4585   4599   4613   4618   4627   4650*  4667   4674   4684   4692   4714*
                    4715*  4727   4754*  4782*  4789   4805   4810   4819   4848*  4868*  4874   4889   4894
                    4903   4946*  4950*  4953*  4959*  4962*  4991*  4995*  4998*  5004*  5017*  5037*  5041*
                    5044*  5050*  5070*  5136*  5140*  5143*  5149*  5182*  5186*  5189*  5202*  5205*  5216*
                    5233*  5247*
R2      =%000002     651#  1173*  1176   1190   1508   1517*  1791   1795*  1812*  1813*  1814*  1815*  1820
                    1824*  1867*  1874   1875   1940*  1941*  1942   1945*  1972*  1981*  1994*  2009*  2022*
                    2023   2025*  2036*  2038*  2048*  2057*  2058   2076*  2087*  2096*  2100*  2111*  2112
                    2115*  2118*  2119   2157*  2170   2181*  2183*  2185*  2186*  2193*  2231*  2254*  2278*
                    2302*  2331*  2373*  2415*  2473*  2609*  2643*  2653*  2691*  2701*  2711*  2749*  2752*
                    2900*  2803*  2851*  2854*  2902*  2905*  2962*  2964*  3001*  3029*  3057*  3085*  3110*
                    3161*  3198*  3235*  3272*  3311*  3321   3325*  3326   3352*  3365   3369*  3370   3985*
                    3998*  4069*  4083   4150*  4163*  4202*  4214*  4274*  4279   4317*  4322   4398*  4411*
                    4450*  4452*  4469*  4481*  4541*  4546   4595*  4600   4651*  4675   4713*  4760*  4761
                    4785*  4790   4825*  4854*  4855   4870*  4875
R3      =%000003     652#  1170*  1172*  1180   1190   1412   1419*  1429*  1432*  1434   1438*  1507   1518*
                    1529   1544*  1545*  1546*  1547   1556*  1557*  1562*  1565*  1571*  1792   1802   1804
                    1806   1808   1811*  1815   1823*  1831*  1834   1835*  1985   1987   1990*  1993*  1994
                    2002   2004   2013   2015   2017   2029   2031   2209*  2212   2213*  2748*  2762*  2763
                    2799*  2813*  2814   2850*  2864*  2865   2901*  2915*  2916   2943*  2961*  2974*  2975
                    3312*  3328*  3331*  3353*  3372*  3375*  3835*  3872*  3873   3875*  3901*  3938*  3939
                    3941*  3982*  4008*  4009   4011*  4029*  4030   4032*  4040*  4041   4044*  4049*  4050
                    4147*  4173*  4174   4176*  4194*  4195   4197*  4224*  4225   4227*  4245*  4246   4248*
                    4256*  4257   4260*  4265*  4266   4273*  4283*  4316*  4326*  4395*  4421*  4422   4424*
                    4442*  4443   4445*  4461*  4462   4464*  4491*  4492   4494*  4512*  4513   4515*  4523*
                    4524   4527*  4532*  4533   4540*  4550*  4594*  4604*  4759*  4767*  4784*  4795*  4797*
                    4853*  4861*
R4      =%000004     653#  1131*  1132   1133   1135   1136   1137   1176*  1177   1179   1413   1418*  1422*
                    1423*  1424   1431*  1435   1437*  1445   1454*  1455   1457   1459   1461*  1462   1463
                    1484*  1495*  1489*  1506   1519*  1530   1541*  1544   1549*  1551*  1553*  1570*  1613*
                    1614*  1615*  1616*  1617*  1618*  1619   1620   1621   1793   1796*  1910*  1818   1822*
                    1989*  1991*  2168*  2169   2177*  2179   2187   2234*  2235*  2237   2257*  2258*  2260
                    2281*  2282*  2284   2305*  2306*  2310*  2312   2338*  2339*  2340   2351*  2352*  2353
                    2380*  2381*  2382   2393*  2394*  2395   2426*  2427*  2428   2447*  2448*  2449   2482*
                    2483   2500*  2501   2526*  2528   2548*  2550   2612*  2613*  2615   2646*  2647*  2649
                    2656*  2657*  2659   2694*  2695*  2697   2704*  2705*  2707   2714*  2716   2944*  2951
                    2954*  2956   2977*  2979   3007*  3008*  3010   3035*  3036*  3038   3063*  3064*  3066
                    3091*  3092*  3094   3121*  3122*  3124   3133*  3134*  3136   3140*  3141*  3143   3169*
                    3170*  3172   3178*  3180   3206*  3207*  3209   3215*  3217   3243*  3244*  3246   3252*
                    3254   3280*  3281*  3283   3289*  3291   3320*  3322   3364*  3366   3401*  3403   3409*
                    3411   3417*  3419   3449*  3450*  3455   3464*  3465*  3470   3508*  3509*  3514   3836*
                    3841   3844*  3845   3848*  3849   3876*  3877   3879   3902*  3907   3910*  3911   3914*
