DMR-11
DMP-11

DMR-11 FCTNL DIAG
CZDMICO

AH-F832C-MC
FICHE 1 OF 2

DMR-11 DMR-11 FCTNL DIAG AH-F832C-MC
DMP-11 CZDMICO FICHE 2 OF 2

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                                        IDENTIFICATION
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                        PRODUCT CODE:   AC-F830C-MC

                        PPODUCT NAME:   CZDMICO  DMR-11 FCTNL DIAG

                        PRODUCT DATE:   AUGUST 1980

                        MAINTAINER:     DIAGNOSTIC ENGINEERING

                        AUTHOR:         MIKE O'CONNOR
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CONTENTS

1.0 INTRODUCTION

THIS PROGRAM WILL BE IMPLEMENTED USING THE DIAGNOSTIC SUPERVISOR AND A STRUCTURED PROGRAMMING APPROACH. BECAUSE THE DESIGN WILL CONFORM TO THE SUPERVISOR (STANDALONE VERSION) THE PROGRAM WILL BE COMPATIBLE WITH ACT, APT, XXDP+, AND SLIDE.

THROUGH DIALOGUE WITH THE OPERATOR, THE PROGRAM WILL ALLOW MODIFICATION OF DEVICE PARAMETERS, SUCH AS UNIBUS ADDRESS, VECTOR ADDRESSES AND TEST CONFIGURATION. IN ADDITION, THE OPERATOR CAN SPECIFY PARTICULAR TESTS TO BE RUN AND A VARIETY OF LOOPING, RUNNING, AND REPORTING MODES.

DEVICE ERRORS WILL BE REPORTED AS THEY OCCUR. THE REPORT WILL INCLUDE A TEST NUMBER AND DESCRIPTION OF THE ERROR, GOOD AND BAD TEST DATA, AND APPLICABLE DEVICE REGISTER CONTENTS.

THE FOLLOWING ARE THE REVISION LEVELS OF THIS DIAGNOSTIC:
REV A - INITIAL RELEASE
REV B - SUPPORT REMOTE LOOPBACK IN TESTS 17-19 PLUS BUG FIXES.
REV C - DETECT 1MSEC PROGRAM TIMER OUT OF RANGE IN TEST 10.

2.0 HARDWARE REQUIREMENTS

THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE DMR-11 FUNCTIONAL DIAGNOSTIC TESTS:

PDP-11/04,05,10,20,30,34,35,40,45,50,60, OR 70
16K MEMORY
CONSOLE TERMINAL
DMR-11

3.0 PRELIMINARY PROGRAM REQUIREMENTS

IT IS ADVISED THAT THE STATIC DIAGNOSTICS BE RUN BEFORE THESE FUNCTIONAL DIAGNOSTICS. IT IS ASSUMED THAT THE PROCESSOR IS IN PROPER WORKING CONDITION.

ENSURE THAT THE SWITCH 1 AT LOCATION E-85 ON THE M8207 IS ON. IF THIS SWITCH IS OFF, THE MAINTENANCE BITS IN BSEL1 CAN'T BE USED AND CERTAIN TESTS WILL BE NOT BE CORRECTLY RUN.

WHEN CHOSING A CABLE TEST CONNECTION, ENSURE THAT THE SWITCH PACK E-39 ON THE M8203 IS PROPERLY SET UP FOR THE DESIRED INTERFACE.

IF CHOSING TEST CONFIGURATION OPTIONS 1-4, IT IS NOT NECESSARY TO SELECT THE INTERFACE; HOWEVER THE BAUD RATE MUST BE CORRECT. FOR EXAMPLE IF IT IS DESIRED TO RUN CONFIGURATION 3 (H3255-EIA), IT IS NOT NECESSARY TO HAVE SWITCH 7 OF THE SWITCH PACK IN THE OFF POSITION. IT IS, HOWEVER, NECESSARY TO HAVE THE BAUD RATE SELETCTED TO BE WITHIN THE EIA RANGE.

NOTE THAT A MANUFACTURING-ONLY PATCH IS REQUIRED TO RUN WHEN USING THE SPECIAL MANUFACTURING TEST CONNECTORS. THIS PATCH WILL CHANGE THE FLAG WORD 'MANUF' TO A NON-ZERO VALUE. WHEN THE FLAG IS NON-ZERO, THE MAINTENANCE BIT IS SET BY A MODEM WRITE COMMAND IF THE V.35 OR EIA CNBOARD CONNECTORS ARE USED.

4.0 GENERAL PROGRAM CONSIDERATIONS

4.1 DIAGNOSTIC SUPERVISOR

THIS PROGRAM IS COMPATIBLE WITH THE STANDALONE DIAGNOSTIC SUPERVISOR, AND MUST BE LOADED TO BE CO-RESIDENT WITH THE SUPERVISOR, OR BE PREVIOUSLY COMBINED WITH THE SUPERVISOR AND LOADED AS A SINGLE FILE. IN EITHER CASE, THE COMBINED PROGRAM WILL NOT EXCEED 16K OF MEMORY.

4.2 EXECUTION TIME

EXECUTION TIME IS DEPENDENT ON THE PROCESSOR SPEED AND THE DMR BAUD RATE. EXAMPLES OF EXECUTION TIME

11/70 WITH CACHE AND DMR AT 2.4K	4 AND 1/2 MINUTES
11/70 WITHOUT CACHE AND DMR AT 2.4K	5 AND 1/2 MINUTES
11/34 AND DMR AT 2.4K	10 MINUTES

4.3 XXDP+

THIS PROGRAM MAY BE LOADED UNDER XXDP+, AND MAY BE RUN IN DUMP MODE OR CHAIN MODE.

4.4 ACT/SLIDE

THIS PROGRAM MAY BE LOADED UNDER ACT OR SLIDE AND MAY BE RUN IN DUMP MODE OR CHAIN MODE.

4.5 APT

THIS PROGRAM MAY BE LOADED BY THE APT SYSTEM (INCLUDING APT-RD) AND RUN IN PROGRAM MODE OR SCRIPT MODE.

4.6 MEMORY MANAGEMENT

IF MEMORY MANAGEMENT IS AVAILABLE, IT IS USED BY CERTAIN TESTS IN THIS FUNCTIONAL DIAGNOSTIC.

4.7 MEMORY PARITY OPTION

IF PARITY MEMORY IS INSTALLED, MEMORY PARITY TRAPS ARE DISABLED BY THE PROGRAM.

4.8 ERROR LOGGING

AT THE END OF EACH PASS ON ALL UNITS, THE PROGRAM PRINTS OUT THE CUMULATIVE TOTAL NUMBER OF ERRORS SINCE THE LAST START OR RESTART COMMAND.

5.0 PROGRAM LOAD MEDIA

THIS PROGRAM CAN BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER OR FROM ACT, SLIDE, OR APT SYSTEMS, OR FROM ANY MEDIA SUPPORTED BY XXDP+. WHEN USING THE PAPER TAPE ABSOLUTE LOADER, THE PROGRAM SHOULD BE LOADED FIRST, FOLLOWED BY THE DIAGNOSTIC SUPERVISOR. WHEN USING XXDP+, THE DIAGNOSTIC SUPERVISOR SHOULD BE LOADED FIRST, FOLLOWED BY THE DIAGNOSTIC PROGRAM.

6.0 OPERATING INSTRUCTIONS

6.1 LOADING AND STARTING PROCEDURES

6.1.1 LOADING PROCEDURES

1 IS PROGRAM MAY BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER. IT MAY ALSO BE LOADED FROM ANY XXDP+ LOAD MEDIA. WHEN LOADED UNDER XXDP+, THE DIAGNOSTIC SUPERVISOR WILL BE LOADED AUTOMATICALLY.

6.1.2 STARTING PROCEDURES

THE PROGRAM STARTS AT LOCATION 200. USE STANDARD DEC PROCEDURES TO START THE PROGRAM.

6.1.3 STEPS FOR QUICK AND SIMPLE EXECUTION

THE DIAGNOSTIC CAN BE EXECUTED STANDALONE UNDER XXDP+, WITHOUT READING THE REMAINDER OF THIS DOCUMENT, AS FOLLOWS:

A) LOAD AND START DIAGNOSTIC USING RUN COMMAND
B) RECEIVE DIAGNOSTIC SUPERVISOR IDENTIFICATION AND PROMPT (DRS-C>)
C) ENTER STA<CR>
D) ANSWER HARDWARE AND SOFTWARE QUESTIONS

E) GET END OF PASS MESSAGES OR ERROR MESSAGES
F) TO END EXECUTION, ENTER CONTROL/C

6.2 INITIAL DIALOGUE

AFTER THE PROGRAM AND THE SUPERVISOR ARE LOADED AND THE PROGRAM IS STARTED, THE FOLLOWING IDENTIFICATION IS TYPED :

```
DPS LOADED
DIAG. RUN-TIME SERVICES

DR>
```

THE OPERATOR THEN PROCEEDS BY TYPING ONE OR MORE OF THE COMMANDS DESCRIBED IN THE FOLLOWING SECTION 6.3. (FOR MORE DETAILED INFORMATION, REFER TO THE DIAGNOSTIC SUPERVISOR FUNCTIONAL SPECIFICATION).

6.3 PROGRAM OPTIONS

6.3.1 START COMMAND

```
**********************************************************************
STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
   <FLAG-LIST>/EOP:<INCR>
**********************************************************************
```

6.3.1.1 TESTS SWITCH (/TESTS:<TEST-LIST>)

<TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT SPECIFY THE TESTS TO BE EXECUTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC. THEY MAY BE SPECIFIED IN ANY ORDER. TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS. ON THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPERATOR. SEE EXAMPLE AT END OF 6.3.1.5.

6.3.1.2 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED. THE DEFAULT IS NON-ENDING EXECUTION. IN THIS CASE EXIT FROM THE PROGRAM IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY OCCURANCE OF AN ERROR WITH THE HALT ON ERROR FLAG BEING SET. THE EXIT IS A RETURN TO COMMAND MODE. SEE EXAMPLE AT END OF 6.3.1.5.

```
                                    6.3.1.3 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

                                    <FLAG-LIST>  IS  A  SEQUENCE OF ELEMENTS OF THE FORM <FLAG>,
                                    <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS
                                    ONE OF THE FOLLOWING VALUES:

                                       HOE    HALT ON ERROR, CAUSING COMMAND MODE TO BE
                                              ENTERED WHEN AN ERROR IS ENCOUNTERED
                                       LOE    LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP
                                              CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK
                                              OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAIN-
                                              ING THE ERROR
                                       IER    INHIBIT ERROR REPORTING
                                       IBE    INHIBIT BASIC ERROR REPORTS
                                       IXE    INHIBIT EXTENDED ERROR REPORTS
                                       PRI    DIRECT ALL MESSAGES TO A LINE PRINTER
                                       PNT    PRINT NUMBER OF TEST BEING EXECUTED
                                       BOE    BELL ON ERROR
                                       UAM    RUN IN UNATTENDED MODE, BYPASSING MANUAL
                                              INTERVENTION TESTS
                                       ISR    INHIBIT STATISTICAL REPORTS
                                       IDU    INHIBIT DROPPING OF UNITS BY DIAGNOSTIC
                                       LOT    LOOP ON TEST

                                    THE  FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0
                                    ARE CLEARED.  A FLAG NOT SPECIFIED IS CLEARED.  IF THE FLAGS
                                    SWITCH  IS  NOT GIVEN ALL FLAGS ARE CLEARED.  SEE EXAMPLE AT
                                    END OF 6.3.1.5.


                                    6.3.1.4 END OF PASS SWITCH (/EOP:<INCR>)

                                    <INCR> IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF
                                    PASSES)  IT  IS  DESIRED  THAT  THE  END  OF PASS MESSAGE BE
                                    PRINTED.  THE DEFAULT IS AT THE  END  OF  EVERY  PASS.   SEE
                                    EXAMPLE AT END OF 6.3.1.5.


                                    6.3.1.5 EFFECT OF START COMMAND

                                    THE  EFFECT OF THE STAI. COMMAND IS TO INITIATE THE HARDWARE
                                    PARAMETER DIALOGUE, THE  SOFTWARE  PARAMETER  DIALOGUE,  AND
                                    THEN THE DIAGNOSTIC TESTS THEMSELVES.

                                    THE  HARDWARE PARAMETER DIALOGUE COMMENCES WITH THE QUESTION
                                    "# UNITS?" TO WHICH THE  OPERATOR  REPLIES  WITH  A  DECIMAL
                                    NUMBER  N FROM 1 TO 16. THE TERM 'UNIT" REFERS TO THE DEVICE
                                    TO WHICH THIS SERIES OF DIAGNOSTICS IS DEDICATED.  FOLLOWING
                                    THIS  ARE THE QUESTIONS WHEREBY THE P-TABLES THEMSELVES WILL
                                    BE BUILT.  EACH P-TABLE IS A CORE-RESIDENT TABLE  CONTAINING
                                    ALL  THE  HARDWARE  INFORMATION  FOR ONE UNIT.  THE OPERATOR
                                    MUST SUPPLY N (NUMBER OF UNITS) VALUES  FOR  EACH  QUESTION.
                                    HE  MAY  DO  THIS  BY GIVING ONE ANSWER TO EACH QUESTION (IN
                                    WHICH CASE THE SERIES OF QUESTIONS WILL BE POSED N TIMES) OR
                                    BY  GIVING  N  VALUES, SEPARATED BY COMMAS, TO EACH QUESTION
                                    (SERIES WILL BE POSED ONCE).  EACH QUESTION IS  FOLLOWED  BY
                                    THE  RESPONSE  RADIX  (D  FOR  DECIMAL,  B FOR BINARY, O FOR
```

OCTAL, L FOR YES/NO) IN PARENTHESES AND THE DEFAULT VALUE AFTER THE PARENTHESES.

FOLLOWING THE HARDWARE QUESTIONS ARE THE SOFTWARE QUESTIONS TO BUILD THE SOFTWARE TABLES, WHICH DEFINE THE MODE (QUICK VERIFY ETC.) THAT THE DIAGNOSTIC WILL EXECUTE IN.

WHEN THE QUESTION "# UNITS?" IS ANSWERED, MEMORY STORAGE IS ALLOCATED FOR THE P-TABLES, AND IF THERE IS NOT ENOUGH TO ACCOMMODATE THEM THE MESSAGE "TOO MANY UNITS" IS ISSUED. IN THIS CASE THE DIAGNOSTIC MUST BE EXECUTED MORE THAN ONCE TO TEST ALL UNITS.

EXAMPLE:

STA/TESTS:1:2-4:6:8-10/PASS:3/FLAGS:IER:HOE=1:UAM:LOE

THIS COMMAND WILL CAUSE THREE PASSES TO BE MADE, EACH PASS CONSISTING OF TESTS 1,2,3,4,6,8,9, AND 10 EXECUTED AGAINST ALL UNITS. THERE IS NO DIFFERENCE BETWEEN SAYING <FLAG> AND SAYING <FLAG=1>. THE NOTATION <FLAG=0> IS MEANINGFUL ONLY ON A COMMAND OTHER THAN START TO CLEAR A FLAG THAT WAS PREVIOUSLY SET. NOTE THAT ON ALL COMMANDS ONLY THE FIRST THREE LETTERS ARE SCANNED.

6.3.2 RESTART COMMAND

```
**************************************************************
RES(TART)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
   <FLAG-LIST>/UNITS:<UNIT-LIST>
**************************************************************
```

6.3.2.1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START COMMAND.

6.3.2.2 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (0,1 ETC.) OR RANGES OF DECIMAL NUMBERS (0-5, 8-10 ETC.) THAT SPECIFY THE UNITS TO BE TESTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS MAY RANGE FROM 0 THRU N-1 (N IS THE NUMBER OF UNITS SPECIFIED IN THE PREVIOUS START COMMAND). THE NUMBER INDICATES THE POSITION OF THE P-TABLE AS THE DATA WAS ENTERED DURING THE HARDWARE DIAGLOGUE. THE UNITS WHICH ARE SELECTED MUST NOT HAVE BEEN DROPPED BY THE DROP COMMAND. SEE THE DISCUSSION OF ADD AND DROP COMMANDS BELOW. DEFAULT IS TO TEST ALL UNITS WHICH HAVE NOT BEEN DROPPED BY A DROP COMMAND.

6.3.2.3 EFFECT OF RESTART COMMAND

THE RESTART COMMAND DIFFERS FROM THE START COMMAND IN THAT THE P-TABLES FROM THE PREVIOUS START COMMAND (THERE MUST HAVE BEEN ONE) ARE USED, INSTEAD OF NEW ONES BEING BUILT. THE UNITS SWITCH GIVES THE ABILITY TO SELECT A SUBSET OF THESE. THE SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED (OPERATOR WILL BE ASKED). THE COMMAND CAN BE USED AFTER COMMAND MODE HAS BEEN REENTERED IN ANY OF THE THREE NORMAL WAYS: A) THE REQUESTED NUMBER OF PASSES HAVE BEEN MADE B) AN ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET C) A CONTROL/C WAS ENTERED BY THE OPERATOR.

6.3.3 CONTINUE COMMAND

```
**************************************************************
CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>
**************************************************************
```

6.3.3.1 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS SAME AS IN START COMMAND, BUT THE DEFAULT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART. IF NONE REMAINS, THE DEFAULT IS NON-ENDING EXECUTION.

6.3.3.2 FLAG SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS SAME AS IN START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

6.3.3.3 EFFECT OF CONTINUE COMMAND

CONTINUE MUST FOLLOW A START OR RESTART, AND COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

6.3.4 PROCEED COMMAND

```
**************************************************************
PRO(CEED)/FLAGS:<FLAG-LIST>
**************************************************************
```

6.3.4.1 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

6.3.4.2 EFFECT OF PROCEED COMMAND

PROCEED MUST FOLLOW A START, RESTART, OR CONTINUE. COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

6.3.5 ADD COMMAND

****
ADD/UNITS:<UNIT-LIST>
****

6.3.5.1 UNITS SWITCH (/UNITS:<UNIT-LIST>

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

6.3.5.2 EFFECT OF ADD COMMAND

THE UNITS SPECIFIED ARE ADDED TO THE TEST SEQUENCE. EACH UNIT MUST HAVE A P-TABLE IN MEMORY DUE TO AN EARLIER HARDWARE DIALOGUE. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR CONTINUE. THE UNITS SWITCH MUST BE SPECIFIED. THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS THAT WERE PREVIOUSLY DROPPED.

6.3.6 DROP COMMAND

****
DRO(P)/UNITS:<UNIT-LIST>
****

6.3.6.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

6.3.6.2 EFFECT OF DROP COMMAND

THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING. THE UNITS WILL BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START COMMAND. THE UNITS SWITCH MUST BE ENTERED. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR A CONTINUE COMMAND.

6.3.7 PRINT COMMAND

****
PRI(NT)
****

```
                                6.3.7.1 EFFECT OF PRINT COMMAND

                                THE TOTAL NUMBER OF ERRORS FOR EACH UNIT SINCE THE LAST
                                START OR RESTART COMMAND ARE PRINTED. THE ISR (INHIBIT
                                STATISTICAL REPORTING) FLAG IS CLEARED.


                                6.3.8 DISPLAY COMMAND

                                ****************************************************************
                                DIS(PLAY)/UNITS:<UNIT-LIST>
                                ****************************************************************


                                6.3.8.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

                                <UNIT-LIST> IS AS IN THE RESTART COMMAND.


                                6.3.8.2 EFFECT OF DISPLAY COMMAND

                                THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED
                                OUT IN THE FORMAT IN WHICH THEY WERE ENTERED. ANY UNITS
                                THAT WERE DROPPED BY THE OPERATOR "DROP" COMMAND ARE SO
                                DESIGNATED.


                                6.3.9 FLAGS COMMAND

                                ****************************************************************
                                FLA(GS)
                                ****************************************************************


                                6.3.9.1 EFFECT OF FLAGS COMMAND

                                THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.


                                6.3.10 ZFLAGS COMMAND

                                ****************************************************************
                                ZFL(AGS)
                                ****************************************************************


                                6.3.10.1 EFFECT OF ZFLAGS COMMAND

                                ALL FLAGS ARE CLEARED.


                                6.3.11 CONTROL CHARACTERS

                                A CONTROL C (C) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES
                                A RETURN TO COMMAND MODE.

                                A CONTROL Z (Z) ENTERED DURING ONE OF THE THREE OPERATOR
```

DIALOGUES- HARD CORE QUESTIONS (SEE 6.2),HARDWARE DIALOGUE (SEE 6.3.1.5), OR SOFTWARE DIALOGUE (SEE 6.3.1.5) CAUSES THE DEFAULTS TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.

A CONTROL O (O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES ALL TELETYPE OUTPUT TO BE SURPRESSED FOR THE REMAINDER OF THE DIAGNOSTIC OR UNTIL ANOTHER O IS TYPED, WHICH RESTORES NORMAL TELETYPE OUTPUT.

6.3.12 HARDWARE PARAMETERS

THE FOLLOWING 3 QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE.

1. CSR ADDRESS: (O) 160070?

THIS IS THE ADDRESS AT WHICH THE CSR REGISTERS (SELO) RESIDE ON THE UNIBUS. THE ALLOWABLE RANGE IS 160000-177776 (OCTAL), AND THE DEFAULT VALUE IS 160070.

2. VECTOR ADDRESS: (O) 300 ?

THIS IS THE ADDRESS OF THE INPUT INTERRUPT VECTOR FOR THIS DEVICE. THE ALLOWABLE RANGE IS 000-674 (OCTAL), AND THE DEFAULT VALUE IS 300.

3. TEST CONFIGURATION -
```
      0 = INTERNAL (NO CONNECTOR)
      1 = H3254 - V.35        (NOTE:  MODE 1-4 ALLOWS
      2 = H3254 - INTEGRAL     PROGRAM INTERFACE SELECTION)
      3 = H3255 - RS232C/423
      4 = H3255 - RS422
      5 = CABLE AND SW PACK INTERFACE SELECTED
          (V.35-H3250, INTEGRAL-BC55A-10, RS232C-H325, RS423/422-H3251)
* SELECT THE FOLLOWING ONLY IF THE MODEM SUPPORTS LOOPBACK *
      6 = LOCAL LOOP
      7 = REMOTE LOOP
     (0)  5 ?
```

THIS QUESTION WILL COVER ALL THE POSSIBLE TEST CONFIGURATIONS. THE DEFAULT IS FOR ACTUAL CABLE LOOPBACK (5). CONFIGURATION 0 WILL ENABLE LINE UNIT (TTL) LOOPBACK. IF THIS IS SELECTED NO CABLES OR CONNECTORS SHOULD BE CONNECTED. CONFIGURATIONS 1-4 WILL SELECT THE INTERFACE REGARDLESS OF THE SWITCH SETTING AS LONG AS THE PROPER BAUD RATE IS SELECTED (I.E. EIA - 2.4K-19.2K).