                    3915   3942*  3943   3945   3972*  3984   4082*  4084   4100*  4101*  4103   4133*  4149
                    4199*  4201   4278*  4280   4297*  4298*  4300   4321*  4323   4340*  4341*  4343   4360*
                    4397   4466*  4468   4545*  4547   4564*  4565*  4567   4585*  4587   4599*  4601   4618*
                    4619*  4621   4674*  4676   4684*  4686   4692*  4694   4727*  4728*  4730   4789*  4791
                    4810*  4811*  4813   4874*  4876   4894*  4895*  4997
F5      =%000005     654#  1157*  1160   1168   1205   1232   1234*  1394   1395*  1401   1406   1408*  1444
                    1446*  1447   1448   1449   1450   1451   1452   1453*  1462*  1465*  1466*  1467*  1475
```

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                    1477    1479    1485    1486*   1490*   1505    1520*   1531    1542*   1554*   1569*   1611*   1613*
                    1613    1615    2187*   2188*   2189*   2190*   2191*   2192*   2193    2236*   2237    2259*   2260
                    2263*   2294    2307*   2311*   2312    2337*   2340    2350*   2363    2379*   2382    2392*   2395
                    2424*   2425*   2428    2445*   2446*   2449    2481*   2483    2499*   2501    2527*   2528    2543*
                    2550    2614*   2615    2648*   2649    2659*   2659    2696*   2697    2706*   2707    2715*   2716
                    2742*   2744    2749    2793*   2795    2800    2844*   2846    2851    2895*   2897    2902    2945*
                    2962    2962*   2983    3009*   3010    3037*   3038    3065*   3066    3093*   3094    3123*   3124
                    3135*   3136    3142*   3143    3171*   3172    3179*   3180    3208*   3209    3216*   3217    3245*
                    3246    3253*   3254    3282*   3283    3290*   3291    3321*   3322    3365*   3366    3402*   3403
                    3410*   3411    3419*   3419    3451*   3454*   3455    3466*   3469*   3470    3500*   3513*   3513*
                    3514    3547*   3576*   3622*   3651*   3697*   3726*   3772*   3801*   3837*   3854    3956*   3982*
                    3983    3903*   3920    3922*   3948*   3949    3977*   3984*   3985    3991    3992*   4073*   4083*
                    4094    4102*   4103    4138*   4142*   4149*   4150    4156    4157*   4201*   4203    4207    4209*
                    4279*   4290    4299*   4300    4322*   4323    4342*   4343    4395*   4390*   4397*   4398    4404
                    4405*   4449*   4450    4468*   4469    4474    4475*   4546*   4547    4566*   4567    4586*   4587
                    4600*   4601    4620*   4621    4655*   4660*   4675*   4676    4685*   4686    4693*   4694    4720*
                    4729*   4730    4762*   4769*   4773*   4777*   4792*   4791    4812*   4813    4856*   4863*   4875*
                    4876    4896*   4897    5056*   5101    5102    5103    5120*   5230    5231    5240*   5260    5261
                    5274*   5283    5284    5300*

SAVAC1  001312      799*    1244    2140*
SAVAC2  001314      790*    1074*   1321*   1324*   2133*
SAVPC   001276      783*    1196*   1216    1501*   1670
SAVR0   001260      776*    1510*   1515    5335
SAVR1   001262      777*    1202*   1219    1509*   1516
SAVR2   001264      779*    1508*   1517    5335
SAVR3   001266      779*    1507*   1518    5335
SAVR4   001270      780*    1506*   1519    5335
SAVR5   001272      781*    1505*   1520    5335
SAVR6   001274      782*
SBUFF = 104426      825*    1610
SCHAR   026746      3309*   3350*   5032    5050    5055    5059*   5060    5066*   5076*
SCOPE = 104400      813*    2240    2263    2287    2315    2357    2399    2457    2509    2531    2553    2596    2613
                    2663    2720    2771    2822    2873    2924    2985    3013    3041    3069    3097    3146    3193
                    3220    3257    3294    3333    3377    3422    3473    3519    3594    3669    3744    3819    3895
                    3951    4052    4109    4355    4633    4638    4733    4828    4909
SCOPI = 104401      815*    2343    2356    2385    2398    2431    2452    2496    2504    3564    3593    3639    3668
                    3714    3743    3789    3818
SILOLD  026536      3314    3330    3358    3374    5027*
SIMBOO  027004      3547    3576    3622    3651    3697    3726    3772    3801    3956    3922    3992    4157    4203
                    4405    4476    4762    4856    5095*
SOFTSW  007720      1759    1838*
SOM     027336      4389    5197*
SP    = 000006      655*    1072*   1089*   1090*   1097    1100    1101    1153*   1154*   1212    1237    1239    1263*
                    1264*   1265*   1274    1275    1277    1353*   1373    1389*   1394*   1395    1396*   1409    1413*
                    1413*   1414    1415*   1431    1432    1434*   1435*   1437    1438    1444*   1445*   1446    1483*
                    1489    1490    1501    1527*   1528*   1529*   1530*   1731*   1532    1533*   1569    1570    1571
                    1572    1573    1586*   1587*   1588*   1589*   1590*   1591*   1592*   1593    1606    1608    1611
                    1656    1665*   1687*   1721    1722*   1731    1732*   1742    1743*   1791*   1792*   1793*   1817*
                    1822    1823    1824    2146*   2185    2194    2195*   4947    4945*   4988    4989*   5014    5015*
                    5100*   5119    5133    5134*   5229*   5239    5259*   5273    5282*   5299    5307*   5312
SPACNT= 004621      1536*   1560    1563*   1577*
STACK = 001200      662*    1072    1263    1665    1687
STAT    001240      768*
STAT1   001366      850*    1871*   2308    3438    3440    3452    3467    3488    3490    3511    4752    4846
STAT2   001370      851*    1872*   2527    2548
STAT3   001372      852*    1873*
```

```
[illegible]  027554  5277#
[illegible]  027474  5056  5255#
STRTSW  001236  767#  1109*  1111*  1112  1114  1124  1126  1239  1235  1294  1893  1917*  1947
                2153
[illegible]  027720  5335#
[illegible]  026750  3310*  3351*  5053  5067*  5077#
SVDS  004310  1505#
SWFLG  007664  1275*  1397  1794*  1821*  1827#
[illegible]  007650  1758#  1795
[illegible]  007650  1758#  1800
SWR  001202  741#  1092*  1094  1098*  1108  1244  1249  1354  1361  1384  1399  1599  1604
                1653  1660  1662  1723  1785  1820*
[illegible]  000176  727#  1098  1785  1840
SW00  = 000001  643#  1112  1947  2153
SW01  = 000002  642#  1294  1893  1917
SW02  = 000004  641#
SW03  = 000010  640#  1239
SW04  = 000020  639#
SW05  = 000040  638#
SW06  = 000100  637#  1723
SW07  = 000200  636#
SW08  = 000400  635#  1660
SW09  = 001000  634#  1384
SW10  = 002000  633#  1652
SW11  = 004000  632#  1361
SW12  = 010000  631#  1399  1599
SW13  = 020000  630#  1604
SW14  = 040000  629#
SW15  = 100000  628#
SYNC  026162  3002  3030  3058  3086  4939#
[illegible]  027256  3840  3906  3975  4071  4136  4383  4653  4718  4755  4756  4849  4850  5177#
TEMP  007364  1543  1699*  1690*  1731*  1736*  1742*  1754*  1775#  2568*  2574*  2577*  2583*
TEMP1  001246  771#  1132*  1760  2165*  2166*  4944*  4956*  4990*  5001*  5036*  5047*  5093*  5099*
                5101*  5115*  5135*  5146*  5181*  5192*  5231*  5236*
TEMP2  001250  772#  1133*  1762  4306*  4307*  4308  4349*  4350*  4351  4573*  4574*  4575  4627*
                4628*  4629  4819*  4820*  4821  4903*  4904*  4905  4988*  5004  5014*  5017  5031*
                5035*  5062*  5069*  5102*  5107*  5133*  5149
TEMP3  001252  773#  1135*  1156*  1192  1201*  1764  1956  1959  2059*  4095*  4096*  4292*  4293*
                4309*  4309  4335*  4336*  4351*  4352  4559*  4560*  4575*  4576  4613*  4614*  4623*
                4630  4805*  4806*  4821*  4822  4889*  4890*  4905*  4906  5261*  5271*  5294*  5297*
                5335
TEMP4  001254  774#  1136*  1766  1969  1972  1978  1981  2045  2048  2054  2057
TEMP5  001256  775#  1137*  1768  1950*  1963*  2151  4972*  4978*
TIMER  = 104416  841#  2608  3118  3166  3203  3240  3277  3446  3461  3496
TKCSR  001204  746#  1357  1420  1829  2207  5309
TKDBR  001206  747#  1359  1422  1428  1787  1789  1831  2209
TLAST  = 025574  1920  4910#
TPCSR  001210  748#  1404  1426  1601  1832  2210
TPDBR  001212  749#  1406*  1429*  1603*  1834*  2212*
TRPCK  004636  1589#
TSYNC  001226  759#  1086*  1673  1701  1904  1911  1913  2227*  2251*  2274*  2299*  2326*  2353*
                2410*  2468*  2520*  2542*  2564*  2598*  2631*  2675*  2733*  2784*  2835*  [illegible]
                2996*  3024*  3052*  3080*  3109*  3157*  3194*  3231*  3269*  3305*  3346*  [illegible]
                3484*  3531*  3606*  3681*  3756*  3830*  3896*  3964*  4064*  4125*  4372*  [illegible]