6.3.13 SOFTWARE PARAMETERS

THE ONLY SOFTWARE PARAMETER QUESTION ASKED BY THE DIAGNOSITC CONCERNS A SOFTWARE TIMEOUT VARIABLE THAT IS USED TO PREVENT SOFTWARE "HUNG" CONDITIONS. THIS VARIABLE IS A VALUE FORM 1-5.

SELECTABLE PROGRAM LOOP TIME-OUT VARIABLE

[REFER TO LISTING 6.3.13] (MAX=5; MIN=1) (0) 5 ?

THERE ARE TWO FACTORS THAT SHOULD BE CONSIDERED WHEN ANSWERING THIS QUESTION. THE FIRST IS PROCESSOR SPEED; THE FASTER THE PROCESSOR THE HIGHER THE VARIABLE SHOULD BE. THE SECOND IS BAUD RATE; THE SLOWER THE DMR BAUD RATE THE HIGHER THE VARAIBLE SHOULD BE. FOR EXAMPLE:

11/70 WITH CACHE AND DMR AT 1 MEG.: 4
11/34 AND DMR AT 56K: 2
11/40 AND DMR AT 2.4K: 3

THE DEFAULT IS 5. THIS WILL COVER THE WORST CASE (I.E. 11/70 WITH CACHE AND THE DMR AT 2.4K).

6.3.14 EXTENDED DISCUSSION OF P-TABLE DIALOGUE

THE FULL CAPABILITY OF THE HARDWARE DIALOGUE IS REVEALED BY THE FOLLOWING DISCUSSION OF WHAT HAPPENS INTERNALLY.

AS SOON AS THE QUESTION "# UNITS?" IS ANSWERED (WITH THE NUMBER N, SAY) SPACE IN CORE IS ALLOCATED FOR N P-TABLES. ALL OF THE P-TABLES ARE OF THE SAME FORMAT, AND THERE IS A ONE-TO ONE CORRESPONDENCE BETWEEN THE HARDWARE PARAMETER QUESTIONS AND THE SLOTS IN THE P-TABLE FORMAT.

ON THE FIRST TRIP THRU THE QUESTIONS, ALL OF THE SLOTS IN ALL OF THE P-TABLES ARE FILLED. IF THE OPERATOR TYPES IN LESS THAN N EXPLICIT VALUES IN RESPONSE TO A PARTICULAR QUESTION, THESE VALUES ARE PLACED IN THE P-TABLES (ONE VALUE GOING INTO THE PROPER SLOT OF EACH P-TABLE BEGINNING WITH THE FIRST P-TABLE) UNTIL THE STRING OF VALUES IS EXHAUSTED. THE LAST VALUE IN THE STRING BECOMES THE NEW DEFAULT AND IS USED TO FILL THAT SLOT IN THE REMAINING P-TABLES.

ON SUBSEQUENT TRIPS THRU THE QUESTIONS, THE SAME PROCESS IS CARRIED OUT, EXCEPT THAT THE EARLIEST P-TABLE NOT TO HAVE RECEIVED AN EXPLICIT VALUE IN ANY OF ITS SLOTS NOW ASSUMES THE ROLE THAT TABLE NUMBER ONE PLAYED IN THE FIRST TRIP.

THE SERIES OF QUESTIONS IS REISSUED UNTIL AT LEAST ONE QUESTION HAS RECEIVED N EXPLICIT VALUES FROM THE OPERATOR.

IN GIVING A STRING OF VALUES, COMMAS WITHOUT INTERVENING VALUES MAY BE USED TO INDICATE A REPETITION OF THE LAST NAMED VALUE.

A STRING OF VALUES MAY BE GIVEN AS A RANGE (6-10 FOR EXAMPLE). IF THE VALUES REPRESENT PURE NUMERICAL DATA, THIS SAMPLE RANGE TRANSLATES TO THE STRING 6,7,8,9,10 (AN INCREMENT OF 1). IF THE VALUES ARE ADDRESSES, THE SAMPLE RANGE TRANSLATES TO THE STRING 6,8,10 (AN INCREMENT OF 2).

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT A SET OF P-TABLES. ASSUME THAT WE HAVE 16 UNITS,

```
                                AND THAT THERE ARE THREE HARDWARE PARAMETERS FOR EACH (THREE
                                SLOTS IN THE P-TABLE, THREE HARDWARE QUESTIONS IN THE
                                DIALOGUE). LET THE DESIRED VALUE FOR THE FIRST PARAMETER BE
                                THE NUMBER 75 FOR ALL 16 TABLES. LET THE DESIRED VALUE FOR
                                THE SECOND PARAMETER BE EQUAL TO THE UNIT NUMBER
                                (0,1,2,...,15) EXCEPT FOR UNIT 12, WHICH SHOULD RECEIVE THE
                                VALUE 11. LET THE DESIRED VALUE FOR THE THIRD PARAMETER BE
                                THE NUMBER 76 FOR THE FIRST 7 UNITS AND THE NUMBER 77 FOR
                                THE LAST 9 UNITS.

                                THE FOLLOWING DIALOGUE WOULD ACCOMPLISH THIS GOAL:

                                # UNITS (D) ? 16
                                UNIT 0
                                <QUESTION 1> ? 75
                                <QUESTION 2> ? 0-6
                                <QUESTION 3> ? 76

                                UNIT 7
                                <QUESTION 1> ?
                                <QUESTION 2> ? 7-11,,13-15
                                <QUESTION 3> ? 77
```

```
                                THE  FIRST  TIME THE SERIES IS ASKED, SLOT ONE RECEIVES A 75
                                IN ALL 16 TABLES.  SLOT TWO RECEIVES THE VALUES 0,1,2,...,6
                                IN  TABLES 0 THRU 6 AND A CONSTANT 6 IN TABLES 7 THRU 15.
                                SLOT THREE RECEIVES A CONSTANT 76 IN ALL 16 TABLES.

                                THE SECOND TIME THRU THE SERIES, TABLES 7 THRU THE END  ARE
                                GOING TO BE AFFECTED (NOTE THAT THIS PIECE OF INFORMATION IS
                                PRINTED OUT FOR THE THE OPERATOR IN THE FORM  'UNIT  XX''  AT
                                THE  BEGINNING  OF EACH SERIES).  QUESTION 1 IS RESPONDED TO
                                BY A <CR>, SO SLOT ONE STAYS AT CONSTANT  75  IN  TABLES  7
                                THRU 15, SINCE NO NEW EXPLICIT VALUES ARE TYPED IN.  SLOT TWO
                                GETS THE VALUES 7,8,9,10,11 IN TABLES 7  THRU  11,  AND
                                GETS AN 11 IN SLOT 12, AND GETS THE VALUES 13,14,15 IN
                                TABLES 13 THRU 15. SLOT THREE GETS THE VALUE 77 IN TABLES 7
                                THRU 15.

                                THE DIALOGUE IS TERMINATED WHEN THE SOFTWARE RECOGNIZES THAT
                                16 EXPLICIT VALUES HAVE BEEN GIVEN FOR AT LEAST ONE QUESTION
                                (NAMELY QUESTION 2).
```

```
                        7.0 DEVICE INFORMATION TABLES

                        SEE THE GLOBAL EQUATES SECTION FOR DEVICE CSR BIT DEFINITIONS


                        8.0 TEST DESCRIPTIONS

                        ;*****************************************************************************
                        ;*                  TEST 1 - DMR-11
                        ;* VERIFY THAT ADDRESSING THE 4 UNIBUS CSRS DOES NOT CAUSE A NON-
                        ;* EXISTENT MEMORY TRAP.
                        ;*
                        ;* THE DMR IS AN NPR DEVICE RESIDING ON A UNIBUS.  COMMUNICATION
                        ;* BETWEEN THE MAIN CPU AND THE DMR IS ACCOMPLISHED THROUGH A
                        ;* SET OF FOUR 16-BIT UNIBUS CONTROL AND STATUS REGISTERS (CSRS).
                        ;* THE FOUR REGISTERS ARE ASSIGNED ADDRESSES IN THE I/O PAGE
                        ;* FLOATING ADDRESS SPACE: 76XXX0 - 76XXX6
                        ;*
                        ;* NOTE: THIS TEST IS REDUNDANT IN THAT STATIC LOGIC TESTS SHOULD
                        ;* HAVE BEEN RUN BEFORE THESE FREE-RUNNING TESTS WERE STARTED, AND
                        ;* THEY SHOULD HAVE DETECTED ANY CSR ADDRESSING PROBLEMS.
                        ;* BUT JUST IN CASE THOSE STATIC TESTS AREN'T RUN, WE'LL BE SAFE.
                        ;*****************************************************************************


                        ;*****************************************************************************
                        ;*                  TEST 2 - DMR-11
                        ;* ROM CRC/CCITT - CHECK ROM POSITION AND CALCULATE CRC/CCITT.  THE
                        ;* LAST 4 BYTES CONTAIN INFORMATION ABOUT THE ROM TO CHECK.  THE 1ST
                        ;* OF THESE BYTES CONTAINS THE ASCII VERSION NUMBER.  THE 2ND BYTE
                        ;* CONTAINS THE ROM NUMBER.  THE 3RD AND 4TH BYTES CONTAIN A NEGATIVE
                        ;* CRC/CCITT WORD FOR THE ROM.
                        ;*                          CHIP ADDRESS RANGE
                        ;*    LOCATION  CHIP NO.        BYTE     ADDRESS RANGE
                        ;*      E03         0           LOW      0000 - 1777
                        ;*      E02         1           HIGH     0000 - 1777
                        ;*      E04         2           LOW      2000 - 3777
                        ;*      E01         3           HIGH     2000 - 3777
                        ;*      E05         4           LOW      4000 - 5777
                        ;*      E14         5           HIGH     4000 - 5777
                        ;*
                        ;********** IMPORTANT !!!!!!!!!! ***********************************
                        ;* FOR THIS TEST TO RUN CORRECTLY, ENSURE THAT SWITCH 1 AT LOCATION
                        ;* E85 ON THE M8207 IS ON.  IF THIS SWITCH IS OFF, BSEL1 WILL BE
                        ;* LOCKED OUT AND THE MAINTENANCE FEATURES WILL NOT BE ENABLED.
                        ;*****************************************************************************
                        ;*
                        ;*      SUBTEST 1 - ON THE FIRST PASS PRINT THE VERSION # IN EACH ROM
                        ;*      SUBTEST 2 - GENERATE THE CRC-CCITT IN EACH ROM AND COMPARE IT
                        ;*                  IT AGAINST THE CRC BLASTED IN THE ROM
                        ;*      SUBTEST 3 - COMPARE THE ROM # BLASTED IN THE ROM AGAINST THE
                        ;*                  EXPECTED ROM #.
                        ;*****************************************************************************
```

```
;*****************************************************************************
;*                  TEST 3 - DMR-11
;* MASTER CLEAR
;* THIS TEST WILL ISSUE 2 MASTER CLEARS.  EACH CALL TO THE MASTER
;* CLEAR ROUTINE WILL ENSURE THAT THE RUN BIT WILL BE SET.  ALSO
;* THE MASTER CLEAR WILL CAUSE THE DIAGNOSTIC MICROTESTS TO BE
;* RUN WHEN THE MICRODIAGNOSTIC BIT (BIT 13 IN SEL0) IS CORRECTLY
;* SET OR CLEARED.  BECAUSE THE RUNNING OF MICROTESTS DEPENDS ON THE
;* EXCLUSIVE OR OF THE  HARDWARE SWITCH 10 ON E134 OF THE M8203 AND
;* THE MICRODIAGNOSTIC BIT, WE CAN'T KNOW WHETHER THE SETTING OR
;* CLEARING OF BIT 13 WILL RESULT IN THE RUNNING OF MICROTESTS.
;* THEREFORE THE MASTER CLEAR SUBROUTINE WILL TOGGLE (I.E. SET
;* BIT 13 ONLY ON EVERY OTHER MASTER CLEAR) THE SOFTWARE BIT.
;* THIS WILL ENSURE THAT REGARDLESS OF THE POSITION OF THE
;* HARDWARE SWITCH, MICROTESTS WILL BE RUN EVERY OTHER MASTER CLEAR.
;* WHEN RUNNING THIS TEST, WE EXPECT TO ADD THE RESULTS OF BSEL3
;* AFTER EACH MASTER CLEAR.
;* BSEL3 = 100          -  MICROTESTS DISABLED
;* BSEL3 = 200          -  MICROTESTS RUN SUCCESFULLY
;* IF THE RESULT OF THE 2 MASTER CLEARS IS NOT 300, AN ERROR IS
;* REPORTED.
;*
;* ADDITIONALLY THIS ROUTINE WILL REPORT WHENEVER THE RESULT OF
;* BSEL3 IS 0.  THIS WILL MEAN THAT THE DEVICE IS NOT A DMR
;* (I.E. DMC)
;*****************************************************************************
```

```
;*****************************************************************************
;*                  TEST 4 - DMR-11
;*  BASE IN COMMANDS
;*
;*  SUBTEST 1  - ISSUE A BASE IN  -  DMR MODE.
;*               ENSURE THAT THE DMR MODE BIT (BIT 4) IS SET IN
;*               THE MICROCODE SCRATCH PAD 7 AND THAT THE DDCMP
;*               MESSAGE VARIABLES ARE PROPERLY INITIALIZED.
;*  SUBTEST 2  - ISSUE A BASE IN  -  DMC MODE.
;*               ENSURE THAT THE DMC MODE BIT (BIT 4) IS CLEAR IN
;*               THE MICROCODE SCRATCH PAD 7 AND THAT THE DDCMP
;*               MESSAGE VARIABLES ARE PROPERLY INITIALIZED.
;*
;*****************************************************************************
```

PROGRAM DOCUMENT

```
                        ;*****************************************************************
                        ;*              TEST 5 - DMR-11
                        ;* DMR COMMANDS
                        ;*  SUBTEST 1  - ISSUE AN ENABLE EXTENDED ERROR COMMAND AND CHECK THAT
                        ;*               THE EXT. ENABLE BIT IS SET IS SCRATCH PAD 13.  THEN
                        ;*               DISABLE EXTENDED ERROR AND CHECK THAT THE ENABLE BIT
                        ;*               IS CLEAR.
                        ;*  SUBTEST 2  - SET REP/SEL TIMER VALUE AND SET THE DMR THRESHOLD
                        ;*               VALUES.  CHECK THAT THE VALUES ARE CORRECT IN
                        ;*               THE BASE TABLE AFTER HALTING THE DMR.
                        ;*
                        ;*
                        ;*****************************************************************



                        ;*****************************************************************
                        ;*              TEST 6 - DMR-11
                        ;*  CONTROL IN COMMAND TEST -
                        ;*  SUBTEST 1  - CONTROL IN, FULL DUPLEX, DDCMP MODE.  ENSURE THAT
                        ;*               THE HALF-DUPLEX BIT IS CLEAR IN THE MODEM STATUS WORD,
                        ;*               ALSO ENSURE THAT DDCMP MODE BIT IS SET IN SCRATCH PAD 7.
                        ;*  SUBTEST 2  - CONTROL IN, HALF DUPLEX.  ENSURE THAT THE HALF DUPLEX
                        ;*               BIT IS SET.
                        ;*  SUBTEST 3  - CONTROL IN, MAINTENANCE MODE.  ENSURE THAT MAINT. MODE
                        ;*               BIT IS SET IN SCRATCH PAD 7.
                        ;*  SUBTEST 4  - CONTROL IN USING SELECTED LOOPBACK.  ISSUE A CONTROL IN
                        ;*               USING THE USER SELECTED LOOPBACK.  IF THE LOOPBACK IS
                        ;*               NOT CORRECT, DMR RUN MODE ACKNOWLEDGE WILL NOT BE
                        ;*               RECEIVED.
                        ;*
                        ;*
                        ;*****************************************************************



                        ;*****************************************************************
                        ;*              TEST 7 - DMR-11
                        ;* MODEM WRITE COMMAND
                        ;*  SUBTEST 1  - WRITE DATA PATTERNS INTO THE MODEM WRITE REGISTER.
                        ;*               ENSURE THAT ON THE NEXT MODEM READ THAT THE
                        ;*               MICROCODE RETURNS THE PATTERN WRITTEN INTO BSEL6.
                        ;*  SUBTEST 2  - ATTEMPT TO WRITE BOTH THE HALF-DUPLEX BIT AND THE
                        ;*               RTS HOLD BIT.  THE MICROCODE SHOULD NOT ALLOW THIS
                        ;*               TO HAPPEN.  WHEN READING THE MODEM STATUS, ONLY
                        ;*               THE HALF-DUPLEX SHOULD BE SET.
                        ;*
                        ;*****************************************************************
```

```
                        ;*********************************************************************
                        ;*                TEST 8 - DMR-11
                        ;*  SUBTEST 1  - TRANSMIT A BUFFER THREE TIMES WIHOUT ASSIGNING A
                        ;*               RECEIVE BUFFER.  BY ASSIGNING A NO BUFFER THRESHOLD
                        ;*               OF THREE, ENSURE THAT A NO BUFFER ERROR IS RECEIVED
                        ;*               AFTER THE THIRD THRANSMISSION.
                        ;*  SUBTEST 2  - TRANSMIT A BUFFER WITHOUT A RECEIVE BUFFER.
                        ;*               ASSIGN THE NAKS THRESHOLD OF 3 AND A NO BUFFER
                        ;*               THRESHOLD OF 7.  CHECK THAT THE NAKS ERROR COUNT IS
                        ;*               THREE AFTER SHUTDOWN.
                        ;*********************************************************************



                        ;*********************************************************************
                        ;*                TEST 9 - DMR-11
                        ;* NON-EXISTENT MEMORY (NXM) ERROR CHECK
                        ;* PERFORM DMR COMMANDS USING NXM ADDRESSES; VERIFY THAT NXM ERROR IS
                        ;* REPORTED IN EACH OF THE FOLLOWING SUBTESTS:
                        ;*  SUBTEST 1  -  BASE IN RESUME COMMAND - BASE TABLE ADDRESS IS NXM
                        ;*  SUBTEST 2  -  BA/CC IN RECEIVE COMMAND - BA/CC IN ADDRESS IS NXM
                        ;*  SUBTEST 3  -  BA/CC IN TRANSMIT COMMAND - BA/CC IN ADDRESS IS NXM
                        ;*
                        ;*********************************************************************



                        ;*********************************************************************
                        ;*                TEST  10 - DMR-11
                        ;* TIME OUT - FORCE A TIMEOUT AND VERIFY THAT THE ERROR IS REPORTED.
                        ;* THIS TEST WILL ALSO USE AN APPROXIMATE TIMER TO DETERMINE IF THE
                        ;* M8207 1 MSEC. PROGRAM TIMER IS OUT OF RANGE.
                        ;*
                        ;*********************************************************************



                        ;*********************************************************************
                        ;*                TEST 11 - DMR-11
                        ;*  MESSAGE TOO LONG - TRANSMIT A MESSAGE THAT IS TOO LONG FOR THE
                        ;*  RECEIVE BUFFER AND VERIFY THAT THE "TOO LONG" ERROR IS RECEIVED.
                        ;*
                        ;*********************************************************************
```