                4748*  4842*
TST1  012074  1907  1925  2227#
```

```
TST10   013072          2411    2468#
TST11   013246          2469    2520#
TST12   013310          2521    2542#
TST13   013352          2543    2564#
TST14   013452          2565    2598#
TST15   013552          2599    2631#
TST16   013710          2632    2675#
TST17   014106          2676    2733#
TST2    012150          2228    2251#
TST20   014270          2734    2784#
TST21   014452          2785    2835#
TST22   014634          2836    2886#
TST23   015016          2887    2938#
TST24   015224          2939    2996#
TST25   015312          2997    3024#
TST26   015402          3025    3052#
TST27   015470          3053    3080#
TST3    012216          2252    2274#
TST30   015560          3081    3109#
TST31   015732          3110    3157#
TST32   016046          3158    3194#
TST33   016164          3195    3231#
TST34   016302          3232    3268#
TST35   016420          3269    3305#
TST36   016550          3306    3346#
TST37   016710          3347    3390#
TST4    012270          2275    2298#
TST40   017050          3391    3434#
TST41   017246          3435    3484#
TST42   017426          3485    3531#
TST43   017742          3532    3606#
TST44   020256          3607    3681#
TST45   020572          3682    3755#
TST46   021106          3757    3830#
TST47   021344          3831    3896#
TST5    012362          2299    2326#
TST50   021602          3897    3964#
TST51   022134          3965    4054#
TST52   022336          4065    4125#
TST53   023436          4126    4372#
TST54   024636          4373    4646#
TST55   025070          4647    4709#
TST56   025206          4710    4748#
TST57   025574          4749    4842#   4910
TST6    012522          2327    2368#
TST60 = ****** U        4843
TST7    012662          2369    2410#
TTST    003522          1288*   1289*   1291*   1292*   1355#
TWOSYN= 010000           694#
TYPDAT  005114          1625    1643    1646#
TYPE  = 104402           817#   1106    1118    1130    1194    1139    1207    1210    1241    1246    1297    1296    1329
                        1310    1312    1314    1316    1403    1416    1433    1526    1566    1626    1627    1630    1631
                        1633    1635    1639    1644    1692    1797    1800    1852    1898    1916    1922    1960    1982
                        1996    1999    2006    2010    2019    2026    2033    2142
TYPMSG  005014          1623    1626#
VEC     006452          1758#   1974
```

```
VECMAP  011564          2141    2153#
WHICH   011556          1962    2149#
WRDCNT  004616          1534*   1567*   1575#
WRKO.F  005102          1638    1641#
XBX     004206          1600    1602    1604#
XDSR    003456          1311    1336#
XERR    003500          1317    1345#
XHEAD   006150          1130    1758#
XPASS   003472          1315    1342#
XPOLY   027110          3539*   3568*   3614*   3643*   3689*   3718*   3764*   3793*   3839*   3905*   3930*   4155*   4206*
                        4403*   4473*   4757*   4851*   5111    5113    5121#
XSTAT   007274          1139    1758#
XYSTN   005232          1632    1671#
XYZC    003464          1313    1339#
ZERO    001300           784#   5335
$$$$  = ******          599
$CRAP = 177777             1#   2217#   2220    2223#   2241#   2244    2247#   2264#   2267    2270#   2288#   2291    2294#
                        2316#   2319    2322#   2358#   2361    2364#   2400#   2403    2406#   2458#   2461    2464#   2510#
                        2513    2516#   2532#   2535    2538#   2554#   2557    2560#   2587#   2590    2594#   2620#   2623
                        2627#   2664#   2667    2671#   2721#   2724    2729#   2772#   2775    2780#   2823#   2826    2831#
                        2874#   2877    2892#   2925#   2928    2934#   2986#   2989    2992#   3014#   3017    3020#   3042#
                        3045    3048#   3070#   3073    3076#   3098#   3101    3105#   3147#   3150    3153#   3184#   3187
                        3190#   3221#   3224    3227#   3258#   3261    3264#   3295#   3298    3301#   3334#   3337    3342#
                        3378#   3381    3386#   3423#   3426    3430#   3474#   3477    3480#   3520#   3523    3527#   3595#
                        3598    3602#   3670#   3673    3677#   3745#   3748    3752#   3820#   3823    3826#   3886#   3889