PROGRAM DOCUMENT

```
                        ;*********************************************************************
                        ;*              TEST 12 - DMR-11
                        ;*  PROCEDURE ERRORS -
                        ;*  THE FOLLOWING SHOULD CAUSE THE DMR-11 TO HALT AND RESPOND WITH
                        ;*  A PROCEDURE ERROR:
                        ;*  SUBTEST 1  -  A SECOND BASE IN COMMAND
                        ;*  SUBTEST 2  -  A CONTROL IN BEFORE A BASE IN
                        ;*  SUBTEST 3  -  A BA/CC IN BEFORE A BASE IN
                        ;*  SUBTEST 4  -  A BA/CC IN RCV WITH A BUFFER LENGTH OF 0
                        ;*  SUBTEST 5  -  A BA/CC IN XMIT. WITH A BUFFER LENGTH OF 0
                        ;*
                        ;*********************************************************************



                        ;*********************************************************************
                        ;*              TEST 13 - DMR-11
                        ;* FREE RUNNING FLAG MODE DATA TEST
                        ;* TRANSMIT A MESSAGE AND VERIFY THE RECEIVED DATA IS CORRECT.
                        ;* IN THIS TEST NO INTERRUPTS ARE USED AND THE LINE UNIT IS IN
                        ;* INTERNAL (TTL) LOOPBACK.  THIS TEST IS THE FIRST TEST IN WHICH
                        ;* THE DMR IS USED IN A DATA TRANSMISSION MODE.
                        ;*********************************************************************



                        ;*********************************************************************
                        ;*              TEST  14 - DMR-11
                        ;* IN THIS TEST - SEE IF WE HAVE MEMORY MANAGEMENT, IF SO SEE IF WE
                        ;* HAVE THE MEMORY TO CHECK BITS 16 & 17 IN SEL6.  THIS WILL ALLOW
                        ;* US TO TRANSFER DATA USING THOSE EXTENDED ADDRESSING BITS. AS IN
                        ;* TEST 13 THE TEST IS NON-INTERRUPT AND INTERNAL (TTL) LOOPBACK IS
                        ;* USED.
                        ;*
                        ;*********************************************************************
```

```
                        ;*****************************************************************************
                        ;*                  TEST 15 - DMR-11
                        ;* RESUME BASE IN - DMC MODE
                        ;* **  WILL NOT RUN IF MODEM LOOPBACK IS SELECTED  **
                        ;* IN THIS TEST THE DMR WILL TRANSMIT AND RECEIVE 7 BUFFERS. DURING THE
                        ;* TEST THE DMR WILL BE HALTED AND RESTARTED BY A BASE-IN RESUME IN THE
                        ;* FOLLOWING MANNER:
                        ;*      BASE IN
                        ;*      CONTROL IN
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      1 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      1 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*
                        ;*      ALL BA/CC OUTS RECEIVES AND TRANSMITS WILL BE ACCOUNTED FOR AND
                        ;*      THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                        ;*      THE RECEIVE/TRANSMIT TABLE.
                        ;*
                        ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                        ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                        ;*      SEVEN RECEIVE AND SEVEN TRANSMIT BUFFERS.  THE ROUTINE WILL
                        ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                        ;*      HIERARCHY:
                        ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                        ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                        ;*                 THAN 2K BYTES, USE THAT MEMORY
                        ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                        ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                        ;*
                        ;*****************************************************************************
```

```
;*****************************************************************************
;*                TEST 16 - DMR-11
;* RESUME BASE IN - DMR MODE
;* IN THIS TEST THE DMR WILL TRANSMIT AND RECEIVE 7 BUFFERS. DURING THE
;* TEST THE DMR WILL BE HALTED AND RESTARTED BY A BASE-IN RESUME IN THE
;* FOLLOWING MANNER:
;*      BASE IN
;*      CONTROL IN
;*      HALT    -       BASE IN RESUME
;*      2 BA/CC IN RECEIVE
;*      HALT    -       BASE IN RESUME
;*      2 BA/CC IN RECEIVE
;*      HALT    -       BASE IN RESUME
;*      2 BA/CC IN RECEIVE
;*      HALT    -       BASE IN RESUME
;*      1 BA/CC IN RECEIVE
;*      HALT    -       BASE IN RESUME
;*      2 BA/CC IN TRANSMIT
;*      HALT    -       BASE IN RESUME
;*      2 BA/CC IN TRANSMIT
;*      HALT    -       BASE IN RESUME
;*      2 BA/CC IN TRANSMIT
;*      HALT    -       BASE IN RESUME
;*      1 BA/CC IN TRANSMIT
;*      HALT    -       BASE IN RESUME
;*
;*      ALL BA/CC OUTS RECEIVES AND TRANSMITS WILL BE ACCOUNTED FOR AND
;*      THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
;*      THE RECEIVE/TRANSMIT TABLE.
;*
;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
;*      SEVEN RECEIVE AND SEVEN TRANSMIT BUFFERS.  THE ROUTINE WILL
;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
;*      HIERARCHY:
;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
;*                 THAN 2K BYTES, USE THAT MEMORY
;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
;*
;*
;*****************************************************************************
```

```
                        ;*********************************************************************
                        ;*              TEST 17 - DMR-11
                        ;* INTERRUPT DRIVEN EXERCISE
                        ;* IN THIS TEST 64 BUFFERS WILL BE TRANSMITTED AND RECEIVED
                        ;*
                        ;* ALL BA/CC OUTS RECEIVES AND TRANSMITS WILL BE ACCOUNTED FOR AND
                        ;* THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                        ;* THE RECEIVE/TRANSMIT TABLE.
                        ;*
                        ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                        ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                        ;*      64 RECEIVE AND 64 TRANSMIT BUFFERS.  THE ROUTINE WILL
                        ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                        ;*      HIERARCHY:
                        ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                        ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                        ;*                 THAN 2K BYTES, USE THAT MEMORY
                        ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                        ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                        ;*
                        ;*********************************************************************


                        ;*********************************************************************
                        ;*              TEST  18 - DMR-11
                        ;* LARGE MESSAGE
                        ;* IN THIS MODE TRANSMIT AND RECEIVE 1 LARGE BUFFER
                        ;*
                        ;* THE BA/CC OUT RECEIVE AND TRANSMIT WILL BE ACCOUNTED FOR AND
                        ;* THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                        ;* THE RECEIVE/TRANSMIT TABLE.
                        ;*
                        ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                        ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                        ;*      ONE RECEIVE AND ONE TRANSMIT BUFFER.  THE ROUTINE WILL
                        ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                        ;*      HIERARCHY:
                        ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                        ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                        ;*                 THAN 2K BYTES, USE THAT MEMORY
                        ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                        ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                        ;*
                        ;*********************************************************************
```

```
                        ;*****************************************************************
                        ;*              TEST 19 - DMR-11
                        ;* MAINTENANCE MODE OPERATION
                        ;*
                        ;* THE BA/CC OUT RECEIVE AND TRANSMIT WILL BE ACCOUNTED FOR AND
                        ;* THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                        ;* THE RECEIVE/TRANSMIT TABLE.
                        ;*
                        ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                        ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                        ;*      ONE RECEIVE AND ONE TRANSMIT BUFFER.  THE ROUTINE WILL
                        ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                        ;*      HIERARCHY:
                        ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                        ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                        ;*                 THAN 2K BYTES, USE THAT MEMORY
                        ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                        ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                        ;*
                        ;*****************************************************************

                        9.0 ERROR INFORMATION


                        9.1 ERROR REPORTING

                        ERRORS  ARE  REPORTED  BY  THE PROGRAM AS THEY OCCUR (IF NOT
                        INHIBITED). THE REPORT CONFORMS TO THE DIAGNOSTIC SUPERVISOR
                        ERROR  REPORT  FORMAT,  AND CONSISTS OF A DESCRIPTION OF THE
                        ERROR, THE TEST NUMBER, SUBTEST  NUMBER,  PC  OF  THE  ERROR
                        CALL,  DEVICE  ADDRESS,  AND  BASIC  AND  EXTENDED  ERROR
                        INFORMATION.

                        THE FOLLOWING EXAMPLE PROVIDES A TYPICAL ERROR REPORT, WHICH
                        DESCRIBES  AN  "IRDY  NOT SET" ERROR, AND PROVIDES THE PC OF
                        THE ERROR CALL AND THE PC OF  THE  CALL  TO  THE  SUBROUTINE
                        REPORTING IT, THE FAILING REGISTER NAME, AND DEVICE REGISTER
                        CONTENTS :

                          CZDMR DVC FTL ERR 00002 ON UNIT 00 TST 006 SUB 000 PC:  016210
                          TIME OUT
                          ERROR IN SUBROUTINE CALLED AT PC: 036174
                          BUFFER STATUS
                          # OF BUFFERS: 7
                          BUFFER SIZE: 2048
                          IN  - RCV ASSIGNED:  7      XMIT ASSIGNED:  7
                          OUT - RCV RETURNED:  0      XMIT RETURNED:  0
                          DMR RUN ACKNOWLEDGE NOT RCVD
                          (CHECK INTERFACE, BAUD AND TURNAROUND)

                        ALL THE MESSAGES IN THE DIAGNOSTIC USE BASIC MESSAGE CALLS.
                        THEREFORE THE INHIBIT EXTENDED ERROR FLAG WILL HAVE NO
                        EFFECT ON THE MESSAGE OUTPUT.  THE INHIBIT BASIC MESSAGES WILL
                        INHIBIT THE ERROR MESSAGES.
                        @
```

```
      9          002000                          .=2000
     10
     11
     12
     13
     14                                         .MCALL  SVC
     15 002000                                  SVC                                    ; INITIALIZE SUPERVISOR MACROS
     16
     17
     18 002000                             BGNMOD
     19
     20
     21          000001                    $LSTIN=   1      ;   LIST INSTRUCTIONS
     22          000001                    $LSTTAG=  1
     23          000001                    SVCINS=   1      ;   LIST INSTRUCTIONS, SHIFTED RIGHT
     24          000001                    SVCTST=   1      ;   LIST TEST TAGS, SHIFTED RIGHT
     25          000001                    SVCSUB=   1      ;   LIST SUBTEST TAGS, SHIFTED RIGHT
     26          000001                    SVCGBL=   1      ;   LIST GLOBAL TAGS, SHIFTED RIGHT
     27          000001                    SVCTAG=   1      ;   LIST OTHER TAGS, SHIFTED RIGHT
     28
     29                                    ;      CHANGE THE VALUES OF THE SVC... SYMBOLS TO BE ZERO IF YOU WISH
     30                                    ;      TO ALIGN THE MACRO CALLS AND THEIR EXPANSIONS.  CHANGE THE
     31                                    ;      SYMBOLS TO BE MINUS-ONE TO NOT LIST THE EXPANSIONS.  YOU MAY
     32                                    ;      CHANGE THE SYMBOLS AT ANY POINT IN YOUR PROGRAM.
     33
     34 002000                                       POINTER BGNSW,BGNDU,BGNSFT
     35
     43
     44
     45
```

PROGRAM HEADER

```
                                .SBTTL  PROGRAM HEADER
                                ;++
                                ;       THE PROGRAM HEADER MACRO CHARACTERIZES THIS DIAGNOSTIC. THE
                                ;       HEADER MACRO'S ARGUMENTS ARE FILE NAME, RELEASE LEVEL, PATCH
                                ;       DISPOSITION OF THE MOST RECENT PATCH, MAXIMUM TEST TIME IN SEC.,
                                ;       AND THE TYPE OF DIAGNOSTIC (0-SEQUENTIAL, 1-EXERCISER).  THESE
                                ;       ARGUMENTS ARE IN RESPECTIVE ORDER.
                                ;--


002000                                  HEADER CZDMI,C,0,600.,0
002000                                                          L$NAME::
002000  103                                                             .ASCII /C/
002001  132                                                             .ASCII /Z/
002002  104                                                             .ASCII /D/
002003  115                                                             .ASCII /M/
002004  111                                                             .ASCII /I/
002005  000                                                             .BYTE   0
002006  000                                                             .BYTE   0
002007  000                                                             .BYTE   0
002010                                                          L$REV::
002010  103                                                             .ASCII  /C/
002011                                                          L$DEPO::
002011  060                                                             .ASCII  /0/
002012                                                          L$UNIT::
002012  000000                                                          .WORD   0
002014                                                          L$TIML::
002014  001130                                                          .WORD   600.
002016                                                          L$HPCP::
002016  036670                                                          .WORD   L$HARD
002020                                                          L$SPCP::
002020  037624                                                          .WORD   L$SOFT
002022                                                          L$HPTP::
002022  002174                                                          .WORD   L$HW
002024                                                          L$SPTP::
002024  002224                                                          .WORD   L$SW
002026                                                          L$LADP::
002026  040100                                                          .WORD   L$LAST
002030                                                          L$STA::
002030  000000                                                          .WORD   0
002032                                                          L$CO::
002032  000000                                                          .WORD   0
002034                                                          L$DTYP::
002034  000000                                                          .WORD   0
002036                                                          L$APT::
002036  000000                                                          .WORD   0
002040                                                          L$DTP::
002040  002124                                                          .WORD   L$DISPATCH
002042                                                          L$PRIO::
002042  000000                                                          .WORD   0
002044                                                          L$ENVI::
002044  000000                                                          .WORD   0
002046                                                          L$EXP1::
002046  000000                                                          .WORD   0
002050                                                          L$MREV::
002050      003                                                         .BYTE   C$REVISION
002051      003                                                         .BYTE   C$EDIT
```

```
002052                                                  L$EF::
002052  000000                                                  .WORD   0
002054  000000                                                  .WORD   0
002056                                                  L$SPC::
002056  000000                                                  .WORD   0
002060                                                  L$DEVP::
002060  010236                                                  .WORD   L$DVTYP
002062                                                  L$REPP::
002062  000000                                                  .WORD   0
002064                                                  L$EXP4::
002064  000000                                                  .WORD   0
002066                                                  L$EXP5::
002066  000000                                                  .WORD   0
002070                                                  L$AUT::
002070  000000                                                  .WORD   0
002072                                                  L$DUT::
002072  023602                                                  .WORD   L$DU
002074                                                  L$LUN::
002074  000000                                                  .WORD   0
002076                                                  L$DESP::
002076  010244                                                  .WORD   L$DESC
002100                                                  L$LOAD::
002100  104035                                                  EMT     E$LOAD
002102                                                  L$ETP::
002102  000000                                                  .WORD   0
002104                                                  L$ICP::
002104  020440                                                  .WORD   L$INIT
002106                                                  L$CCP::
002106  022034                                                  .WORD   L$CLEAN
002110                                                  L$ACP::
002110  021744                                                  .WORD   L$AUTO
002112                                                  L$PRT::
002112  020432                                                  .WORD   L$PROT
002114                                                  L$TEST::
002114  000000                                                  .WORD   0
002116                                                  L$DLY::
002116  000000                                                  .WORD   0
002120                                                  L$HIME::
002120  000000                                                  .WORD   0
   12
   18
   19
   20
   21
   22                                   .EVEN
   23
   24
   25
   26
   27
   28
```

DISPATCH TABLE

```
                        .SBTTL  DISPATCH TABLE

                        ;////////////////////////////////////////////////////////////////////////
                        ;/ THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
                        ;/ IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                        ;////////////////////////////////////////////////////////////////////////

002122                          DISPATCH 19
002122  000023                                                          .WORD   19
002124                                                          L$DISPATCH::
002124  023662                                                          .WORD   T1
002126  024172                                                          .WORD   T2
002130  025506                                                          .WORD   T3
002132  025640                                                          .WORD   T4
002134  026666                                                          .WORD   T5
002136  030100                                                          .WORD   T6
002140  030660                                                          .WORD   T7
002142  031302                                                          .WORD   T8
002144  032004                                                          .WORD   T9
002146  032516                                                          .WORD   T10
002150  032742                                                          .WORD   T11
002152  033122                                                          .WORD   T12
002154  034026                                                          .WORD   T13
002156  034556                                                          .WORD   T14
002160  036322                                                          .WORD   T15
002162  036426                                                          .WORD   T16
002164  036474                                                          .WORD   T17
002166  036544                                                          .WORD   T18
002170  036614                                                          .WORD   T19
```

```
                        .SBTTL  DEFAULT HARDWARE P-TABLE

                        ;////////////////////////////////////////////////////////////////////////
                        ;/ THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                        ;/ THE TEST-DEVICE PARAMETERS.  **NOTE - MANY OF THE P-TABLE VALUES LISTED
                        ;/ BELOW ARE NOT USED IN THIS DIAGNOSTIC BUT ARE INCLUDED TO AGREE WITH
                        ;/ M8207 & M8203 DIAGNOSTIC P-TABLES.
                        ;////////////////////////////////////////////////////////////////////////

002172                          BGNHW   DFPTBL
002172  000013                                                         .WORD   L10000-L$HW/2
002174                                                                  L$HW::
002174                                                                  DFPTBL::

002174  000000                  .WORD       0         ;**NOT USED - MICROPROCESSOR TYPE
002176  160070                  .WORD  160070         ;DMR11 CSR UNIBUS ADDRESS DEFAULT
002200  000300                  .WORD     300         ;DMR11 INTERRUPT VECTOR DEFAULT
002202  000000                  .WORD       0         ;**NOT USED - PRIORITY LEVEL
002204  000000                  .WORD       0         ;**NOT USED - LINE UNIT
002206  000000                  .WORD     000         ;**NOT USED - SWITCH PACK #1 (REG 11)
002210  000000                  .WOPD     000         ;**NOT USED - SWITCH PACK #2 (REG 15)
002212  000000                  .WORD     000         ;**NOT USED - SWITCH PACK #3 (REG 16)
002214  000005                  .WORD       5         ;CABLE TURNAROUND (DEFAULT = CABLE(5))
002216  000000                  .WORD       0         ;**NOT USED - BAUD RATE
002220  000000                  .WORD       0         ;**NOT USED - RUN SWITCH

002222                          ENDHW
002222                                                                  L10000:
```

```
                                .SBTTL  DEFAULT SOFTWARE P-TABLE

                                ;////////////////////////////////////////////////////////////////////////
                                ;/ THE SOFTWARE P-TABLE CONTAINS THE VALUE OF THE PROGRAM
                                ;/ PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                ;////////////////////////////////////////////////////////////////////////

002222                                  BGNSW   SFPTBL
002222  000001                                                                    .WORD   L10001-L$SW/2
002224                                                                  L$SW::
002224                                                                  SFPTBL::

002224  000005                        SPEED:  .WORD   5       ;PROCESSOR SPEED VARIABLE USED
                                                                ;TO ALTER THE WAIT VARIABLES.
002226                                  ENDSW
002226                                                                  L10001:
```

GLOBAL EQUATES SECTION

```
      1                               .SBTTL  GLOBAL EQUATES SECTION
      2
      3                               ;////////////////////////////////////////////////////////////////////////////
      4                               ;/      THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
      5                               ;/      ARE USED IN MORE THAN ONE TEST.
      6                               ;////////////////////////////////////////////////////////////////////////////
      7
      8 002226                                EQUALS
                                      ;
                                      ; BIT DIFINITIONS
                                      ;
                100000                BIT15== 100000
                040000                BIT14== 40000
                020000                BIT13== 20000
                010000                BIT12== 10000
                004000                BIT11== 4000
                002000                BIT10== 2000
                001000                BIT09== 1000
                000400                BIT08== 400
                000200                BIT07== 200
                000100                BIT06== 100
                000040                BIT05== 40
                000020                BIT04== 20
                000010                BIT03== 10
                000004                BIT02== 4
                000002                BIT01== 2
                000001                BIT00== 1
                                      ;
                001000                BIT9==  BIT09
                000400                BIT8==  BIT08
                000200                BIT7==  BIT07
                000100                BIT6==  BIT06
                000040                BIT5==  BIT05
                000020                BIT4==  BIT04
                000010                BIT3==  BIT03
                000004                BIT2==  BIT02
                000002                BIT1==  BIT01
                000001                BIT0==  BIT00
                                      ;
                                      ; EVENT FLAG DEFINITIONS
                                      ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                      ;
                000040                EF.S ART==      32.                     ; START COMMAND WAS ISSUED
                000037                EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
                000036                EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
                000035                EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
                000034                EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
                                      ;
                                      ;
                                      ; PRIORITY LEVEL DEFINITIONS
                                      ;
                000340                PRI07== 340
                000300                PRI06== 300
                000240                PRI05== 240
                000200                PRI04== 200
                000140                PRI03== 140
                000100                PRI02== 100
```

```
                                                                H 3
GLOBAL EQUATES SECTION

                000040                  PRI01== 40
                000000                  PRI00== 0
                                        ;
                                        ;OPERATOR FLAG BITS
                                        ;
                000004                  EVL==       4
                000010                  LOT==      10
                000020                  ADR==      20
                000040                  IDU==      40
                000100                  ISR==     100
                000200                  UAM==     200
                000400                  BOE==     400
                001000                  PNT==    1000
                002000                  PRI==    2000
                004000                  IXE==    4000
                010000                  IBE==   10000
                020000                  IER==   20000
                040000                  LOE==   40000
                100000                  HOE==  100000
     9                                  ;;*****************************************************************************
    10
    11                                  ;;*****************************************************************************
    12                                  ;SWITCH REGISTER OPTIONS
    13
    14          100000                  SW15=   100000
    15          040000                  SW14=   40000
    16          020000                  SW13=   20000
    17          010000                  SW12=   10000
    18          004000                  SW11=   4000
    19          002000                  SW10=   2000
    20          001000                  SW09=   1000
    21          000400                  SW08=   400
    22          000200                  SW07=   200
    23          000100                  SW06=   100
    24          000040                  SW05=   40
    25          000020                  SW04=   20
    26          000010                  SW03=   10
    27          000004                  SW02=   4
    28          000002                  SW01=   2
    29          000001                  SW00=   1
    30
    31                                  ;;*****************************************************************************
    32                                  ;;CSR AND STAUS WORD DEFINITIONS
    33                                  ;;SEL0 (CSR) - BSEL0/BSEL1
    34          100000                  RUN=    BIT15           ;SET IF RUNNING
    35          040000                  MCLR=   BIT14           ;MASTER CLEAR OF PROCESSOR AND LINE UNIT
    36          020000                  MDIAG=  BIT13           ;CSR MAINTENANCE - ENABLE MICRODIAGNOSTICS
    37          010000                  STLU=   BIT12           ;CSR MAINTENANCE - STEP LINE UNIT
    38          004000                  LPLU=   BIT11           ;CSR MAINTENANCE - LINE UNIT LOOP
    39          002000                  ROMO=   BIT10           ;CSR MAINTENANCE
    40          001000                  ROMI=   BIT9            ;CSR MAINTENANCE
    41          000400                  STUP=   BIT8            ;CSR MAINTENANCE - USED WITH LOOP LU
    42                                                          ;WHEN ASSERTED, XMITTER SHIFTS; CLEAR, REC. SHIFTS
    43          000200                  RDI=    BIT7            ;CSR - DMR11 READY RESPONSE
    44          000100                  IESET=  BIT6            ;CSR - INTERRUPT ENABLE INPUT - DMR11 INTERRUPTS
    45                                                          ;CPU WHEN RDI SET IN RESPONSE TO RQI BEING SET.
    46          000040                  RQI=    BIT5            ;CSR - REQUEST IN
```

GLOBAL EQUATES SECTION

```
                                                                    ;CSR - INTERRUPT ENABLE INPUT - DMR11 INTERRUPTS
                                                                    ;CPU WHEN RDI CLEARS IN RESPONSE TO RQI BEING CLEAR.
                                                                    ;(DMR RUN MODE ONLY)
                                                                    ;CSR -  IF 0, TRANSMIT   &   IF 1, RECEIVE

                                                                    ;;SEL2 - BSEL2/BSEL3
                                                                    ;SEL2 - DMR11 SETS TO INDICATE DATA READY FOR OUTPUT
                                                                    ;SEL2 - SET TO ENABLE DMR11 TO INTERRUPT WHEN RDO

                                                                    ;;SEL6 - BSEL6/BSEL7
                                                                    ;SEL6 - CONTROL OUT - RESPONSE TO DMR MODE BASE
                                                                    ;       TABLE UPDATE COMMAND.
                                                                    ;SEL6 - BASE IN -- WHEN SET CAUSES
                                                                    ;       RESUMPTION OF OPERATION
                                                                    ;SEL6 - CONTROL OUT - CTS FAILED
                                                                    ;SEL6 - CONTROL IN -- START TIME (3 SEC IF SET
                                                                    ;       1 SEC IF CLEAR)
                                                                    ;SEL6 - HALF-DUPLEX  &  CLEAR FOR FULL-DUPLEX
                                                                    ;SEL6 - CONTROL OUT - CD GLITCHED
                                                                    ;SEL6 - EXTENDED CONTROL OUT - HALT COMPLETED
                                                                    ;SEL6 - DDCMP MAINTENANCE DURING CONTROL IN
                                                                    ;SEL6 - BASE IN -- SET FOR DMR11 MODE
                                                                    ;       122 IS THE DMR PASSWORD FOR BSEL6 AND
                                                                    ;       BIT8 SETS THE DMR MODE BIT IN BSEL7
                                                                    ;SEL6 - CONTROL OUT - NON EXISTENT MEMORY
                                                                    ;SEL6 - CONTROL OUT - START RECEIVED
                                                                    ;SEL6 - CONTROL OUT - DISCONNECT
                                                                    ;SEL6 - MODEM WRITE - DATA TERMINAL READY
                                                                    ;SEL6 - CONTROL OUT - DMR RUN MODE
                                                                    ;SEL6 - CONTROL OUT - MESSAGE TOO LONG
                                                                    ;SEL6 - MODEM WRITE - LOCAL MODEM LOOPBACK
                                                                    ;SEL6 - CONTROL OUT - MAINTENANCE MSG. RECEIVED
                                                                    ;SEL6 - CONTROL OUT - NO BUFFER
                                                                    ;SEL6 - MODEM WRITE - REMOTE MODEM LOOPBACK
                                                                    ;SEL6 - CONTROL OUT - TIME OUT
                                                                    ;SEL6 - CONTROL OUT - NAKS THRESHOLD EXCEEDED


                                                                    ;;**********************************************************************
                                                                    ;;DDCMP COMMANDS - BITS 0 & 1 IN SEL0 AND SEL2

                                                                    ;INPUT (SEL0)
                                                                    ;BUF ADDRESS AND CHARACTER COUNT TRANSMIT
                                                                    ;CONTROL COMMAND (IN OR OUT)
                                                                    ;HALT COMMAND
                                                                    ;BASE IN COMMAND
                                                                    ;BUF ADDRESS AND CHARACTER COUNT RECEIVE
                                                                    ;WRITE MODEM STATUS REGISTER
                                                                    ;ENABLE EXTENDED ERROR NOTIFICATION
                                                                    ;DISABLE EXTENDED ERROR NOTIFICATION
                                                                    ;DESELECT DMC LINE MODE
                                                                    ;REQUEST BASE TABLE UPDATE
                                                                    ;SET REP/SELECT TIMER VALUE
                                                                    ;SET THE FOLLOWING THRESHOLDS:
                                                                    ;NAKS RECVD
                                                                    ;NAKS SENT
                                                                    ;REP/SEL
```

```
 47          000020                 IECLR=  BIT4
 48
 49
 50          000004                 RCV=    BIT2
 51
 52                                 ;;SEL2 - BSEL2/BSEL3
 53          000200                 RDO=    BIT7
 54          000100                 IEO=    BIT6
 55
 56                                 ;;SEL6 - BSEL6/BSEL7
 57          020000                 BASEUP= BIT13
 58
 59          010000                 RES=    BIT12
 60
 61          010000                 CTS=    BIT12
 62          004000                 SECN=   BIT11
 63
 64          002000                 HDX=    BIT10
 65          002000                 CD=     BIT10
 66          001000                 HALTC=  BIT9
 67          000400                 MAINT=  BIT8
 68          000522                 DMR=    BIT8!122
 69
 70
 71          000400                 NXM=    BIT8
 72          000200                 STREC=  BIT7
 73          000100                 DISCON= BIT6
 74          000100                 DTR=    BIT6
 75          000040                 DMRRUN= BIT5
 76          000020                 TOLONG= BIT4
 77          000010                 MAINT1= BIT3
 78          000010                 MNTREC= BIT3
 79          000004                 NOBFR=  BIT2
 80          000004                 MAINT2= BIT2
 81          000002                 TOUT=   BIT1
 82          000001                 NAKS=   BIT0
 83
 84
 85
 86
 87
 88
 89          000000                 BACCT=  0
 90          000001                 CNTRL=  1
 91          000002                 HLT=    2
 92          000003                 BASEI=  3
 93          000004                 BACCR=  4
 94          000005                 WMODEM= 5
 95          000006                 EXERR=  6
 96          000007                 DXERR=  7
 97          000010                 DDMC=   10
 98          000011                 UPDATE= 11
 99          000012                 TIMER=  12
100          000013                 THRESH= 13
101
102
103
```

```
                                                    ;NO BUFFER
000014          RRAM=   14                          ;READ M8207 RAM (0-377)
000015          INTER=  15                          ;WRITE INTERFACE IN AX3-15
000017          RMODEM= 17                          ;READ MODEM STATUS (=NOP)

                ;OUTPUT (SEL2)      NOTE: CNTRL IS USED FOR SEL2
000007          CMD=    7                           ; ** MASK USED TO CLEAR COMMAND BITS 0-2 **

                ;;*****************************************************************************
                ;;BASE TABLE OFFSETS
                                                    ;NOTE: THE OFFSETS FOR BASE+3.-BASE+10 WERE
                                                    ;INTENTIONALLY NOT LABELLED, BECAUSE THOSE LOCATIONS
                                                    ;MUST NOT BE CHANGED IN ORDER TO BE DMC COMPATIBLE.
                                                    ;THE LABELS BELOW CORRESPOND WITH THOSE USED IN THE
                                                    ;DMR MICROCODE.
000042          R=      42                          ;#R - MESSAGE RECEIVED
000043          N=      43                          ;#N - MESSAGE TRANSMITTED
000044          A=      44                          ;#A - MESSAGE ACKNOWLEDGED
000045          T=      45                          ;#T - NEXT MESSAGE TO BE TRANSMITTED
000046          X=      46                          ;#X - LAST COMPLETED TRANSMISSION
000055          PRETIM= 55                          ;PROGRAMMABLE REP/SEL TIMER VALUE.
000060          TH1L=   60                          ;THRESHOLD LEVEL - NAKS RECEIVED .
000062          TH2L=   62                          ;THRESHOLD LEVEL - NAKS SENT.
000064          TH3L=   64                          ;THRESHOLD LEVEL - REP SENT.
000066          TH4L=   66                          ;THRESHOLD LEVEL - NO BUFFER AVAILABLE.
000072          ISP7=   72                          ;IMAGE OF SCRATCH PAD 7
000076          ISP13=  76                          ;IMAGE OF SCRATCH PAD 13

                ;;*****************************************************************************
                ;;INSTRUCTION DEFINITIONS

000207          RETURN=207                          ;RETURN FROM SUB.     [=  JSR PC]


                ;;*****************************************************************************
                ; MISC. EQUATES

000006          LLOOP=  6                           ;LOCAL MODEM LOOPBACK
000007          RLOOP=  7                           ;REMOTE MODEM LOOPBACK.
000015          CR=     15                          ;ASCII CARRIAGE RETURN
000012          LF=     12                          ;ASCII LINE FEED
```

GLOBAL DATA SECTION

```
                                .SBTTL  GLOBAL DATA SECTION

                                ;////////////////////////////////////////////////////////////////////////
                                ;/      THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ;/      IN MORE THAN ONE TEST.
                                ;////////////////////////////////////////////////////////////////////////



                                ;;**********************************************************************
                                ;DMR11 VECTOR AND REGISTER INDIRECT POINTERS

002226  000000                  DMRVEC: .WORD   0               ;DMR11 RECEIVER INTERRUPT VECTOR
002230  000000                  DMTVEC: .WORD   0               ;DMR11 TRANSMITTER INT. VECTOR
002232  000000                  CSR:    .WORD   0               ;POINTER TO DMR11 CONTROL STATUS REGISTER
002234  000000                  SEL2:   .WORD   0               ;POINTER TO DMR11 CONTROL OUT REGISTER (SEL 2)
002236  000000                  SEL4:   .WORD   0               ;POINTER TO DMR11 PORT REGISTER (SEL 4)
002240  000000                  SEL6:   .WORD   0               ;POINTER TO DMR11 PORT REGISTER (SEL 6)
        002232                  SEL0=   CSR                     ;CSR IS SEL0
        002232                  BSEL0=  CSR                     ;LOW BYTE OF CSR
002242  000000                  BSEL1:  .WORD   0               ;POINTER TO DMR11 CSR HIGH BYTE
        002234                  BSEL2=  SEL2                    ;LOW BYTE OF SEL2
002244  000000                  BSEL3:  .WORD   0               ;POINTER TO SEL2 HIGH BYTE
        002236                  BSEL4=  SEL4                    ;LOW BYTE OF SEL4
002246  000000                  BSEL5:  .WORD   0               ;POINTER TO SEL4 HIGH BYTE
        002240                  BSEL6=  SEL6                    ;LOW BYTE OF SEL6
002250  000000                  BSEL7:  .WORD   0               ;POINTER TO SEL6 HIGH BYTE

                                ;;**********************************************************************
                                ;;OTHER HARDWARE PARAMETERS

002252  000000                  WTYPE:  .WORD   0               ;MICROPROCESSOR TYPE
002254  000000                  DMTURN: .WORD   0               ;TURN AROUND TYPE (0-7)
002256  000000                  MICRO:  .WORD   0               ;MICRODIAGNOSTICS (IF 1(YES) - ENABLED)

                                ;;**********************************************************************
                                ;PROGRAM CONTROL PARAMETERS



002260  000000                  DMRFLG: .WORD   0               ;FLAG SET WHEN DMR MODE IS REQUESTED IN
                                                                ;THE BASE IN COMMAND.  USED TO FLAG THAT
                                                                ;A DMR MODE ACKNOWLEDGE IS EXPECTED.
002262  000000                  INFACE: .WORD   0               ;FLAG TO ALLOW CHANGE OF INTERFACE TYPE
                                                                ;BY WRITING AX3-15.  FLAG SET/CLEARED IN INIT.
002264  000000                  FRSTIM: .WORD   0               ;FLAG=0 IF PROGRAM JUST LOADED
002266  000000                  FRSPAS: .WORD   0               ;FLAG=0 IF FIRST PASS AFTER LOAD
002270  000000                  STARES: .WORD   0               ;FLAG=0 IF 1ST TIME THRU AFTER STA OR RES

                                                                ;FOLLOWING PARAMETERS ARE USED IN THE
                                                                ;INTERRUPT TESTS (TESTS 15-19):
002272  000000                  START:  .WORD   0               ;FLAG SET WHEN A CONTROL IN HAS BEEN ISSUED.
002274  000000                  RESUME: .WORD   0               ;FLAG SET WHEN A BASE IN WITH RESUME DESIRED.
002276  000000                  DMCMDE: .WORD   0               ;FLAG SET WHEN A BASE IN WITH DMC MODE DESIRED
002300  000000                  MNTMDE: .WORD   0               ;FLAG SET WHEN MAINTENANCE MODE IS DESIRED.
002302  000000                  MMANAG: .WORD   0               ;FLAG RETURNED IN THE SUBROUTINE $BUFFS
                                                                ;MMANAG=1, MEMORY MANAGED BUFFERS USED
```

GLOBAL DATA SECTION

```
                                                ;BIT PATTERN TO WRITE INTO AX3-15, WHEN
                                                ;IT IS REQUESTED TO ALLOW INTERFACE
                                                ;SELECTION. (TEST CONFIGURATION 1-4)
                                                ;BIT0 = TEST BIT (MUST BE SET TO ALLOW SELECT)
                                                ;BIT3 = INTEGRAL MODEM
                                                ;BIT4 = V.35
                                                ;BIT6 = EIA
                                                ;BIT7 = RS422
                                                ;FLAG SET WHEN IT IS NECESSARY TO WRITE
                                                ;MODEM MAINTENANCE BITS (MAINTENANCE 1 & 2)
                                                ;THIS FLAG IS SET OR CLEARED IN THE INIT CODE.
                                                ;******* MANUFACTURING USE ONLY *******
                                                ;THIS WORD MAY BE PATCHED TO A NON ZERO WHEN
                                                ;MANUFACTURING SPECIAL TEST CONNECTORS ARE
                                                ;USED.  THIS WILL ALLOW MAINTENANCE BITS
                                                ;TO BE SET.


                        ;;**************************************************************************
                        ;PROGRAM VARIABLES
                                                ;WORD1-WORD3 VALUES DETERMINED IN INIT
                                                ;CODE DEPENDING ON THE BAUD RATE.
002312  000000  WAIT1:  .WORD   0               ;VALUE FOR TIMEOUT COUNTER
                                                ;USED IN $WAIT SUBROUTINE
002314  000000  WAIT2:  .WORD   0               ;VALUE FOR TIMEOUT COUNTER USED IN $MSCLR
                                                ;AND $CLRQI SUBROUTINES.
002316  000000  WAIT3:  .WORD   0               ;VALUE FOR TIMEOUT COUNTER USED IN $INOUT.
002320  000000  WAIT4:  .WORD   0               ;WORD USED AS OUTER LOOP COUNTER IN $INOUT.
002322  000000  BUFSIZ: .WORD   0               ;CALCULATED BUFFER SIZE IN BYTES.
002324  000000  BUFNUM: .WORD   0               ;# OF RECEIVE & TRANSMIT BUFFERS.  THIS
                                                ;VARIABLE IS USED IN THE SUBROUTINE $BUFFS

002326  000000  INRCV:  .WORD   0               ;COUNTER FOR # OF BA/CC IN RECEIVES.
002330  000000  INXMIT: .WORD   0               ;COUNTER FOR # OF BA/CC IN TRANSMITS.
002332  000000  OUTRCV: .WORD   0               ;COUNTER FOR # OF BA/CC OUT RECEIVES.
002334  000000  OUTXMT: .WORD   0               ;COUNTER FOR # OF BA/CC OUT TRANSMITS.

                        ;;**************************************************************************
                        ;* MISCELLANEOUS STORAGE
002336  000000  TEMP:   .WORD   0               ;SCRATCH WORD USED FOR MISC. STORAGE IN SUB.
002340  000000  SAVE:   .WORD   0               ;SCRATCH WORD USED FOR MISC. STORAGE IN SUB.
002342  000000  FLAG:   .WORD   0               ;SCRATCH WORD USED FOR MISC. FLAG IN SUB.
002344  000000  SFLAG:  .WORD   0               ;FLAG USED IN TEST 15 FOR LOOP CONTROL.
002346  000000  SKIP:   .WORD   0               ;FLAG USED IN TEST 7 TO MARK WHETHER TO SKIP
                                                ;A PORTION OF THE TEST.
002350  000000  NXMFLG: .WORD   0               ;FLAG USED TO MARK THAT THE DMR ADDRESS IS NXM

002352  000000  INFLAG: .WORD   0               ;FLAG USED IN INISR TO FLAG WHEN ALL THE
                                                ;BA/CC INS HAVE BEEN DONE.

002354  000000  OUTFLG: .WORD   0               ;FLAG USED IN OUTISR TO FLAG WHEN ALL THE
                                                ;BA/CC OUTS HAVE BEEN DONE.
002356  000000  RESFLG: .WORD   0               ;FLAG USED IN IN ISR TO FLAG THAT THE RESUME
                                                ;COMMAND HAS JUST BEEN ISSUED.
002360  000000  ERRFLG: .WORD   0               ;FLAG USED IN THE WAIT SUBROUTINES ($WAIT
                                                ; & $CLRQI) TO RETURN ERROR CONDITON (SEC)
```

```
                                                LAST:   .WORD   0               ;WORD USED TO STORE LAST COMMAND PROCESSED IN
                                                                                ;THE INPUT INTERRUPT ROUTINE.
                                                ERROR:  .WORD   0               ;ERROR STORAGE
                                                LOGDEV: .WORD   0               ;LOGICAL DEVICE NUMBER
                                                PSTACK: .WORD   0               ;CONTAINS BASE LEVEL PROGRAM SP
                                                SUBRPC: .WORD   0               ;PC OF SUBR CALL FOR ERROR REPORTS
                                                NESTPC: .WORD   0               ;FLAG TO NOTIFY WHEN A SUBR IS NESTED
                                                                                ;IN ANOTHER SUBROUTINE (WHEN SET)
                                                CLRNO:  .WORD   0               ;THIS WORD IS INCREMENTED DURING EACH MASTER
                                                                                ;CLEAR.  THIS WILL ALLOW EVERY OTHER MASTER
                                                                                ;CLEAR TO RUN THE MICRO TESTS.

                                                                                ;ROM CHECK VARAIBLES
                                                LOCRC:  .WORD   0               ;CRC STORAGE FOR LOW BYTE CHIP
                                                HICRC:  .WORD   0               ;CRC STORAGE FOR HIGH BYTE CHIP
                                                LOWORD: .WORD   0               ;TEMP. WORD CONTAINING 2 CONSECUTIVE LOW BYTES
                                                HIWORD: .WORD   0               ;TEMP. WORD CONTAINING 2 CONSECUTIVE HI BYTES
                                                ROMADR: .WORD   0               ;POINTER TO ROM ADDRESS.
                                                CHIPNO: .WORD   0               ;CHIP NUMBER BEING CHECKED.
                                                COUNT:  .WORD   0               ;COUNTER USED IN THE $WAIT SUBROUTINE.
                                                        .EVEN

                                                ;;**************************************************************************
                                                ;;**************************************************************************
                                                ;;BUFFER AREA
                                                        ;       ** CCITT PSUEDO-RANDOM TEST PATTERN **
                                                        ; THE FOLLOWING 32 WORDS TRANSLATE INTO A 512 BIT PATTERN
                                                        ; THAT WAS GENERATED ACCORDING TO CCITT RECOMMENDATION V.52.  THIS
                                                        ; PATTERN WAS GENERATED BY A 9 BIT SHIFT REGISTER (INITIALIZED
                                                        ; AS 1S) WHOSE 5TH AND 9TH BITS ARE XORED.  THIS XOR RESULT IS SHIFTED
                                                        ; INTO THE 1ST BIT OF THE REGISTER AS THE REGISTER IS SHIFTED RIGHT.
                                                        ; THE 9TH BIT (OR BIT SHIFTED OUT) IS SHIFTED INTO THE BIT PATTERN.
                                                        ; NOTE: CCITT RECOMMENDED 511 BITS, I'VE EXTENDED THIS BY 1 BIT TO END
                                                        ; ON A WORD BOUNDARY.
002416                                          $CCITT:
002416  177603  157427  031011                          .WORD   177603,157427,031011
002424  047321  163715  105221                          .WORD   047321,163715,105221
002432  143325  142304  040041                          .WORD   143325,142304,040041
002440  014116  052606  172334                          .WORD   014116,052606,172334
002446  105025  123754  111337                          .WORD   105025,123754,111337
002454  111523  030030  145064                          .WORD   111523,030030,145064
002462  137642  143531  063617                          .WORD   137642,143531,063617
002470  135015  066730  026575                          .WORD   135015,066730,026575
002476  052012  053627  070071                          .WORD   052012,053627,070071
002504  151172  165044  031605                          .WORD   151172,165044,031605
002512  166632  016741                                  .WORD   166632,016741

                                                ;;**************************************************************************
                                                ;; TRANSMIT BUFFER (SMALL)

002516  000000                                  TFLAG:  .WORD   0               ;FLAG FOR STATUS OF TRANSMIT BUFFER
        000044                                  TCOUNT= 36.                     ;CHARACTER COUNT OF TBUF
002520    101     102     103                   TBUF:   .ASCIZ  /ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789/
002523    104     105     106
002526    107     110     111
```

GLOBAL DATA SECTION

```
        002531      112      113      114
        002534      115      116      117
        002537      120      121      122
        002542      123      124      125
        002545      126      127      130
        002550      131      132      060
        002553      061      062      063
        002556      064      065      066
        002561      067      070      071
        002564      000
    170                                     .EVEN
    171
    172
    173                                 ;;**********************************************************************
    174                                 ;; RECEIVE BUFFER (SMALL)
    175
    176 002566  000000                  RFLAG:  .WORD   0               ;FLAG FOR STATUS OF RECEIVE BUFFER
    177         000044                  RCOUNT= 36.                     ;CHARACTER COUNT OF RBUF
    178 002570                          RBUF:   .BLKB   38.             ;36. BYTE BUFFER + 2 BYTES USED
    179                                                                 ;TO MARK THE END OF THE RECEIVE BUFFER
    180                                     .EVEN
    181
    182                                 ;;**********************************************************************
    183                                 ;; BASE TABLE
    184
    185 002636                          BASE:   .BLKB   256.            ;MICROPROCESSOR MEMORY ALLOCATION
    186
    187                                 ;;**********************************************************************
    188                                 ;; TRANSMIT AND RECEIVE BUFFER POINTERS
    189
    190 003236                          XMTBUF: .BLKW   128.            ;POINTERS TO TRANSMIT BUFFERS (UP TO 64)
    191                                                                 ;1 WORD FOR ADDRESS AND 1 WORD FOR CHAR. COUNT
    192 003636                          RCVBUF: .BLKW   128.            ;POINTERS TO RECEIVE BUFFERS (UP TO 64).
    193
    194                                 ;;**********************************************************************
    195                                 ;; BUFFER AREA (LARGE)
    196
    197 004236                          BIGBUF: .BLKB   4000            ;MAX BUFFER (2K BYTES)
```

```
                                          .SBTTL  GLOBAL TEXT SECTION

                                          ;%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
                                          ;%      THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                          ;%      MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                          ;%      MORE THAN ONE TEST.
                                          ;%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%


                                          ;;*******************************************************************
                                          ;* NAMES OF DEVICES SUPPORTED BY PROGRAM
                                          ;;*******************************************************************
 010236                                          DEVTYP  <DMR11>
 010236                                                                        L$DVTYP::
 010236     104     115     122                                                        .ASCIZ  /DMR11/
 010241     061     061     000
                                                                                       .EVEN

                                          ;;*********************************************************************
                                          ;* TITLE OF PROGRAM
                                          ;;*********************************************************************
 010244                                          DESCRIPT   <DMR-11 FUNCTIONAL TESTS>
 010244                                                                        L$DESC::
 010244     104     115     122                                                        .ASCIZ  /DMR-11 FUNCTIONAL T
 010247     055     061     061
 010252     040     106     125
 010255     116     103     124
 010260     111     117     116
 010263     101     114     040
 010266     124     105     123
 010271     124     123     000
                                                                                       .EVEN



                                          ;
                                          ; FORMAT STATEMENTS USED IN PRINT CALLS
                                          ;
```

```
                        .SBTTL  GLOBAL SUBROUTINES

                        ;////////////////////////////////////////////////////////////////////////////
                        ;/      THE GLOBAL SUBROUTINES ARE CALLED BY MORE THAN ONE TEST
                        ;////////////////////////////////////////////////////////////////////////////


                        ;;**************************************************************************
                        ;
                        ;       MACROS - THERE ARE 2 BASIC TYPES OF MACROS USED
                        ;                       1. NORMAL MACROS -
                        ;                       2. DMR11 FUNCTIONAL MACROS - THESE MACROS MAY
                        ;                          BE NOTHING MORE THAN A CALL TO A SUBROUTINE,
                        ;                          BUT THEY ARE DISTINCT DMR FUNCTIONS WHICH CAN
                        ;                          DISTINGUISHED BY THE IN-LINE MACRO NAME.
                        ;
                        ;;**************************************************************************

                        ;;**************************************************************************
                        ; CALL MACRO - CALL ROUTINE = JSR PC, ROUTINE
                        ;              (NOTE: RETURN IS  EQUATED TO A RTS PC)
                        ;;**************************************************************************

                                .MACRO  CALL    ROUTIN
                                .IF     B, ROUTIN
                                .ERROR  ROUTINE; ## MISSING ROUTINE-EXPANSION ABORT ##
                                .MEXIT
                                .ENDC
                                JSR     PC,ROUTIN
                                .ENDM

                        ;;**************************************************************************
                        ; WAIT $FLAG MACRO - THIS MACRO INTERPUTS THE $FLAG AS RDI, RQI OR RDO.
                        ;                   IF RDI OR RDO, THE SUBROUTINE CALLED WILL WAIT UNTIL
                        ;                   THE RESPECTIVE BIT IS SET.  IF RQI, THE SUBROUTINE
                        ;                   CALLED WILL CLEAR RQI AND WAIT UNTIL RDI IS CLEARED.
                        ;;**************************************************************************

                                .MACRO  WAIT    $FLAG
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                .IF     B, $FLAG
                                .ERROR  FLAG    ;## MISSING FLAG FOR WAIT - EXPANSION ABORT ##
                                .MEXIT
                                .ENDC
                                .IF     IDN $FLAG,RQI
                                JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                .ENDC
                                .IF     IDN $FLAG,RDI
                                JSR     PC, $WAIT       ;CALL WAIT ROUTINE
                                        .WORD   0       ;FLAG THAT WE'RE WAITING FOR RDI
                                .ENDC
                                .IF     IDN $FLAG,RDO
                                JSR     PC, $WAIT       ;CALL WAIT ROUTINE
                                        .WORD   1       ;FLAG THAT WE'RE WAITING FOR RDO
```

```
                                .ENDC
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM


                        ;;*******************************************************************************
                        ; CLEAR MACRO - THIS IS A DMR FUNCTIONAL MACRO WHICH CALLS THE
                        ;               $MSCLR SUBROUTINE
                        ;;*******************************************************************************
                                .MACRO  CLEAR
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM
```