                        3892#   3952#   3955    3960#   4053#   4056    4060#   4110#   4113    4121#   4356#   4359    4368#
                        4634#   4637    4642#   4699#   4702    4705#   4734#   4737    4744#   4829#   4832    4839#
$ENDAD  000438          721     1104    1328#   1651
$$    = 000055             1#   2217    2223    2225    2230#   2241    2247    2249    2254#   2264    2270    2272    2277
                        2278#   2288    2294    2296    2301    2302#   2316    2322    2324    2330    2331#   2359    2364
                        2366    2372    2373#   2400    2406    2409    2414    2415#   2458    2464    2466    2472    2473#
                        2510    2516    2518    2523    2524#   2532    2538    2540    2545    2546#   2554    2560    2562
                        2567    2568#   2587    2594    2596    2601    2602#   2620    2627    2629    2634    2635#   2664
                        2671    2673    2678    2679#   2721    2729    2731    2736    2737#   2772    2780    2782    2787
                        2788#   2823    2831    2833    2838    2839#   2874    2882    2884    2889    2890#   2925    2934
                        2936    2941    2942#   2986    2992    2994    2999    3000#   3014    3020    3022    3027    3028#
                        3042    3048    3050    3055    3056#   3070    3076    3078    3083    3084#   3098    3105    3107
                        3112    3113#   3147    3153    3155    3160    3161#   3184    3190    3192    3197    3198#   3221
                        3227    3229    3234    3235#   3258    3264    3266    3271    3272#   3295    3301    3303    3308
                        3309#   3334    3342    3344    3349    3350#   3378    3386    3389    3393    3394#   3423    3430
                        3432    3437    3438#   3474    3480    3482    3487    3493#   3520    3527    3529    3535    3536#
                        3595    3602    3604    3610    3611#   3670    3677    3679    3685    3686#   3745    3752    3754
                        3760    3761#   3820    3826    3828    3833    3834#   3886    3892    3894    3899    3900#   3952
                        3960    3962    3967    3968#   4053    4060    4062    4067    4068#   4110    4121    4123    4129
                        4129#   4356    4368    4370    4375    4376#   4634    4642    4644    4649    4650#   4699    4705
                        4707    4712    4713#   4734    4744    4746    4751    4752#   4829    4838    4840    4945    4846#
                        4910#
$S    = 000061             1#   2228    2230#   2252    2254#   2275    2278#   2299    2302#   2327    2331#   2369    2373#
                        2411    2415#   2469    2473#   2521    2524#   2543    2546#   2565    2568#   2599    2602#   2633
                        2635#   2676    2679#   2734    2737#   2785    2788#   2836    2839#   2887    2890#   2939    2942#
                        2997    3000#   3025    3028#   3053    3056#   3081    3084#   3110    3113#   3158    3161#   3195
                        3198#   3232    3235#   3269    3272#   3306    3309#   3347    3350#   3391    3394#   3435    3439#
                        3485    3488#   3532    3536#   3607    3611#   3682    3686#   3757    3761#   3831    3934#   3997
                        3900#   3965    3968#   4065    4068#   4126    4129#   4373    4376#   4454    4650#   4713    4713#
                        4749    4752#   4843    4846#
$Y    = 000017             1#    805#    813     815#    817#    819#    821#    823#    825#    827#    829#    831#    833#
```

```
                          935*    837*    839*    841*    843*
.      = 031774           706*    707     710*    717*    722*    725*    723*    733*    735*    787*    788*    789*    790*
                          871*    873*    874*    875*    876*    878*    879*    880*    881*    883*    884*    885*    886*
                          888*    889*    890*    891*    893*    894*    895*    896*    898*    899*    900*    901*    903*
                          904*    905*    906*    908*    909*    910*    911*    913*    914*    915*    916*    918*    919*
                          920*    921*    923*    924*    925*    926*    928*    929*    930*    931*    933*    934*    935*