GLOBAL SUBROUTINES

```
                        ;;*****************************************************************************
                        ; BASEIN MACRO - THIS IS A DMR FUNCTIONAL MACRO WHICH CALLS THE
                        ;               $BASEIN SUBROUTINE (WITH DEFAULT ARGUMENTS
                        ;               IF ARGUMENTS NOT GIVEN)
                        ;;*****************************************************************************
                                .MACRO  BASEIN  $A,$B,$C
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                .IF     B       $A
                                JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
                                        .WORD   LPLU    ;SET LINE UNIT LOOP
                                        .WORD   BASE    ;BASE TABLE ADDRESS
                                        .WORD   DMR     ;DMR-11 MODE
                                .IFF
                                JSR     PC, $BASEI      ;CALL BASE IN ROUTINE
                                        .WORD   $A      ;MAINTENANCE MODE BITS TO SET IN BSEL1
                                        .WORD   $B      ;BASE TABLE ADDRESS
                                        .WORD   $C      ;MODE
                                .ENDC
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM



                        ;;*****************************************************************************
                        ; CNTRIN MACRO - THIS IS A DMR FUNCTIONAL MACRO WHICH CALLS THE
                        ;               $CNTIN SUBROUTINE (WITH DEFAULT ARGUMENTS
                        ;               IF ARGUMENTS NOT GIVEN)
                        ;;*****************************************************************************
                                .MACRO  CNTRIN  $A
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                .IF     B       $A
                                JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
                                        .WORD   0       ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                .IFF
                                JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE
                                        .WORD   $A      ;SEL6 - (DUPLEX, MODE)
                                .ENDC
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM
```

GLOBAL SUBROUTINES

```
                        ;;*****************************************************************************
                        ; DMRIN MACRO -  THIS IS A DMR FUNCTIONAL MACRO WHICH CALLS THE
                        ;               $DMRIN SUBROUTINE
                        ;;*****************************************************************************
                                .MACRO  DMRIN   $A,$B,$C
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                .IF     B       $A
                                .ERROR  DMRIN; ## MISSING ARGUMENTS-EXPANSION ABORT ##
                                .MEXIT
                                .ENDC
                                JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
                                        .WORD   $A      ;INPUT COMMAND
                                .IF     B       $B
                                        .WORD   0       ;NO SEL4
                                .IFF
                                        .WORD   $B      ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
                                .ENDC
                                .IF     B       $C
                                        .WORD   0       ;NO SEL6
                                .IFF
                                        .WORD   $C      ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                .ENDC
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM


                        ;;*****************************************************************************
                        ; SHUTDN MACRO - THIS IS A DMR FUNCTIONAL MACRO WHICH CALLS THE
                        ;               $HALT SUBROUTINE
                        ;;*****************************************************************************
                                .MACRO  SHUTDN
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM
```

```
                        ;;*****************************************************************************
                        ; BACCIR MACRO -  THIS IS A DMR FUNCTIONAL MACRO WHICH CALLS THE
                        ;                $BACC SUBROUTINE (WITH DEFAULT ARGUMENTS
                        ;                IF ARGUMENTS NOT GIVEN)
                        ;;*****************************************************************************
                                .MACRO  BACCIR  $A,$B
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                .IF     B       $A
                                JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
                                        .WORD   RQI!BACCR       ;BA/CC IN RECEIVE COMMAND
                                        .WORD   RBUF    ;RECEIVE BUFFER
                                        .WORD   RCOUNT  ;RECEIVE CHARACTER COUNT
                                .IFF
                                JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE
                                        .WORD   RQI!BACCR       ;BA/CC IN RECEIVE COMMAND
                                        .WORD   $A      ;BUFFER ADDRESS BITS 0-15
                                        .WORD   $B      ;BA BITS 16/17 AND CHAR. COUNT
                                .ENDC
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM


                        ;;*****************************************************************************
                        ; BACCIT MACRO -  THIS IS A DMR FUNCTIONAL MACRO WHICH CALLS THE
                        ;                $BACC SUBROUTINE (WITH DEFAULT ARGUMENTS
                        ;                IF ARGUMENTS NOT GIVEN)
                        ;;*****************************************************************************
                                .MACRO  BACCIT  $A,$B
                                .NLIST
                                .LIST ME
                                .LIST
                                                        ;**** MACRO EXPANSION ****
                                .IF     B       $A
                                JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
                                        .WORD   RQI!BACCT       ;BA/CC IN TRANSMIT COMMAND
                                        .WORD   TBUF    ;TRANSMIT BUFFER ADDRESS
                                        .WORD   TCOUNT  ;TRANSMIT CHARACTER COUNT
                                .IFF
                                JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE
                                        .WORD   RQI!BACCT       ;BA/CC IN TRANSMIT COMMAND
                                        .WORD   $A      ;BUFFER ADDRESS BITS 0-15
                                        .WORD   $B      ;BA BITS 16 & 17 AND CHAR. COUNT
                                .ENDC
                                                        ;****                   ****
                                .NLIST ME
                                .ENDM
```

```
                ;;*****************************************************************
                ;;*****************************************************************
                ;
                ;                       SUBROUTINE $WAIT
                ;
                ;             FUNCTION -  TO WAIT FOR RDI TO BE SET IN SEL0
                ;                         OR RDO TO BE SET IN SEL2
                ;
                ;       CALLING FORMAT:          JSR     PC,     $WAIT
                ;                                .WORD   FLAG
                ;                                (MACRO CALL -- WAIT RDI)
                ;
                ;       NESTING LEVEL    - MAY BE CALLED FROM ANOTHER SUBROUTINE
                ;
                ;       ENTRY CONDITIONS - FLAG  = 1   -   WAIT FOR RDO
                ;                          = 0   -   WAIT FOR RDI
                ;                        WAIT1 = DELAY COUNTER (DETERMINED IN INIT.)
                ;                        NESTPC= 1   -   ROUTINE NESTED WITHIN ANOTHER
                ;                                        SUBROUTINE.
                ;                              = 0   -   ROUTINE NOT NESTED.
                ;
                ;       EXIT CONDITIONS  - EITHER RDI OR RDO BIT SET AS EXPECTED
                ;                               OR (ERROR CONDITONS):
                ;                               1. RDI OR RDO SET, BUT NOT THE EXPECTED ONE
                ;                                  THE USER WILL BE INFORMED.  HOWEVER,
                ;                                  THIS WILL NOT NECESSARILY BE AN ERROR.
                ;                               2. BIT NOT SET BEFORE DELAY EXPIRED.
                ;                                  THIS WILL RESULT IN A HARD ERROR MESSAGE
                ;                                  AND THE CARRY BIT WILL BE SET.  THE CARRY
                ;                                  BIT SET FLAG THE ERROR CONDITION.
                ;
                ;
                ;    REGISTERS DESTROYED - RESTORED
                ;
                ;;*****************************************************************
                ;;*****************************************************************
010274          $WAIT:
010274 005037 002360            CLR     ERRFLG          ;CLEAR ERROR FLAG
010300 005037 002414            CLR     COUNT           ;CLEAR DELAY COUNTER
010304 005737 002374            TST     NESTPC          ;IS THIS NESTED IN ANOTHER SUBROUTINE?
010310 001005                   BNE     10$             ;YES - USE THE SUBRPC ALREADY CALCULATED.
010312 011637 002372            MOV     (SP),SUBRPC     ;SAVE PC AFTER THE CALL TO $WAIT.
010316 162737 000004 002372     SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE ACTUAL CALL
010324          10$:
010324 017637 000000 002336     MOV     @(SP),TEMP      ;GET THE FLAG FOR RDI OR RDO
010332 062716 000002            ADD     #2,(SP)         ;INC THE PC LEFT ON THE STACK TO POINT
                                                        ;PAST THE FLAG ARGUMENT
010336 010046                   MOV     R0,-(SP)        ;SAVE R0
010340 010146                   MOV     R1,-(SP)        ;SAVE R1
010342 013701 002312            MOV     WAIT1,R1        ;DELAY COUNTER DETERMINED BY BAUD RATE
                                                        ;(DETERMINED IN INIT ROUTINE).
010346          30$:
010346 005000                   CLR     R0              ;INNER LOOP COUNT OF DELAY COUNTER
010350          40$:
010350 032777 000200 171656     BIT     #RDO,@SEL2      ;IS THE RDO BIT SET IN SEL2?
010356 001036                   BNE     60$             ;YES - EXIT BIT CHECK LOOP.
010360 032777 000200 171644     BIT     #RDI,@SEL0      ;IS THE RDI BIT SET IN SEL0?
```

```
     58 010366  001064                    BNE     70$             ;YES - EXIT
     59 010370                            BREAK                   ;CALL SUPERVISOR - ALLOW CONSOLE INTERRUPT.
        010370  104422                                                      TRAP    C$BRK
     60 010372  005237  002414            INC     COUNT           ;INCREMENT DELAY COUNTER.
     61 010376  005300                    DEC     R0              ;LOOP UNTIL R0 RETURNS TO 0
     62 010400  001363                    BNE     40$
     63 010402                            DELAY   1               ;DELAY 100 MICROSECONDS
        010402  012727  000001                                              MOV     #1,(PC)+
        010406  000000                                                      .WORD   0
        010410  013727  002116                                              MOV     L$DLY,(PC)+
        010414  000000                                                      .WORD   0
        010416  005367  177772                                              DEC     -6(PC)
        010422  001375                                                      BNE     .-4
        010424  005367  177756                                              DEC     -22(PC)
        010430  001367                                                      BNE     .-20
     64                                     ;BETWEEN LOOPS.
     65 010432  005301                    DEC     R1              ;REPEAT UNTIL MAXIMUM LOOP SATISFIED.
     66 010434  001344                    BNE     30$
     67 010436                            ERRDF   1,EMG1,ERRG2    ;TIME OUT ERROR
        010436  104455                                                      TRAP    C$ERDF
        010440  000001                                                      .WORD   1
        010442  017704                                                      .WORD   EMG1
        010444  015112                                                      .WORD   ERRG2
     68 010446  005237  002360            INC     ERRFLG          ;SET ERROR FLAG
     69 010452  000445                    BR      100$            ;BRANCH TO COMMON EXIT.
     70 010454                      60$:
     71 010454  005737  002336            TST     TEMP            ;WERE WE WAITING FOR THE RDO FLAG?
     72 010460  001042                    BNE     100$            ;YES - OK, EXIT.
     73 010462  022737  000001  002364    CMP     #CNTRL,ERROR    ;IS THIS CONTROL OUT ERROR EXPECTED?
     74 010470  001436                    BEQ     100$            ;IF YES, DON'T REPORT THE FOLLOWING ERRORS.
     75 010472                            PRINTB #FMS1            ;RECEIVED AN RDO, WHEN WAITING FOR RDI
        010472  012746  010616                                              MOV     #FMS1,-(SP)
        010476  012746  000001                                              MOV     #1,-(SP)
        010502  010600                                                      MOV     SP,R0
        010504  104414                                                      TRAP    C$PNTB
        010506  062706  000004                                              ADD     #4,SP
     76 010512  032777  000001  171514    BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
     77 010520  001422                    BEQ     100$            ;NO NEED TO CHECK ERROR CODES.
     78 010522                            ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT.
        010522  104455                                                      TRAP    C$ERDF
        010524  000011                                                      .WORD   9
        010526  020026                                                      .WORD   EMG9
        010530  015112                                                      .WORD   ERRG2
     79 010532  005237  002360            INC     ERRFLG          ;SET ERROR FLAG.
     80 010536  000413                    BR      100$
     81 010540                      70$:
     82 010540  005737  002336            TST     TEMP            ;WERE WE WAITING FOR THE RDI FLAG?
     83 010544  001410                    BEQ     100$            ;YES - OK, EXIT
     84 010546                            PRINTB  #FMS2           ;RECEIVED AN RDI, WHEN WAITING FOR RDO
        010546  012746  010651                                              MOV     #FMS2,-(SP)
        010552  012746  000001                                              MOV     #1,-(SP)
        010556  010600                                                      MOV     SP,R0
        010560  104414                                                      TRAP    C$PNTB
        010562  062706  000004                                              ADD     #4,SP
     85 010566                      100$:
     86 010566  005737  002374            TST     NESTPC          ;WAS THIS NESTED IN ANOTHER SUBROUTINE?
     87 010572  001002                    BNE     105$            ;IF YES - LEAVE THE SUBROUTINE PC ALONE
```

```
     88 010574  005037  002372                    CLR     SUBRPC          ;CLEAR THE PC
     89 010600                              105$:
     90 010600  012601                            MOV     (SP)+,R1        ;RESTORE R1
     91 010602  012600                            MOV     (SP)+,R0        ;RESTORE R0
     92 010604  005737  002360                    TST     ERRFLG          ;WAS THERE AN ERROR (CARRY CLEARED ON TST)
     93 010610  001401                            BEQ     110$            ;IF NOT, RETURN WITH CARRY CLEAR
     94 010612  000261                            SEC                     ;SET CARRY.
     95 010614                              110$:
     96 010614  000207                            RETURN
     97
     98 010616     045     116     045  FMS1:    .ASCIZ  /%N%ARDO SET EXPECTED RDI%N/
        010621     101     122     104
        010624     117     040     123
        010627     105     124     040
        010632     105     130     120
        010635     105     103     124
        010640     105     104     040
        010643     122     104     111
        010646     045     116     000
     99 010651     045     116     045  FMS2:    .ASCIZ  /%N%ARDI SET EXPECTED RDO%N/
        010654     101     122     104
        010657     111     040     123
        010662     105     124     040
        010665     105     130     120
        010670     105     103     124
        010673     105     104     040
        010676     122     104     117
        010701     045     116     000
    100                                         .EVEN
    101
    102
```

```
                        ;*****************************************************************************
                        ;*****************************************************************************
                        ;
                        ;                       SUBROUTINE $CLRQI
                        ;
                        ;             FUNCTION -  TO CLEAR RQI AND WAIT FOR RDI TO BE CLEARED
                        ;
                        ;       CALLING FORMAT:         JSR     PC,     $CLRQI
                        ;                               (MACRO CALL -- WAIT RQI)
                        ;
                        ;       NESTING LEVEL    - MAY BE NESTED WITHIN ANOTHER SUBROUTINE
                        ;
                        ;       ENTRY CONDITIONS - WAIT2 = DELAY COUNTER (DETERMINED IN INIT. ROUTINE)
                        ;                          NESTPC= 1    -   ROUTINE NESTED WITHIN ANOTHER
                        ;                                           SUBROUTINE.
                        ;                                = 0    -   ROUTINE NOT NESTED.
                        ;
                        ;        EXIT CONDITIONS - 1. NON ERROR, DMR READY TO RECEIVE THE NEXT COMMAND
                        ;                          2. ERROR IF RDI DOES NOT CLEAR BEFORE THE
                        ;                             DELAY ROUTINE EXPIRES. AN ERROR MESSAGE WILL
                        ;                             OCCUR.  ALSO A CARRY BIT WILL BE SET TO FLAG
                        ;                             THE ERROR FOR THE USER.
                        ;
                        ;
                        ;    REGISTERS DESTROYED - RESTORED
                        ;
                        ;*****************************************************************************
                        ;*****************************************************************************
010704                  $CLRQI:
010704  005037  002360          CLR     ERRFLG          ;CLEAR ERROR FLAG
010710  042777  000040  171314  BIC     #RQI,@SEL0      ;REQUEST INPUT CLEAR
010716  005737  002374          TST     NESTPC          ;IS THIS NESTED IN ANOTHER SUBROUTINE?
010722  001005                  BNE     10$             ;YES - USE SUBRPC CALCULATED
010724  011637  002372          MOV     (SP),SUBRPC     ;SAVE THE PC AFTER THE CALL TO $WAIT.
010730  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE ACTUAL CALL.
010736                  10$:
010736  010046                  MOV     R0,-(SP)        ;SAVE R0
010740  010146                  MOV     R1,-(SP)        ;SAVE R1
010742  013701  002314          MOV     WAIT2,R1        ;GET THE DELAY COUNTER (DETERMINED BY
                                                        ;BAUD RATE IN INIT ROUTINE)
010746                  12$:
010746  005000                  CLR     R0              ;INNER LOOP COUNT
010750                  20$:
010750  032777  000200  171254  BIT     #RDI,@SEL0      ;IS THE RDI BIT CLEAR IN SEL0?
010756  001427                  BEQ     30$             ;YES - EXIT
010760                          BREAK                   ;CALL SUPERVISOR - ALLOW CONSOLE INTERRUPT.
010760  104422                                                  TRAP    C$BRK
010762  005300                  DEC     R0              ;LOOP UNTIL R0 RETURNS TO 0
010764  001371                  BNE     20$
010766                          DELAY   1               ;DELAY 100 MICROSECONDS
010766  012727  000001                                          MOV     #1,(PC)+
010772  000000                                                  .WORD   0
010774  013727  002116                                          MOV     L$DLY,(PC)+
011000  000000                                                  .WORD   0
011002  005367  177772                                          DEC     -6(PC)
011006  001375                                                  BNE     .-4
011010  005367  177756                                          DEC     -22(PC)
```

```
                                                                                    BNE     .-20
    50 011016  005301                    DEC     R1              ;REPEAT UNTIL MAXIMUM LOOP SATISFIED.
    51 011020  001352                    BNE     12$
    52 011022                            ERRDF   1,EMG1,ERRG2    ;TIME OUT ERROR
       011022  104455                                                             TRAP    C$ERDF
       011024  000001                                                             .WORD   1
       011026  017704                                                             .WORD   EMG1
       011030  015112                                                             .WORD   ERRG2
    53 011032  005237  002360            INC     ERRFLG          ;SET ERROR FLAG
    54 011036                       30$:
    55 011036  005737  002374            TST     NESTPC          ;WAS THIS A NESTED ROUTINE?
    56 011042  001002                    BNE     40$             ;IF YES - LEAVE THE SUBRPC ALONE
    57 011044  005037  002372            CLR     SUBRPC          ;CLEAR THE PC
    58 011050                       40$:
    59 011050  012601                    MOV     (SP)+,R1        ;RESTORE R1
    60 011052  012600                    MOV     (SP)+,R0        ;RESTORE R0
    61 011054  005737  002360            TST     ERRFLG          ;WAS THERE AN ERROR? (CARRY CLEARED ON TST)
    62 011060  001401                    BEQ     50$             ;IF NOT - RETURN WITH CARRY CLEAR
    63 011062  000261                    SEC                     ;SET CARRY.
    64 011064                       50$:
    65 011064  000207                    RETURN
    66
    67
```

```
                ;*****************************************************************************
                ;*****************************************************************************
                ;
                ;                       SUBROUTINE $MSCLR
                ;
                ;             FUNCTION -  TO PERFORM A MASTER CLEAR FOR THE DMR11
                ;
                ;       CALLING FORMAT:         JSR     PC,     $MSCLR
                ;                               (MACRO CALL -- CLEAR)
                ;
                ;       NESTING LEVEL    - MAY ONLY BE CALLED FROM IN-LINE CODE (TEST,
                ;                          SUBTEST OR TEST SEGMENT)
                ;
                ;       ENTRY CONDITIONS - WAIT2 = DELAY COUNTER (DETERMINED BY INIT. ROUTINE)
                ;                          CLRNO = EVEN OR ODD COUNT.  THE ACTUAL # IS NOT
                ;                                  SIGNIFICANT, HOWEVER IF BIT 0 IS SET
                ;                                  THEN THE MICROTEST IS SET ALONG WITH
                ;                                  THE MASTER CLEAR. THIS ROUTINE WILL INCR.
                ;                                  THE VALUE.  THIS WILL RESULT IN THE MICRO
                ;                                  TESTS BEING RUN ON EVERY OTHER MASTER CLEAR
                ;
                ;        EXIT CONDITIONS - 1. NO ERROR - DMR11 MICROPROCESSOR INITIALIZED
                ;                          2. IF RUN BIT NOT SET BEFORE DELAY TIMEOUT, ERROR
                ;                             WILL RESULT.  ADDITONALLY THE ERROR MESSAGE WILL
                ;                             RELAY THE RESULTS OF THE MICROTESTS IF THE RUN
                ;                             BIT IS NOT SET.
                ;
                ;        NOTE:             THERE IS A PATCH AREA TO ALLOW THESE DIAGNOSTICS
                ;                          TO RUN ON A M8206 (INSTEAD OF M8207).  THIS
                ;                          SHOULD BE FOR DEVELOPMENT USE ONLY.
                ;
                ;    REGISTERS DESTROYED - RESTORED
                ;
                ;*****************************************************************************
                ;*****************************************************************************
011066          $MSCLR:
011066  011637  002372          MOV     (SP),SUBRPC     ;SAVE PC AFTER THE CALL TO $WAIT.
011072  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE ACTUAL CALL
011100  010046                  MOV     R0,-(SP)        ;SAVE R0
011102  010146                  MOV     R1,-(SP)        ;SAVE R1
                ;
011104  105077  171134          CLRB    @BSEL3          ;CLEAR BSEL3
                ;
011110  000240                  NOP                     ;*************************************
011112  000240                  NOP                     ;** PATCH AREA FOR 8206 IF NEEDED **
011114  000240                  NOP                     ;CLR @#SEL6  -
011116  000240                  NOP                     ;*************************************
                ;
011120  032737  000001  002376  BIT     #BIT0,CLRNO     ;IS THIS AN ODD MASTER CLEAR.
011126  001004                  BNE     7$              ;IF YES - BR
011130  012777  040000  171074  MOV     #MCLR,@SEL0     ;ISSUE A MASTER CLEAR.
011136  000403                  BR      8$
011140          7$:
011140  012777  060000  171064  MOV     #MCLR!MDIAG,@SEL0 ;ISSUE THE MASTER CLEAR AND TOGGLE
                                                        ;MICRO TEST SWITCH.
011146          8$:
011146  000240                  NOP                     ;*************************************
```

GLOBAL SUBROUTINES

```
     58 011150  000240                          NOP                     ;** PATCH AREA FOR 8206 IF NEEDED **
     59 011152  000240                          NOP                     ;MOV #RUN,@#SEL0  -
     60 011154  000240                          NOP                     ;**********************************
     61
     62 011156  005237  002376                  INC     CLKNO           ;INCR WORD (CHANGE ODD TO EVEN ETC.)
     63 011162  013701  002314                  MOV     WAIT2,R1        ;GET THE # OF 100 MICRO SECOND DELAYS
     64                                                                 ;TO WAIT BEFORE EXITING THE ROUTINE.
     65 011166                          10$:
     66 011166  005000                          CLR     R0              ;INNER LOOP COUNT
     67 011170                          20$:
     68 011170  032777  100000  171034          BIT     #RUN,@SEL0      ;IS THE RUN BIT SET IN SEL0?
     69 011176  001025                          BNE     40$             ;YES - EXIT
     70 011200                                  BREAK                   ;CALL SUPERVISOR - ALLOW CONSOLE INTERRUPT.
        011200  104422                                                                  TRAP    C$BRK
     71 011202  005300                          DEC     R0              ;LOOP UNTIL R0 RETURNS TO 0
     72 011204  001371                          BNE     20$
     73 011206                                  DELAY   1               ;DELAY 100 MICROSECONDS
        011206  012727  000001                                                          MOV     #1,(PC)+
        011212  000000                                                                  .WORD   0
        011214  013727  002116                                                          MOV     L$DLY,(PC)+
        011220  000000                                                                  .WORD   0
        011222  005367  177772                                                          DEC     -6(PC)
        011226  001375                                                                  BNE     .-4
        011230  005367  177756                                                          DEC     -22(PC)
        011234  001367                                                                  BNE     .-20
     74 011236  005301                          DEC     R1              ;REPEAT UNTIL MAX LOOP SATISFIED.
     75 011240  001352                          BNE     10$
     76 011242                                  ERRDF   1,EMG1,ERRG3    ;REPORT RUN NOT SET
        011242  104455                                                                  TRAP    C$ERDF
        011244  000001                                                                  .WORD   1
        011246  017704                                                                  .WORD   EMG1
        011250  015226                                                                  .WORD   ERRG3
     77 011252                          40$:
     78 011252  012601                          MOV     (SP)+,R1        ;RESTORE R1
     79 011254  012600                          MOV     (SP)+,R0        ;RESTORE R0
     80 011256  005037  002372                  CLR     SUBRPC          ;TIDY UP SUBRPC
     81 011262  000207                          RETURN
     82
     83
```

```
                ;*****************************************************************
                ;*****************************************************************
                ;
                ;                       SUBROUTINE $BASEI
                ;
                ;               FUNCTION -  TO PERFORM A BASE IN COMMAND
                ;
                ;       CALLING FORMAT:         JSR     PC,     $BASEI
                ;                               .WORD A (SEL0 MAINTENANCE BITS)
                ;                               .WORD B (SEL4 - ADDRESS)
                ;                               .WORD C (SEL6 - MODE AND/OR RESUME)
                ;                               (MACRO CALL -- BASEIN  OR  BASEIN A,B,C)
                ;
                ;       NESTING LEVEL    - MAY ONLY BE CALLED FROM IN-LINE CODE (TEST,
                ;                          SUBTEST OR TEST SEGMENT)
                ;
                ;       ENTRY CONDITIONS - A = MAINTENANCE BITS (I.E. LINE UNIT LOOP BACK)
                ;                          B = BASE TABLE ADDRESS (SEL4)
                ;                          C = MODE + RESUME (SEL6)
                ;                          INFACE = 0  - NO INTERFACE WRITE REQUIRED
                ;                                   1  - WRITE INTERFACE (Ax3-15)
                ;
                ;        EXIT CONDITIONS - 1. IF NO ERROR - DMR11 BASE TABLE ASSIGNED
                ;                          2. IF IN DMR MODE, AND INTERFACE WRITE REQUESTED
                ;                             WRITE REQUESTED Ax3-15.
                ;                          3. TIMEOUT ERRORS ARE DETECTED IN WAIT SUBROUTINES.
                ;                          DMRFLG = -1  DMR MODE REQUESTED (USED IN CONTROL IN
                ;                                       ROUTINE)
                ;                                   0  DMC MODE OR RESUME REQUESTED.
                ;
                ;
                ;    REGISTERS DESTROYED - RESTORED
                ;
                ;*****************************************************************
                ;*****************************************************************
011264          $BASEI:
011264  011637  002372          MOV     (SP),SUBRPC     ;SAVE PC AFTER THE CALL TO $WAIT.
011270  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE ACTUAL CALL
                ;
011276  112777  000043  170726  MOVB    #RQI!BASEI,@BSEL0 ;ISSUE THE BASE IN COMMAND.
011304  012737  000001  002374  MOV     #1,NESTPC       ;FLAG THAT THE NEXT SUBROUTINE IS NESTED.
011312          WAIT    RDI             ;WAIT FOR RDI
                                        ;**** MACRO EXPANSION ****
011312  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
011316  000000                  .WORD   0               ;FLAG THAT WE'RE WAITING FOR RDI
                                        ;****                   ****
011320          BNERROR 10$             ;IF NO ERROR, RDI SET - PROCEED
011320  103003                                                  BCC     10$
011322  062716  000006          ADD     #6,(SP)         ;CORRECT STACK FOR ERROR EXIT
011326  000467                  BR      30$             ;EXIT
011330          10$:
011330  057677  000000  170674  BIS     @(SP),@SEL0     ;SET ANY MAINTENANCE BITS
011336  062716  000002          ADD     #2,(SP)         ;INC. POINTER.
011342  017677  000000  170666  MOV     @(SP),@SEL4     ;SET UP BASE ADDRESS
011350  062716  000002          ADD     #2,(SP)         ;INC. POINTER AGAIN
011354  017677  000000  170656  MOV     @(SP),@SEL6     ;SET UP RESUME BIT AND THE HIGH 2 BITS
                                                        ;OF THE BASE TABLE ADDRESS
```

```
     53 011362  062716  000002                ADD     #2,(SP)          ;INC. POINTER AGAIN (SHOULD BE AT RETURN PC)
     54 011366                                WAIT    RQI              ;CLEAR RQI AND WAIT FOR RDI TO CLEAR
                                                                       ;**** MACRO EXPANSION ****
        011366  004737  010704                JSR     PC, $CLRQI       ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                                                       ;****                    ****
     55 011372                                BERROR  30$              ;IF ERROR, EXIT
        011372  103445                                                                  BCS     30$
     56 011374  122777  000122  170636        CMPB    #122,@BSEL6      ;WAS THIS A DMR BASE IN?
     57 011402  001004                        BNE     15$              ;IF NOT, CLEAR DMR FLAG (DMC MODE)
     58 011404  032777  010000  170626        BIT     #RES,@SEL6       ;IS THIS A RESUME?
     59 011412  001403                        BEQ     16$              ;IF NOT, PROCEED
     60 011414                          15$:
     61 011414  005037  002260                CLR     DMRFLG           ;CLEAR DMR FLAG (NO DMR RUN ACKNOWLEDGE).
     62 011420  000432                        BR      30$              ;SKIP - TO END
     63 011422                          16$:
     64 011422  012737  177777  002260        MOV     #-1,DMRFLG       ;FLAG THAT DMR MODE WAS REQUESTED.
     65 011430  005737  002262                TST     INFACE           ;IS AN INTERFACE WRITE REQUIRED?
     66 011434  001424                        BEQ     30$              ;IF NOT - SKIP TO END
     67 011436  022737  000001  002364        CMP     #CNTRL.ERROR     ;ARE WE EXPECTING AN ERROR (IN TEST THAT
     68                                                                 ;FORCES AN ERROR)
     69 011444  001004                        BNE     17$              ;IF NOT PROCEED
     70 011446  032777  000200  170556        BIT     #RDO,@SEL0       ;IF EXPECTING AN ERROR - IS RDO SET
     71 011454  001014                        BNE     30$              ;IF YES - DON'T BOTHER CHANGING THE INTERFACE.
     72 011456                          17$:
     73 011456  112777  000055  170546        MOVB    #RQI!INTER,@BSEL0 ;ISSUE WRITE INTERFACE COMMAND.
     74 011464                                WAIT    RDI              ;WAIT FOR RDI
                                                                       ;**** MACRO EXPANSION ****
        011464  004737  010274                JSR     PC, $WAIT        ;CALL WAIT ROUTINE
        011470  000000                                .WORD   0        ;FLAG THAT WE'RE WAITING FOR RDI
                                                                       ;****                    ****
     75 011472                                BERROR  30$              ;IF ERROR, BR TO END.
        011472  103405                                                                  BCS     30$
     76 011474  113777  002304  170546        MOVB    AX3,@BSEL7       ;WRITE AX3-15. INTERFACE SELECTED
     77                                                                 ;BY AX3 DETERMINED IN INIT. CODE.
     78 011502                                WAIT    RQI              ;CLEAR RQI AND WAIT FOR RDI TO CLEAR.
                                                                       ;**** MACRO EXPANSION ****
        011502  004737  010704                JSR     PC, $CLRQI       ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                                                       ;****                    ****
     79 011506                          30$:
     80 011506  005037  002374                CLR     NESTPC           ;CLEAR THE NEST FLAG
     81 011512  005037  002372                CLR     SUBPPC           ;TIDY UP SUBRPC
     82 011516  000207                        RETURN
     83
     84
```

```
                ;*****************************************************************
                ;*****************************************************************
                ;
                ;                       SUBROUTINE $CNTIN
                ;
                ;               FUNCTION -  TO PERFORM A CONTROL IN COMMAND
                ;
                ;       CALLING FORMAT:         JSR     PC,     $CNTIN
                ;                               .WORD  A (SEL6 - MAINTENANCE MODE & HDX)
                ;                               (MACRO CALL -- CNTRIN  OR  CNTRIN A)
                ;
                ;       NESTING LEVEL     - MAY ONLY BE CALLED FROM IN-LINE CODE (TEST,
                ;                           SUBTEST OR TEST SEGMENT)
                ;
                ;       ENTRY CONDITIONS - DMRFLG = -1  EXPECT  CONTROL OUT IF IN DMR MODE
                ;                                  0  NO CONTROL OUT, IN DMC MODE OR RESUME.
                ;
                ;
                ;        EXIT CONDITIONS - 1. IF NO ERROR - DMR11 CONTROL IN PERFORMED
                ;                          2. TIMEOUTS REPORTED IN WAIT SUBROUTINES
                ;                          3. IF THIS IS A DMR MODE START UP CONTROL IN,
                ;                             THIS ROUTINE WILL WAIT FOR A CONTROL
                ;                             OUT - DMR RUN.  IF THIS CONTROL OUT IS
                ;                             NOT RECEIVED,  THIS WILL RESULT IN AN ERROR
                ;                             MESSAGE AND A REMINDER TO CHECK THE BAUD RATE,
                ;                             INTERFACE AND TURNAROUND (PROBABLE REASON).
                ;
                ;
                ;    REGISTERS DESTROYED
                ;
                ;*****************************************************************
                ;*****************************************************************
011520          $CNTIN:
011520  011637  002372          MOV     (SP),SUBRPC     ;SAVE PC FROM WHERE THIS SUBR. WAS CALLED.
011524  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO PC OF ACTUAL CALL
011532  112777  000041  170472  MOVB    #RQI+CNTRL,@BSEL0 ;SET UP CONTROL IN COMMAND
011540  012737  000001  002374  MOV     #1,NESTPC       ;FLAG THAT THE NEXT SUBROUTINE IS NESTED.
011546                          WAIT    RDI             ;WAIT FOR SETTING OF RDI
                                                        ;**** MACRO EXPANSION ****
011546  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
011552  000000                  .WORD   0               ;FLAG THAT WE'RE WAITING FOR RDI
                                                        ;****                    ****
011554                          BNERROR 1$              ;IF NO ERROR - PROCEED
011554  103003                                                                    BCC     1$
011556  062716  000002          ADD     #2,(SP)         ;CORRECT RETURN ADDRESS
011562  000463                  BR      20$             ;ERROR - EXIT
011564                  1$:
011564  017677  000000  170446  MOV     @(SP),@SEL6     ;SET MODE DESIRED
011572  062716  000002          ADD     #2,(SP)         ;INC. RETURN PC LEFT ON STACK.
011576  032777  000400  170434  BIT     #MAINT,@SEL6    ;WAS MAINTENANCE MODE REQUESTED?
011604  001402                  BEQ     5$              ;IF NOT, LEAVE DMRFLG AS IS.
011606  005037  002260          CLR     DMRFLG          ;CLEAR FLAG - NO RUN MODE CONTROL OUT.
011612                  5$:
011612                          WAIT    RQI             ;CLEAR RQI AND WAIT FOR RDI TO CLEAR
                                                        ;**** MACRO EXPANSION ****
011612  004737  010704          JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
```

```
                                                        ;****                   ****
 51 011616  005737  002260                      TST     DMRFLG          ;WAS DMR MODE REQUESTED ON BASE IN?
 52 011622  001443                              BEQ     20$             ;BR IF NOT (DMC MODE)
 53 011624  005037  002260                      CLR     DMRFLG          ;CLEAR DMR RUN MODE FLAG
 54 011630                                      WAIT    RDO             ;EXPECT RDO TO BE SET
                                                                        ;**** MACRO EXPANSION ****
    011630  004737  010274                      JSR     PC, $WAIT       ;CALL WAIT ROUTINE
    011634  000001                              .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                   ****
 55 011636                                      BNERROR 7$              ;IF NO ERROR - PROCEED
    011636  103011                                                                      BCC     7$
 56 011640                                      PRINTB  #FMS3           ;PRINT RUN ACKNOWLEDGE NOT RECEIVED.
    011640  012746  011744                                                              MOV     #FMS3,-(SP)
    011644  012746  000001                                                              MOV     #1,-(SP)
    011650  010600                                                                      MOV     SP,R0
    011652  104414                                                                      TRAP    C$PNTB
    011654  062706  000004                                                              ADD     #4,SP
 57 011660  000421                              BR      15$
 58 011662                                7$:
 59 011662  032777  000001  170344             BIT     #CNTRL,@SEL2    ;DID WE RECEIVE A CONTROL OUT?
 60 011670  001005                              BNE     10$             ;IF YES - PROCEED.
 61 011672                                      ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT NOT RECEIVED.
    011672  104455                                                                      TRAP    C$ERDF
    011674  000010                                                                     .WORD   8
    011676  017762                                                                     .WORD   EMG8
    011700  015112                                                                     .WORD   ERRG2
 62 011702  000410                              BR      15$
 63 011704                                10$:
 64 011704  032777  000040  170326             BIT     #DMRRUN,@SEL6   ;WAS THE DMR RUN MODE BIT SET?
 65 011712  001004                              BNE     15$             ;BR IF OK.
 66 011714                                      ERRDF   9,EMG9,ERRG2    ;WRONG CONTROL OUT RECEIVED.
    011714  104455                                                                      TRAP    C$ERDF
    011716  000011                                                                     .WORD   9
    011720  020026                                                                     .WORD   EMG9
    011722  015112                                                                     .WORD   ERRG2
 67
 68 011724                                15$:
 69 011724  042777  000207  170302             BIC     #RDO!CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS
 70 011732                                20$:
 71 011732  005037  002374                      CLR     NESTPC          ;CLEAR THE NEST FLAG
 72 011736  005037  002372                      CLR     SUBRPC          ;CLEAR PC
 73 011742  000207                              RETURN
 74
 75 011744     045     101     104        FMS3:   .ASCII  /%ADMR RUN ACKNOWLEDGE NOT RCVD.%N/
    011747     115     122     040
    011752     122     125     116
    011755     040     101     103
    011760     113     116     117
    011763     127     114     105
    011766     104     107     105
    011771     040     116     117
    011774     124     040     122
    011777     103     126     104
    012002     056     045     116
 76 012005     045     101     050                .ASCIZ  /%A(CHECK INTERFACE, BAUD AND TURNAROUND)%N/
    012010     103     110     105
    012013     103     113     040
```

GLOBAL SUBROUTINES

```
        012016      111      116      124
        012021      105      122      106
        012024      101      103      105
        012027      054      040      102
        012032      101      125      104
        012035      040      101      116
        012040      104      040      124
        012043      125      122      116
        012046      101      122      117
        012051      125      116      104
        012054      051      045      116
        012057      000
    77                                          .EVEN
    78
    79
```

```
                ;*****************************************************************
                ;*****************************************************************
                ;
                ;                       SUBROUTINE $DMRIN
                ;
                ;               FUNCTION -  TO PERFORM A DMR MODE INPUT COMMAND
                ;
                ;       CALLING FORMAT:         JSR     PC,     $DMRIN
                ;                               .WORD   COMMAND
                ;                               .WORD   B
                ;                               .WORD   C
                ;                               (MACRO CALL -- DMRIN A,B,C)
                ;
                ;       NESTING LEVEL     - MAY BE CALLED FROM IN-LINE CODE (TEST,
                ;                           SUBTEST OR TEST SEGMENT) OR FROM THE $LOOP
                ;                           SUBROUTINE
                ;
                ;       ENTRY CONDITIONS - MUST BE IN DMR MODE
                ;                          FOR ALL COMMANDS EXCEPT WRITE MODEM
                ;                               B = SEL4
                ;                               C = SEL6
                ;                          FOR MODEM WRITE
                ;                               B = BITS TO CLEAR IN SEL6
                ;                               C = BITS TO SET IN SEL6
                ;                          NESTPC = 1 - SUBROUTINE NESTED WITHIN ANOTHER SUB.
                ;                                 = 0 - SUBROUTINE NOT NESTED.
                ;
                ;               EXIT CONDITIONS - IF NO ERROR - DMR11 MODE INPUT COMMAND PERFORMED.
                ;
                ;
                ;       REGISTERS DESTROYED
                ;
                ;*****************************************************************
                ;*****************************************************************
012060          $DMRIN:
012060  005737  002374          TST     NESTPC          ;IS THIS SUBROUTINE NESTED?
012064  001005                  BNE     1$              ;IF YES - DON'T CHANGE  SUBRPC.
012066  011637  002372          MOV     (SP),SUBRPC     ;SAVE PC FROM WHERE THIS SUBR. WAS CALLED.
012072  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO PC OF ACTUAL CALL
012100          1$:
012100  117637  000000  002340  MOVB    @(SP),SAVE      ;SAVE DMR INPUT COMMAND
012106  117677  000000  170116  MOVB    @(SP),@BSEL0    ;SET UP DMR INPUT COMMAND.
012114  062716  000002          ADD     #2,(SP)         ;INC RETURN PC LEFT ON STACK.
012120  052777  000040  170104  BIS     #RQI,@SEL0      ;REQUEST INPUT.
012126  013746  002374          MOV     NESTPC,-(SP)    ;SAVE THE CURRENT NEST FLAG.
012132  012737  000001  002374  MOV     #1,NESTPC       ;USE THE FLAG TO SHOW THE WAIT
                                                        ;ROUTINE IS NESTED.
012140                          WAIT    RDI             ;WAIT FOR SETTING OF RDI
                                                        ;**** MACRO EXPANSION ****
012140  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
012144  000000                  .WORD   0               ;FLAG THAT WE'RE WAITING FOR RDI
                                                        ;****                   ****
012146  012637  002374          MOV     (SP)+,NESTPC    ;RESTORE THE ORIGINAL NEST FLAG.
012152                          BNERROR 5$              ;IF NO ERROR, OK - PROCEED.
012152  103003                                                  BCC     5$
012154  062716  000004          ADD     #4,(SP)         ;UPDATE RETURN ADDRESS.
012160  000433                  BR      10$             ;ERROR EXIT.
```

GLOBAL SUBROUTINES

```
     53 012162                              5$:
     54 012162  122737  000005  002340              CMPB    #WMODEM,SAVE    ;IS THIS A MODEM WRITE?
     55 012170  001413                              BEQ     6$              ;IF YES - SET/CLEAR BITS.
     56 012172  017677  000000  170036              MOV     @(SP),@SEL4     ;PASS VALUE FOR SEL4 (VALUE, IF ANY,
     57                                                                     ;DEPENDS ON THE DMR COMMAND)
     58 012200  062716  000002                      ADD     #2,(SP)         ;INC. RETURN PC LEFT ON STACK.
     59 012204  017677  000000  170026              MOV     @(SP),@SEL6     ;PASS VALUE FOR SEL6 (VALUE, IF ANY,
     60                                                                     ;DEPENDS ON THE DMR COMMAND)
     61 012212  062716  000002                      ADD     #2,(SP)         ;INC. RETURN PC LEFT ON STACK.
     62 012216  000412                              BR      7$
     63 012220                              6$:
     64 012220  047677  000000  170012              BIC     @(SP),@SEL6     ;CLEAR MODEM BITS
     65 012226  062716  000002                      ADD     #2,(SP)         ;INC. RETURN PC LEFT ON STACK
     66 012232  057677  000000  170000              BIS     @(SP),@SEL6     ;SET MODEM BITS
     67 012240  062716  000002                      ADD     #2,(SP)         ;INC. RETURN PC LEFT ON STACK.
     68 012244                              7$:
     69 012244                                      WAIT    RQI             ;CLEAR RQI AND WAIT FOR RDI TO CLEAR
                                                                            ;**** MACRO EXPANSION ****
        012244  004737  010704                      JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                                                            ;****                    ****
     70 012250                              10$:
     71 012250  005737  002374                      TST     NESTPC          ;WAS THIS ROUTINE NESTED?
     72 012254  001002                              BNE     15$             ;BR IF YES
     73 012256  005037  002372                      CLR     SUBRPC          ;CLEAR PC
     74 012262                              15$:
     75 012262  005037  002340                      CLR     SAVE            ;RESTORE TEMP VALUE
     76 012266  000207                              RETURN
     77
     78
     79
     80
```

```
                        ;*****************************************************************************
                        ;*****************************************************************************
                        ;
                        ;                       SUBROUTINE $BACC
                        ;
                        ;               FUNCTION -  TO PERFORM A BUFFER ADDRESS/CHARACTER
                        ;                           COUNT IN COMMAND
                        ;
                        ;       CALLING FORMAT:         JSR     PC,     $BACC
                        ;                               .WORD   SEL0    ;BA/CC IN COMMAND
                        ;                               .WORD   SEL4    ;BUFFER ADDRESS
                        ;                               .WORD   SEL6    ;BA BITS 16 & 17 AND
                        ;                                               ;CHARACTER COUNT
                        ;                           (MACRO CALL -- BACCIT  OR  BACCIT A,B)
                        ;                        OR (MACRO CALL -- BACCIR  OR  BACCIR A,B)
                        ;
                        ;       NESTING LEVEL    - MAY ONLY BE CALLED FROM IN-LINE CODE (TEST,
                        ;                          SUBTEST OR TEST SEGMENT)
                        ;
                        ;       ENTRY CONDITIONS -
                        ;
                        ;        EXIT CONDITIONS - IF NO ERROR - DMR11 BA/CC COMMAND IN PERFORMED
                        ;
                        ;
                        ;   REGISTERS DESTROYED - NOT AFFECTED
                        ;
                        ;*****************************************************************************
                        ;*****************************************************************************
012270                  $BACC:
012270  011637  002372          MOV     (SP),SUBRPC     ;SAVE PC FROM WHERE THIS SUBR. WAS CALLED.
012274  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO PC OF ACTUAL CALL
012302  117677  000000  167722  MOVB    @(SP),@BSEL0    ;SET UP BA/CC COMMAND IN (TRANSMIT OR RECEIVE)
012310  062716  000002          ADD     #2,(SP)         ;INC POINTER ON STACK
012314  012737  000001  002374  MOV     #1,NESTPC       ;FLAG THAT THE NEXT SUBROUTINE IS NESTED.
012322                          WAIT    RDI             ;WAIT FOR SETTING OF RDI
                                                        ;**** MACRO EXPANSION ****
012322  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
012326  000000                  .WORD   0               ;FLAG THAT WE'RE WAITING FOR RDI
                                                        ;****                   ****
012330                          BNERROR 10$             ;IF NO ERROR - PROCEED
012330  103003                                                          BCC     10$
012332  062716  000004          ADD     #4,(SP)         ;CORRECT STACK FOR ERROR EXIT.
012336  000414                  BR      20$             ;EXIT
012340                  10$:
012340  017677  000000  167670  MOV     @(SP),@SEL4     ;SET BUFFER ADDRESS
012346  062716  000002          ADD     #2,(SP)         ;INC POINTER ON STACK
012352  017677  000000  167660  MOV     @(SP),@SEL6     ;SET UP BUFFER COUNT AND BUFFER ADDRESS
                                                        ;BITS 16 & 17
012360  062716  000002          ADD     #2,(SP)         ;INC POINTER ON STACK
012364                          WAIT    RQI             ;CLEAR RQI AND WAIT FOR RDI TO CLEAR
                                                        ;**** MACRO EXPANSION ****
012364  004737  010704          JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                                        ;****                   ****
012370                  20$:
012370  005037  002374          CLR     NESTPC          ;CLEAR THE NEST FLAG
012374  005037  002372          CLR     SUBRPC          ;CLEAR PC
012400  000207                  RETURN
```