                          936*    938*    939*    940*    941*    943*    944*    945*    946*    948*    949*    950*    951*
                         1110    1120    1231*   1248    1691    1691    1739*   1774*   1776*   1778*   1830    1833    1854
                         1948    1992    2095    2099    2145    2176    2208    2211    2309    3439    3453    3468    3489
                         3512    4047    4263    4530
.BEGIN  003062           1263*
.CNVRT  004400            832    1527*
.CONVR  004374            830    1526*
.DATAC  005454            840    1730*
.DELAY  005340            836    1703*
.EOP    003274           1304*   4843
.ERRTA  031452           1618    5335*
.HLT    004656            713    1598*
.INSTE  004062            822    1433*
.INSTR  003756            820    1412*
.INST1  003776           1416*   1436
.MSG    004000           1414*   1417*
.MSTCL  005370            834    1714*
.PARAM  004102            824    1444*
.PFAIL  005240            711    1073    1678*   1686
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                2364    2373    2400    2406    2415    2459    2464    2473    2510    2516    2524    2532    2538    2599    2621
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                2780    2788    2823    2831    2839    2874    2882    2890    2925    2934    2942    2950    2956    3002    3010
                3020    3028    3042    3045    3056    3070    3076    3084    3098    3105    3113    3147    3153    3202    3210
                3190    3198    3221    3227    3235    3258    3264    3272    3295    3301    3309    3334    3340    3415    3423
                3378    3386    3394    3423    3430    3438    3474    3480    3488    3520    3527    3536    3545    3602    3610
                3666    3674    3666    3745    3752    3761    3820    3826    3834    3836    3842    3900    3952    3960    3968
                4065    4066    4101    4110    4121    4126    4356    4368    4376    4634    4642    4650    4699    4705    4713
                4734    4744    4752    4829    4838    4846    4910    5335
.ABS.            599
.ASCII           599     622     644     694     696     707     732     734     805     815     817     819     821     823
.BLK.            599     622     644     694     696     707     732     734     805     815     917     819     821     823
                 825     827     829     831     833     835     837     939     941     843    1013    1063    1298    1349    1368
                2223    2230    2241    2247    2254    2264    2270    2278    2298    2294    2302    2316    2332    2339    2368
                2364    2373    2400    2406    2415    2459    2464    2473    2510    2516    2524    2532    2538    2599    2621
                2565    2568    2587    2594    2602    2630    2627    2635    2664    2671    2679    2721    2736    2986    3002
                2780    2788    2823    2831    2839    2874    2882    2890    2925    2934    2942    2950    2956    3002    3010
                3020    3028    3042    3045    3056    3070    3076    3084    3098    3105    3113    3147    3153    3202    3210
                3190    3198    3221    3227    3235    3258    3264    3272    3295    3301    3309    3334    3340    3415    3423
                3378    3386    3394    3423    3430    3438    3474    3480    3488    3520    3527    3536    3545    3602    3610
                3666    3674    3666    3745    3752    3761    3820    3826    3834    3836    3842    3900    3952    3960    3968
                4065    4066    4101    4110    4121    4126    4356    4368    4376    4634    4642    4650    4699    4705    4713
                4734    4744    4752    4829    4838    4846    4910    5335
.BPAGE           644     696     742     795     846     954    1007    1063    1298    1841
.CREF           1013    4769
.REPT            707    4769
.SBTTL           599     644     696     732    1063    1298    1349    2217    2316    2587    2986    4910
.TITLE           622
```

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

```
*,DZDMEA.SEC/SOL/CRF/PAGNUM/NL:TOC=IPLUTL.MAC,DZDMEA.P11
RUN-TIME:  52.74 11 SECONDS
RUN-TIME RATIO: 654/137=4.7
CORE USED:  32K  (63 PAGES)
```

Spooler runtime 22 Seconds, 648 KCS, 609 disk reads, 3 disk writes, 131 pages