GLOBAL SUBROUTINES

```
                        ;*****************************************************************************
                        ;*****************************************************************************
                        ;
                        ;                       SUBROUTINE $ERROR
                        ;
                        ;             FUNCTION -  TO CHECK THE FIRST 8. BASE TABLE ERROR COUNTS
                        ;                         FOR NON-ZERO VALUES.
                        ;
                        ;       CALLING FORMAT:         JSR     PC,     $ERROR
                        ;
                        ;       NESTING LEVEL    - CAN BE NESTED WITHIN ANOTHER ROUTINE
                        ;
                        ;       ENTRY CONDITIONS - SHOULD BE DONE AFTER PROPER SHUTDOWN
                        ;                          NESTPC = 1 - SUBROUTINE NESTED WITHIN ANOTHER SUB.
                        ;                                 = 0 - SUBROUTINE NOT NESTED.
                        ;
                        ;        EXIT CONDITIONS - IF ANY NON-ZERO VALUE FOUND IN THE BASE TABLE A
                        ;                          SOFT ERROR IS DECLARED.
                        ;
                        ;
                        ;    REGISTERS DESTROYED - RESTORED
                        ;
                        ;*****************************************************************************
                        ;*****************************************************************************
012402                  $ERROR:
012402  005737  002374          TST     NESTPC          ;IS THIS ROUTINE NESTED?
012406  001005                  BNE     10$             ;BR IF YES (PC ALREADY SAVED)
012410  011637  002372          MOV     (SP),SUBRPC     ;SAVE PC AFTER THE CALL TO $WAIT.
012414  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE ACTUAL CALL
                                                        ;THE INSTRUCTION AFTER THE CALL.
012422                  10$:
012422  010046                  MOV     R0,-(SP)        ;SAVE R0
012424  010146                  MOV     R1,-(SP)        ;SAVE R1
012426  012700  002641          MOV     #BASE+3,R0      ;POINTER TO ACTUAL BASE TABLE COUNTS.
012432  012701  000006          MOV     #6.,R1          ;CHECK THE 6 NAK BYTES IN THE TABLE
012436                  20$:
012436  105720                  TSTB    (R0)+           ;IS THE NAK COUNT NON-ZERO?
012440  001016                  BNE     30$             ;IF YES - REPORT SOFT ERROR
012442  005301                  DEC     R1              ;LOOP UNTIL DONE.
012444  001374                  BNE     20$
012446  122010                  CMPB    (R0)+,(R0)      ;ARE THE REPS THE SAME?
012450  001012                  BNE     30$             ;IF NOT - REPORT ERROR.
012452  022737  000022  002114  CMP     #18.,L$TEST     ;IS THIS TEST 18 (LARGE BUFFER TEST)
012460  001403                  BEQ     25$             ;IF YES - ALLOW 1 REP
012462  105710                  TSTB    (R0)            ;IF NOT TEST 18 - REPORT IF NON ZERO.
012464  001004                  BNE     30$
012466  000407                  BR      40$             ;IF ZERO - OK.
012470                  25$:
012470  122710  000001          CMPB    #1,(R0)         ;IS THE REP 0 OR 1?
012474  002004                  BGE     40$             ;IF YES - OK (WE ALLOW 1 REP BECAUSE
                                                        ;IN TEST 18 AT LOW BAUD RATES 1 REP IS
                                                        ;EXPECTED.)
012476                  30$:
012476                  ERRSOFT 5,EMS3,ERRG4    ;REPORT SOFT ERROR
012476  104457                                                  TRAP    C$ERSOFT
012500  000005                                                  .WORD   5
012502  012526                                                  .WORD   EMS3
```

```
                012504  015456                                                                  .WORD   ERRG4
     55 012506                          40$:
     56 012506  005737  002374                  TST     NESTPC          ;IS THE ROUTINE NESTED?
     57 012512  001002                          BNE     45$             ;BR IF YES
     58 012514  005037  002372                  CLR     SUBRPC          ;CLEAR SAVED PC
     59 012520                          45$:
     60 012520  012601                          MOV     (SP)+,R1        ;RESTORE R1
     61 012522  012600                          MOV     (SP)+,R0        ;RESTORE R0
     62 012524  000207                          RETURN
     63
     64 012526     102     101     123  EMS3:  .ASCIZ  /BASE TABLE ERRORS/
        012531     105     040     124
        012534     101     102     114
        012537     105     040     105
        012542     122     122     117
        012545     122     123     000
     65                                         .EVEN
     66
```

```
                        ;*****************************************************************************
                        ;*****************************************************************************
                        ;
                        ;                       SUBROUTINE $HALT
                        ;
                        ;               FUNCTION - TO SHUTDOWN THE DMR11
                        ;
                        ;       ENTRY CONDITIONS - NONE
                        ;
                        ;       EXIT CONDITIONS  - DMR SHUTDOWN
                        ;
                        ;       REGISTERS        - NO EFFECT
                        ;
                        ;
                        ;*****************************************************************************
                        ;*****************************************************************************
012550                  $HALT:
012550  011637  002372          MOV     (SP),SUBRPC     ;SAVE THE PC WHEN THE SUBROUTINE WAS CALLED.
012554  162737  000004  002372  SUB     #4,SUBRPC       ;BACK UP TO THE ADDRESS OF THE ACTUAL CALL.
012562  112777  000042  167442  MOVB    #RQI!HLT,@SEL0  ;ISSUE A HALT
012570  105077  167440          CLRB    @SEL2           ;CLEAR ANY OUTPUT PENDING
012574  012737  000001  002374  MOV     #1,NESTPC       ;FLAG THAT THE NEXT SUBROUTINE IS NESTED.
012602                          WAIT    RDI             ;WAIT FOR RDI
                                                        ;**** MACRO EXPANSION ****
012602  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
012606  000000                  .WORD   0               ;FLAG THAT WE'RE WAITING FOR RDI
                                                        ;****                   ****
012610                          BERROR  20$             ;IF ERROR, EXIT
012610  103430                                                                    BCS     20$
012612                          WAIT    RQI             ;CLEAR RQI AND WAIT FOR RDI TO CLEAR
                                                        ;**** MACRO EXPANSION ****
012612  004737  010704          JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                                        ;****                   ****
012616                          BERROR  20$             ;IF ERROR, EXIT
012616  103425                                                                    BCS     20$
012620                          WAIT    RDO             ;WAIT FOR RDO
                                                        ;**** MACRO EXPANSION ****
012620  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
012624  000001                  .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                        ;****                   ****
012626                          BERROR  20$             ;IF ERROR, EXIT
012626  103421                                                                    BCS     20$
012630  032777  000001  167376  BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
012636  001005                  BNE     10$             ;IF YES - PROCEED
012640                          ERRDF   4,EMS4,ERRG2    ;ERROR
012640  104455                                                                    TRAP    C$ERDF
012642  000004                                                                    .WORD   4
012644  012712                                                                    .WORD   EMS4
012646  015112                                                                    .WORD   ERRG2
012650  000410                  BR      20$
012652                  10$:
012652  032777  001000  167360  BIT     #HALTC,@SEL6    ;IS THE DMR HALTED?
012660  001004                  BNE     20$             ;IF YES - EXIT
012662                          ERRDF   4,EMS4,ERRG2    ;ERROR - NOT EXPECTED CONTROL OUT.
012662  104455                                                                    TRAP    C$ERDF
012664  000004                                                                    .WORD   4
012666  012712                                                                    .WORD   EMS4
```

```
                012670  015112                                                                  .WORD   ERRG2
     37         012672                          20$:
     38         012672  042777  000207  167334          BIC     #RDO!CMD.@SEL2  ;CLEAR RDO AND COMMAND BITS.
     39         012700  005037  002374                  CLR     NESTPC          ;CLEAR THE NEST FLAG
     40         012704  005037  002372                  CLR     SUBRPC          ;CLEAR THE PC.
     41         012710  000207                          RETURN
     42
     43         012712     123     110     125  EMS4:  .ASCIZ  /SHUTDOWN ERROR/
                012715     124     104     117
                012720     127     116     040
                012723     105     122     122
                012726     117     122     000
     44                                          .EVEN
```

GLOBAL SUBROUTINES

```
                        ;*****************************************************************************
                        ;*****************************************************************************
                        ;
                        ;                       SUBROUTINE $ROMO
                        ;
                        ;               FUNCTION - TO READ THE CONTENTS OF THE ROM
                        ;
                        ;       ENTRY CONDITIONS - ROMADR =  ROM ADDRESS
                        ;
                        ;       EXIT CONDITIONS  - BSEL6  =  CONTENTS OF ROM ADDRESS
                        ;
                        ;       REGISTERS        - NO EFFECT
                        ;
                        ;
                        ;*****************************************************************************
                        ;*****************************************************************************
012732                  $ROMO:
012732  005077  167274         CLR     @SEL0           ;INIT
012736  113777  002411  167270 MOVB    ROMADR+1,@SEL2  ;SET HIGH BYTE OF ROM ADDRESS
012744  052777  001000  167260 BIS     #ROMI,@SEL0     ;ENABLE SEL6 TO BE USED AS MAINTENANCE REG.
012752  012777  121053  167260 MOV     #121053,@SEL6   ;SET UP MICROINSTRUCTION TO
                                                       ;MOVE IBUS* 2 TO OBUS* 13
                                                       ;(OBUS* 13 IS A SHADOW REGISTER FOR
                                                       ;BITS 8-11 OF THE PC)
012760  052777  000400  167244 BIS     #STUP,@SEL0     ;CLOCK THE INSTRUCTION
012766  042777  001400  167236 BIC     #ROMI!STUP,@SEL0 ;CLEAR
012774  042737  000377  013050 BIC     #377,1$         ;CLEAR ADDRESS FIELD OF BRANCH INST.
013002  153737  002410  013050 BISB    ROMADR,1$       ;ADD ADDRESS OF BRANCH.
013010  052777  001000  167214 BIS     #ROMI,@SEL0     ;ENABLE SEL6
013016  013777  013050  167214 MOV     1$,@SEL6        ;SET UP MICROINSTRUCTION TO
                                                       ;BRANCH IMMEDIATELY TO PC.  BRANCH IS
                                                       ;NECESSARY TO TRANSFER PC SHADOW REG TO PC
013024  052777  000400  167200 BIS     #STUP,@SEL0     ;CLOCK THE INSTRUCTION
                                                       ;ROM PC = ROM ADDRESS
013032  042777  001400  167172 BIC     #ROMI!STUP,@SEL0 ;CLEAR
013040  052777  002000  167164 BIS     #ROMO,@SEL0     ;CLOCK IN A MAINTENANCE ROM OUT
                                                       ;ROM CONTENTS ARE NOW IN SEL6.
013046  000207         RETURN

013050  100000  1$:    .WORD   100000          ;MICRO INSTRUCTION OPCODE FOR IMMEDIATE
                                               ;BRANCH (ROM ADDRESS IS ADDED INTO BITS 0-7)
```

```
                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;
                        ;                       SUBROUTINE $LOOP
                        ;
                        ;               FUNCTION - TO ISSUE AN EXTENDED CONTROL IN TO SET
                        ;                          UP THE MODEM LOOPBACK DESIRED BY THE USER.
                        ;
                        ;       ENTRY CONDITIONS -  WMAINT = 0 - DON'T WRITE MAINT. BITS
                        ;                           WMAINT = 1 - SET BITS
                        ;                                    (WMAINT SET IN INIT CODE)
                        ;                           DMCMDE = 0 - DMR MODE
                        ;                           DMTURN = TURN AROUND CONNECTOR
                        ;
                        ;       EXIT CONDITIONS  -
                        ;
                        ;       REGISTERS        -  NOT DESTROYED
                        ;
                        ;
                        ;;*****************************************************************
                        ;;*****************************************************************
013052                  $LOOP:
013052  005737  002276          TST     DMCMDE          ;IS THE DMR IN DMC MODE?
013056  001041                  BNE     30$             ;IF SO, EXIT (CAN'T DO DMR MODE INPUT)
013060  005737  002306          TST     WMAINT          ;DO WE NEED TO WRITE THE MAINTENANCE BITS?
013064  001436                  BEQ     30$             ;IF NOT - EXIT.
013066  011637  002372          MOV     (SP),SUBRPC     ;SAVE THE PC AFTER THE CALL TO $LOOP
013072  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE ACTUAL CALL.
013100  022737  000006  002254  CMP     #LLOOP,DMTURN   ;IS LOCAL MODEM LOOPBACK DESIRED?
013106  001007                  BNE     10$             ;IF NOT - PROCEED.
013110  012737  000004  013156  MOV     #MAINT2,100$    ;ENSURE REMOTE LOOPBACK IS CLEAR.
013116  012737  000010  013160  MOV     #MAINT1,101$    ;SET MAINT BIT FOR LOCAL LOOPBACK
013124  000406                  BR      20$
013126                  10$:
                                                        ;IN ALL OTHER LOOPBACK CONFIGURATIONS
                                                        ;SET MAINTENANCE 2 (CONFIG. TYPE 1,3,7)
013126  012737  000010  013156  MOV     #MAINT1,100$    ;ENSURE REMOTE LOOPBACK IS CLEAR.
013134  012737  000004  013160  MOV     #MAINT2,101$    ;SET MAINT BIT FOR REMOTE LOOPBACK
013142                  20$:
013142  012737  000001  002374  MOV     #1,NESTPC       ;FLAG THAT THE NEXT SUBROUTINE IS NESTED.
013150                          CALL    $DMRIN          ;DMR MODE INPUT COMMAND
013154  000005                          .WORD   WMODEM  ;WRITE MODEM COMMAND
013156  000000          100$:           .WORD   0       ;BITS TO CLEAR IN MODEM REGISTER
013160  000000          101$:           .WORD   0       ;BITS TO SET IN MODEM REGISTER
                        
013162                  30$:
013162  005037  002374          CLR     NESTPC          ;CLEAR THE NEST FLAG
013166  005037  002372          CLR     SUBRPC          ;CLEAR PC.
013172  000207                  RETURN
                        
```

```
                        ;*****************************************************************************
                        ;*****************************************************************************
                        ;
                        ;                       SUBROUTINE $BUFFS
                        ;
                        ;               FUNCTION - TO DETERMINE BUFFERS FOR TEST 15 - 19.  THIS
                        ;                          SUBROUTINE WILL USE ONE OF THE FOLLOWING
                        ;                          THREE BUFFER AREAS:
                        ;                               1. IF MEMORY MANAGED, 32K - 48K
                        ;                               2. FREE MEMORY, IF MORE THAN 4K BYTES.
                        ;                               3. IF 2 OR 3 NOT POSSIBLE, DEFAULT 4K
                        ;                                  DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                        ;
                        ;       CALL            - JSR  PC,$BUFFS
                        ;
                        ;       NESTING LEVEL   - CALLED ONLY BY TESTS  16-20
                        ;
                        ;       ENTRY CONDITIONS - BUFNUM = # OF RCV & XMIT BUFFERS
                        ;
                        ;       EXIT CONDITIONS  - MMANAG = 1   MEMORY MANAGEMENT USED
                        ;                          MMANAG = 0   MEMORY MANAGEMENT NOT USED
                        ;                          RCVBUF    =  ADDRESS OF RECEIVE BUFFER (VIRTUAL)
                        ;                          RCVBUF+2  =  CHARACTER COUNT
                        ;                          RCVBUF+4  =  ADDRESS OF NEXT RECEIVE BUFFER
                        ;                               (UP TO 64 ADDRESSES AND COUNTS)
                        ;                          XMTBUF    =  ADDRESS OF TRANSMIT BUFFER (VIRTUAL)
                        ;                               (UP TO 64 ADDRESSES AND COUNTS)
                        ;
                        ;       REGISTERS       - NOT DESTROYED
                        ;
                        ;
                        ;*****************************************************************************
                        ;*****************************************************************************
013174                  $BUFFS:
013174  011637  002372          MOV     (SP),SUBRPC     ;SAVE PC AFTER THE CALL TO $BUFFS
013200  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE CALL.
013206  005037  002350          CLR     NXMFLG
013212                          SETVEC  #4,#NOXMEM,#PR107 ;SET UP TRAP 4 (WILL SET FLAG FOR NXM)
013212  012746  000340                                                  MOV     #PR107,-(SP)
013216  012746  023572                                                  MOV     #NOXMEM,-(SP)
013222  012746  000004                                                  MOV     #4,-(SP)
013226  012746  000003                                                  MOV     #3,-(SP)
013232  104437                                                          TRAP    C$SVEC
013234  062706  000010                                                  ADD     #10,SP
013240  005737  177572          TST     @#177572        ;ADDRESS MEMORY MANAGEMENT REG
013244  005737  002350          TST     NXMFLG          ;IS THE FLAG STILL CLEARED?
                                                        ;NOTE: THE FLAG WILL BE SET BY THE TRAP
                                                        ;IF THERE IS NO MEMORY MANAGEMENT.
013250  001143                  BNE     30$             ;BR TO USE NON-MEMORY MANAG. BUFFERS.
013252  023727  002120  003000  CMP     L$HIMEM,#3000   ;IS THERE AT LEAST 48K WORDS? (16K WORDS
                                                        ;FOR BUFFERS)
013260  002537                  BLT     30$             ;IF NOT, USE NON-MEMORY MANAG. BUFFERS.
013262  012737  000001  002302  MOV     #1,MMANAG       ;FLAG THAT MEMORY MANAGEMENT IS USED
013270                          SETPRI  #PR107          ;MAKE SURE WE ARE IN KERNEL MODE.
013270  012700  000340                                                  MOV     #PR107,R0
013274  104441                                                          TRAP    C$SPRI
                                                        ;SETTING PRI SHOULD SHOULD ALSO CLEAR
```

```
                                                                        ;BITS 14 & 15
013276  012701  172300                  MOV     #172300,R1      ;GET ADDRESS OF KERNEL PDR REG 0.
013302  012700  000010                  MOV     #8.,R0          ;WRITE PDR REG 0-7.
013306                          10$:
013306  012721  077406                  MOV     #77406,(R1)+    ;WRITE BITS FOR THE FOLLOWING PAGE DESCRIPTION
                                                                ;READ/WRITE ACCESS, 128. BLOCK PAGE LENGTH.
013312  005300                          DEC     R0              ;WRITE ALL PDRS.
013314  001374                          BNE     10$
013316  012701  172340                  MOV     #172340,R1      ;ADDRESS OF KERNEL PAR 0
013322  005011                          CLR     (R1)            ;PAR 0, ADDRS      0 -  17776
013324  012761  000200  000002          MOV     #200,2(R1)      ;PAR 1, ADDRS  20000 -  37776
013332  012761  000400  000004          MOV     #400,4(R1)      ;PAR 2, ADDRS  40000 -  57776
013340  012761  002000  000006          MOV     #2000,6(R1)     ;PAR 3, ADDRS 200000 - 217776 (BUFFER PAGE 1)
013346  012761  002200  000010          MOV     #2200,10(R1)    ;PAR 4, ADDRS 220000 - 237776 (BUFFER PAGE 2)
013354  012761  002400  000012          MOV     #2400,12(R1)    ;PAR 5, ADDRS 240000 - 257776 (BUFFER PAGE 3)
013362  012761  002600  000014          MOV     #2600,14(R1)    ;PAR 6, ADDRS 260000 - 277776 (BUFFER PAGE 4)
013370  012761  007600  000016          MOV     #7600,16(R1)    ;PAR 7, ADDRS 160000 - 677776 (I/O PAGE)

013376  012703  000400                  MOV     #256.,R3        ;COUNTER FOR OUTER  LOOP OF TEST PATTERN
013402  012704  060000                  MOV     #60000,R4       ;USE VIRTUAL ADDRESS TO MAP TO PAR 5
                                                                ;GENERATE A TEST PATTERN IN THE 1ST 8K WORDS
                                                                ;VIRTUAL ADDRESS 60000 - 111776
013406  012737  000001  177572          MOV     #1,@#177572     ;ENABLE MEMORY MANAGEMENT
013414                          15$:
013414  012701  000040                  MOV     #32.,R1         ;COUNTER FOR INNER LOOP OF TEST PATTERN
013420  012702  002416                  MOV     #$CCITT,R2      ;ADDRESS FOR 32. WORD TEST PATTERN.
013424                          16$:
013424  012224                          MOV     (R2)+,(R4)+     ;WRITE TEST PATTERN
                                                                ;PHYSICAL ADDRESS 200000 - 237776
013426  005737  002350                  TST     NXMFLG          ;FLAG WILL BE SET IF WE ADDRESS NXM.
013432  001050                          BNE     29$             ;IF NXM - DON'T USE MEMORY MANAGEMENT.
013434  005301                          DEC     R1              ;DO TH INNER LOOP 32. TIMES
013436  001372                          BNE     16$
013440  005303                          DEC     R3              ;DO THE OUTER LOOP 256. TIMES
013442  001364                          BNE     15$
013444  012701  020000                  MOV     #20000,R1       ;COUNTER TO CLEAR THE NEXT 8K WORDS
013450                          17$:
013450  005024                          CLR     (R4)+           ;CLEAR VIRTUAL ADDRESS 120000 - 157776
013452  005737  002350                  TST     NXMFLG          ;DOES AN NXM TRAP OCCUR?
013456  001036                          BNE     29$             ;IF SO DON'T USE MEMORY MANAGEMENT.
013460  005301                          DEC     R1
013462  001372                          BNE     17$
013464  005037  177572                  CLR     @#177572        ;TURN OFF MEMORY MANAGEMENT

013470  012737  060000  003236          MOV     #60000,XMTBUF   ;VIRTUAL ADDRESS OF XMIT BUFFER
013476  012737  120000  003636          MOV     #120000,RCVBUF  ;VIRTUAL ADDRESS OF RCV. BUFFER
013504  022737  000001  002324          CMP     #1,BUFNUM       ;IS THERE ONLY 1 XMIT & RECEIVE BUFFER?
013512  001004                          BNE     20$             ;IF NOT, BR
013514  012737  037777  002322          MOV     #37777,BUFSIZ   ;EACH BUFFER IS 16K BYTES
013522  000525                          BR      60$
013524                          20$:
013524  022737  000007  002324          CMP     #7,BUFNUM       ;ARE THERE 7 XMIT & RECEIVE (14 TOTAL BUFFER)?
013532  001004                          BNE     21$             ;IF NOT - MUST BE 64 BUFFERS
013534  012737  004000  002322          MOV     #4000,BUFSIZ    ;EACH BUFFER IS 2K BYTES
013542  000515                          BR      60$
013544                          21$:
013544  012737  000376  002322          MOV     #376,BUFSIZ     ;EACH BUFFER IS 254. BYTES.
```

```
                                                BR      60$
                                29$:
                                                CLR     @#177572        ;TURN OFF MEMORY MANAGEMENT
                                30$:
                                                CLR     MMANAG          ;FLAG THAT MEMORY MANAGEMENT NOT USED.
                                                CLRVEC  #4              ;RESTORE TRAP 4.
                                                                                        MOV     #4,R0
                                                                                        TRAP    C$CVEC
                                                MEMORY  R2              ;FIND THE FREE MEMORY AVAILABLE BETWEEN
                                                                                        TRAP    C$MEM
                                                                                        MOV     R0,R2
                                                                        ;THE DIAGNOSTIC AND THE DRS (SUPERVISOR).
                                                CMP     @R2,#2000       ;IS THERE AT LEAST 1K WORDS? (NOTE: CONTENTS
                                                                        ;OF THE RETURNED ADDRESS OF THE START OF FREE
                                                                        ;MEMORY CONTAIN THE AMOUNT OF AVAILABLE MEM.)
                                                BLE     35$             ;IF NOT AT LEAST 1K, USE DEFAULT BUFFER.
                                                MOV     R2,XMTBUF       ;USE THE FREE MEMORY BUFFER.
                                                MOV     @R2,R0          ;SAVE THE WORD SIZE OF THE BUFFER.
                                                BIC     #BIT0,R0        ;START WITH AN EVEN # OF WORDS.
                                                BR      40$
                                35$:
                                                MOV     #BIGBUF,XMTBUF  ;USE THE DEFAULT BUFFER (1ST HALF FOR XMIT).
                                                MOV     #2000,R0        ;1K WORD SIZE.
                                40$:
                                                MOV     XMTBUF,RCVBUF   ;CALCULATE THE RECEIVE BUFFER ADDRESS
                                                ADD     R0,RCVBUF       ;AS STARTING IN THE 2ND HALF OF THE BUFFER.
                                                MOV     R0,R1           ;BUFFER SIZE IN WORDS.
                                                CMP     #1,BUFNUM       ;ARE WE SETTING UP 1 RECEIVE AND XMIT BUFFER?
                                                BEQ     47$             ;IF YES - R1 = BYTE SIZE FOR BOTH BUFFERS.
                                                CMP     #7,BUFNUM       ;ARE WE SETTING UP 7 RCV & 7 XMIT BUFFERS?
                                                BNE     45$             ;IF NOT WE MUST NEED 64 RCV & 64 XMIT BUFFERS.
                                                ASR     R1              ;R1 = # BYTES IN THE BUFFERS/8
                                                ASR     R1
                                                ASR     R1
                                                BR      47$
                                45$:
                                                MOV     #7,R4           ;DIVIDE BYTES BY 128.
                                46$:
                                                ASR     R1              ;SHIFT RIGHT 7 TIMES
                                                DEC     R4
                                                BNE     46$
                                47$:
                                                MOV     R1,BUFSIZ       ;SAVE THE BUFFER SIZE IN BYTES.
                                                SUB     #2,BUFSIZ       ;ADJUST BUFFER SIZE BECAUSE WE
                                                                        ;WILL ADJUST BUFFER STARTING ADDRESS.
                                                BIC     #1,BUFSIZ       ;ENSURE WE START WITH AN EVEN # OF BYTES.
                                                ASR     R0              ;# OF WORDS IN ALL XMIT BUFFERS.
                                                MOV     R0,R1           ;SAVE # OF WORDS IN ALL RCV BUFFERS.
                                                MOV     XMTBUF,R2       ;ADDRESS OF START OF XMIT BUFFERS.
                                50$:
                                                MOV     #$CCITT,R3      ;ADDRESS OF TEST PATTERN
                                                MOV     #32.,R4         ;# OF WORDS IN THE TEST PATTERN.
                                51$:
                                                MOV     (R3)+,(R2)      ;WRITE TEST PATTERN INTO ALL XMIT BUFFERS.
                                                DEC     R0              ;ARE ALL THE XMIT BUFFERS WRITTEN?
                                                BEQ     55$             ;IF YES PROCEED.
```

```
    160 013756  005304                          DEC     R4              ;CONTINUE WITH TEST PATTERN TILL DONE.
    161 013760  001373                          BNE     51$
    162 013762  000766                          BR      50$             ;START AT BEGINNING OF TEST PATTERN.
    163 013764                          55$:
    164 013764  013702  003636                  MOV     RCVBUF,R2       ;ADDRESS OF RECEIVE BUFFERS
    165 013770                          56$:
    166 013770  005022                          CLR     (R2)+           ;CLEAR ALL RECEIVE BUFFERS.
    167 013772  005301                          DEC     R1
    168 013774  001375                          BNE     56$
    169
    170
    171 013776                          60$:
    172 013776  013700  003636                  MOV     RCVBUF,R0       ;ADDRESS OF RECEIVE BUFFER
    173 014002  012701  003636                  MOV     #RCVBUF,R1      ;TABLE ADDRESS OF RCV BUFFER POINTERS.
    174 014006  013702  002324                  MOV     BUFNUM,R2       ;# OF RCV. BUFFERS.
    175 014012                          65$:
    176 014012  010021                          MOV     R0,(R1)+        ;SAVE THE RECEIVE BUFFER ADDRESS
    177 014014  013721  002322                  MOV     BUFSIZ,(R1)+    ;SAVE THE BUFFER SIZE
    178 014020  063700  002322                  ADD     BUFSIZ,R0       ;CALCULATE THE NEXT BUFFER ADDRESS.
    179 014024  005200                          INC     R0              ;CHANGE EVEN ADDRESS TO ODD & ODD TO EVEN.
    180 014026  005302                          DEC     R2              ;CALCULATE ALL THE BUFFER ADDRESSES.
    181 014030  001370                          BNE     65$
    182
    183 014032  013700  003236                  MOV     XMTBUF,R0       ;ADDRESS OF TRANSMIT BUFFERS
    184 014036  012701  003236                  MOV     #XMTBUF,R1      ;TABLE OF XMIT BUFFER POINTERS.
    185 014042  013702  002324                  MOV     BUFNUM,R2       ;#OF XMIT BUFFERS.
    186 014046  012703  000004                  MOV     #4,R3           ;R3 IS USED TO VARY THE CHARACTER COUNT.
    187 014052                          70$:
    188 014052  010021                          MOV     R0,(R1)+        ;SAVE THE XMIT BUFFER ADDRESS.
    189 014054  013711  002322                  MOV     BUFSIZ,(R1)     ;SAVE THE BUFFER SIZE.
    190 014060  160321                          SUB     R3,(R1)+        ;VARY THE BUFFER SIZE
    191 014062  063700  002322                  ADD     BUFSIZ,R0       ;CALCULATE THE NEXT BUFFER ADDRESS
    192 014066  005303                          DEC     R3              ;CHANGE THE CHARACTER COUNT VARIABLE.
    193 014070  032703  000001                  BIT     #BIT0,R3        ;IS THE CONTENTS OF R3 ODD
    194 014074  001001                          BNE     72$             ;IF YES, DON'T ADJUST BUFFER ADDRESS.
    195 014076  005200                          INC     R0              ;CHANGE EVEN TO ODD ETC.
    196 014100                          72$:
    197 014100  005703                          TST     R3              ;WHAT IS R3.
    198 014102  002002                          BGE     75$             ;CONTINUE UNTIL R3 = -1
    199 014104  012703  000004                  MOV     #4,R3           ;RE-INIT. THE R3 VARIABLE AGAIN.
    200 014110                          75$:
    201 014110  005302                          DEC     R2              ;CALCULATE ALL THE XMIT BUFFERS.
    202 014112  001357                          BNE     70$
    203
    204 014114  005037  002350                  CLR     NXMFLG          ;RESTORE FLAG USED IN TRAP VECTOR.
    205 014120  005037  002372                  CLR     SUBRPC          ;CLEAR PC.
    206 014124  000207                          RETURN
```

```
                        ;*****************************************************************
                        ;*****************************************************************
                        ;
                        ;                       SUBROUTINE $INOUT
                        ;
                        ;             FUNCTION - TO MANAGE THE INTERRUPT FROM BASE IN
                        ;                        TO BA/CC OUT IN THE INTERRUPT TESTS 15-19
                        ;
                        ;       ENTRY CONDITIONS - BUFNUM = # OF RCV AND XMIT BUFFERS
                        ;                          ALL BUFFERS SET UP IN  THE $BUFFS SUBROUTINE.
                        ;                          WAIT3  = # OF OUTER LOOP TIMEOUT COUNTERS.
                        ;                                   THIS VALUE IS DETERMINED BY THE BAUD
                        ;                                   RATE IN THE INIT. SECTION OF CODE.
                        ;
                        ;       EXIT CONDITIONS  -
                        ;
                        ;       REGISTERS        - R0 - R5 DESTROYED
                        ;
                        ;
                        ;*****************************************************************
                        ;*****************************************************************
014126                  $INOUT:
014126  011637  002372          MOV     (SP),SUBRPC     ;SAVE THE PC AFTER THE CALL TO $LOOP
014132  162737  000004  002372  SUB     #4,SUBRPC       ;BACKUP TO THE PC OF THE ACTUAL CALL.
014140  012737  000001  002374  MOV     #1,NESTPC       ;FLAG THAT ANY SUBROUTINE USED WILL BE NESTED.
014146  013737  002324  002326  MOV     BUFNUM,INRCV    ;# OF BA/CC IN RECEIVES
014154  013737  002324  002330  MOV     BUFNUM,INXMIT   ;# OF BA/CC IN TRANSMITS
014162  013737  002324  002332  MOV     BUFNUM,OUTRCV   ;# OF BA/CC OUT RECEIVES
014170  013737  002324  002334  MOV     BUFNUM,OUTXMT   ;# OF BA/CC OUT TRANSMITS
014176  005037  002352          CLR     INFLAG          ;CLEAR INPUT BA/CC FLAG
014202  005037  002354          CLR     OUTFLG          ;CLEAR OUTPUT BA/CC FLAG
014206  005037  002272          CLR     START           ;CLEAR FLAG TO SHOW START UP NOT DONE (SET
                                                        ;AFTER CONTROL IN)
014212  012702  003636          MOV     #RCVBUF,R2      ;ADDR OF RCV. BUFFER TABLE (FOR INPUT)
014216  012703  003236          MOV     #XMTBUF,R3      ;ADDR OF XMIT BUFFER TABLE (FOR INPUT)
014222  012704  003636          MOV     #RCVBUF,R4      ;ADDR OF RCV. BUFFER TABLE (OUTPUT CHECKING)
014226  012705  003236          MOV     #XMTBUF,R5      ;ADDR OF XMIT BUFFER TABLE (OUTPUT CHECKING)
014232                          SETPRI  #PRI04          ;SET THE PRIORITY TO LEVEL 4 TO ALLOW THE
014232  012700  000200                                                  MOV     #PRI04,R0
014236  104441                                                          TRAP    C$SPRI
                                                        ;DMR TO INTERRUPT AT LEVEL 5
014240  013737  002316  002320  MOV     WAIT3,WAIT4     ;TIMEOUT COUNTER DETERMINED BY BAUD RATE.
014246  112777  000143  165756  MOVB    #IESET!RQI!BASEI,@BSEL0 ;FIRST COMMAND - BASE IN.
014254                  8$:
014254  012701  001000          MOV     #1000,R1        ;INNER LOOP COUNTER
014260                  10$:
014260                          BREAK                   ;OPERATOR INTERRUPT ENABLE.  CALL TO
014260  104422                                                          TRAP    C$BRK
                                                        ;THE SUPERVISOR TO ALLOW CONSOLE INTERRUPT
                                                        ;(NOTE: INFLAG AND OUTFLG SET IN THE INTERRUPT
                                                        ;SERVICE ROUTINES)
014262  005737  002352          TST     INFLAG          ;ARE THE INPUTS DONE?   (INISR DONE?)
014266  001403                  BEQ     12$             ;IF NOT KEEP CHECKING.
014270  005737  002354          TST     OUTFLG          ;ARE THE OUTPUTS DONE?  (OUTISR DONE?)
014274  001026                  BNE     20$             ;IF YES EXIT WAIT LOOP.
014276                  12$:
014276                          DELAY   1               ;WAIT 100 MICROSECONDS.
```

GLOBAL SUBROUTINES

```
        014276  012727  000001                                                  MOV     #1,(PC)+
        014302  000000                                                          .WORD   0
        014304  013727  002116                                                  MOV     L$DLY,(PC)+
        014310  000000                                                          .WORD   0
        014312  005367  177772                                                  DEC     -6(PC)
        014316  001375                                                          BNE     .-4
        014320  005367  177756                                                  DEC     -22(PC)
        014324  001367                                                          BNE     .-20
    55  014326  005301                  DEC     R1              ;CONTINUE IN LOOP UNTIL R1 = 0.
    56  014330  001353                  BNE     10$
    57  014332  005337  002320          DEC     WAIT4           ;DECREMENT OUTER LOOP COUNTER
    58  014336  001346                  BNE     8$              ;IF NOT DONE - GO THROUGH INNER LOOP AGAIN.
    59  014340                          ERRDF   2,EMG2,ERRG1    ;TIMEOUT MESSAGE.
        014340  104455                                                          TRAP    C$ERDF
        014342  000002                                                          .WORD   2
        014344  017715                                                          .WORD   EMG2
        014346  014604                                                          .WORD   ERRG1
    60                                          ;ALSO PRINT # OF BUFFERS NOT COMPLETE.
    61
    62  014350  000453                  BR      60$             ;EXIT
    63  014352                  20$:
    64
    65  014352  012700  003636          MOV     #RCVBUF,R0      ;RECEIVE BUFFER POINTER TABLE ADDRESS.
    66  014356  012701  003236          MOV     #XMTBUF,R1      ;TRANSMIT BUFFERS
    67  014362  013702  002324          MOV     BUFNUM,R2       ;# OF RCV. AND XMIT BUFFERS.
    68  014366  005737  002302          TST     MMANAG          ;ARE THE BUFFERS MEMORY MANAGED?
    69  014372  001403                  BEQ     40$             ;IF YES - PROCEED.
    70  014374  012737  000001  177572  MOV     #1,@#177572     ;TURN ON MEMORY MANAGEMENT
    71  014402                  40$:
    72  014402  012003                  MOV     (R0)+,R3        ;ADDRESS OF A RECEIVE BUFFER.
    73  014404  012104                  MOV     (R1)+,R4        ;ADDRESS OF A TRANSMIT BUFFER.
    74  014406  011005                  MOV     @R0,R5          ;CHARACTER COUNT.
    75  014410  022021                  CMP     (R0)+,(R1)+     ;ARE THE CHARACTER COUNTS THE SAME?
    76  014412  001412                  BEQ     45$             ;IF YES - PROCEED.
    77  014414  005737  002302          TST     MMANAG          ;IS MEMORY MANAGEMENT TURNED ON?
    78  014420  001402                  BEQ     41$             ;IF NOT - SKIP TURN OFF.
    79  014422  005037  177572          CLR     @#177572        ;TURN OFF MEMORY MANAGEMENT.
    80  014426                  41$:
    81  014426                          ERRDF   12,EMG12,ERRG10
        014426  104455                                                          TRAP    C$ERDF
        014430  000014                                                          .WORD   12
        014432  020127                                                          .WORD   EMG12
        014434  016152                                                          .WORD   ERRG10
    82  014436  000420                  BR      60$             ;EXIT
    83  014440                  45$:
    84  014440  122324                  CMPB    (R3)+,(R4)+     ;ARE THE CHARACTERS THE SAME?
    85  014442  001005                  BNE     50$             ;IF NOT - ERROR EXIT
    86  014444  005305                  DEC     R5              ;CHECK ALL THE CHARACTERS
    87  014446  001374                  BNE     45$
    88  014450  005302                  DEC     R2              ;CHECK ALL THE BUFFERS.
    89  014452  001353                  BNE     40$
    90  014454  000411                  BR      60$
    91  014456                  50$:
    92  014456  005737  002302          TST     MMANAG          ;IS MEMORY MANAGEMENT TURNED ON?
    93  014462  001402                  BEQ     51$             ;IF NOT - SKIP TURN OFF.
    94  014464  005037  177572          CLR     @#177572        ;TURN OFF MEMORY MANAGEMENT.
    95  014470                  51$:
```

GLOBAL SUBROUTINES

```
 96 014470                                  ERRDF   15,EMG15,ERRG12
    014470  104455                                                      TRAP    C$ERDF
    014472  000017                                                      .WORD   15
    014474  020223                                                      .WORD   EMG15
    014476  016236                                                      .WORD   ERRG12
 97 014500                          60$:
 98 014500  005737  002302                  TST     MMANAG          ;IS MEMORY MANAGEMENT TURNED ON?
 99 014504  001402                          BEQ     61$             ;IF NOT - SKIP TURN OFF.
100 014506  005037  177572                  CLR     @#177572        ;TURN OFF MEMORY MANAGEMENT.
101 014512                          6'$:
102 014512  042777  000120  165512          BIC     #IESET!IECLR,@SEL0 ;DISABLE BOTH INPUT INTERRUPTS
103 014520  042777  000100  165506          BIC     #IEO,@SEL2      ;DISABLE OUTPUT INTERRUPT
104 014526  022737  000021  002114          CMP     #17.,L$TEST     ;IS THIS TEST 17, 18 OR 19 ?
105 014534  003011                          BGT     62$             ;IF NOT - SHUTDOWN.
106                                                                 ;NOTE:
107                                                                 ;DOING AN UPDATE IN TESTS 17 - 19, ALLOWS
108                                                                 ;THE USER TO CHECK OUT REMOTE LOOPBACK BETER.
109                                                                 ;A SHUTDOWN WHEN TESTING THE REMOTE LOOPBACK,
110                                                                 ;WOULD CAUSE THE CONNECTION TO BE DROPPED.
111 014536                                  DMRIN   UPDATE          ;DO A DMR UPDATE.
                                                                    ;**** MACRO EXPANSION ****
    014536  004737  012060                  JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
    014542  000011                                  .WORD   UPDATE  ;INPUT COMMAND
    014544  000000                                  .WORD   0       ;NO SEL4
    014546  000000                                  .WORD   0       ;NO SEL6
                                                                    ;****                   ****
112 014550                                  WAIT    RDO             ;WAIT FOR RDO
                                                                    ;**** MACRO EXPANSION ****
    014550  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
    014554  000001                                  .WORD   1       ;FLAG THAT WE'RE WAITING FOR RDO
                                                                    ;****                   ****
113 014556  000402                          BR      63$
114 014560                          62$:
115 014560                                  SHUTDN                  ;SHUT DOWN THE DMR
                                                                    ;**** MACRO EXPANSION ****
    014560  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                    ;****                   ****
116 014564                          63$:
117 014564                                  SETPRI  #PRI07          ;RETURN PROCESSOR PRIORITY TO 7
    014564  012700  000340                                                      MOV     #PRI07,R0
    014570  104441                                                              TRAP    C$SPRI
118 014572  005037  002374                  CLR     NESTPC          ;CLEAR NESTED FLAG.
119 014576  005037  002372                  CLR     SUBRPC          ;CLEAR PC.
120 014602  000207                          RETURN
121
122
123
124
125
126
127
128
```

```
      1                                 .SBTTL  GLOBAL ERROR REPORT REPORT SECTION
      2                                 ;////////////////////////////////////////////////////////////////////////
      3                                 ;/    THE GLOBAL ERROR REPORT SECTION CONTAINS ERROR MESSAGES
      4                                 ;/    THAT ARE USED IN MORE THAN ONE TEST.
      5                                 ;////////////////////////////////////////////////////////////////////////
      6                                         .EVEN
      7
      8 014604                          BGNMSG  ERRG1
        014604                                                                          ERRG1::
      9 014604                                  PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
        014604  013746  002372                                                        MOV     SUBRPC,-(SP)
        014610  012746  016354                                                        MOV     #FMG3,-(SP)
        014614  012746  000002                                                        MOV     #2,-(SP)
        014620  010600                                                                MOV     SP,R0
        014622  104414                                                                TRAP    C$PNTB
        014624  062706  000006                                                        ADD     #6,SP
     10 014630                                  PRINTB  #FMG1,@SEL0,@SEL2 ;PRINT SEL0 AND SEL2 CONTENTS.
        014630  017746  165400                                                        MOV     @SEL2,-(SP)
        014634  017746  165372                                                        MOV     @SEL0,-(SP)
        014640  012746  016270                                                        MOV     #FMG1,-(SP)
        014644  012746  000003                                                        MOV     #3,-(SP)
        014650  010600                                                                MOV     SP,R0
        014652  104414                                                                TRAP    C$PNTB
        014654  062706  000010                                                        ADD     #10,SP
     11 014660                                  PRINTB  #FMG2,@SEL4,@SEL6 ;PRINT SEL4 AND SEL2 CONTENTS.
        014660  017746  165354                                                        MOV     @SEL6,-(SP)
        014664  017746  165346                                                        MOV     @SEL4,-(SP)
        014670  012746  016322                                                        MOV     #FMG2,-(SP)
        014674  012746  000003                                                        MOV     #3,-(SP)
        014700  010600                                                                MOV     SP,R0
        014702  104414                                                                TRAP    C$PNTB
        014704  062706  000010                                                        ADD     #10,SP
     12 014710                                  PRINTB  #FMG21,BUFNUM   ;# OF BUFFERS
        014710  013746  002324                                                        MOV     BUFNUM,-(SP)
        014714  012746  017447                                                        MOV     #FMG21,-(SP)
        014720  012746  000002                                                        MOV     #2,-(SP)
        014724  010600                                                                MOV     SP,R0
        014726  104414                                                                TRAP    C$PNTB
        014730  062706  000006                                                        ADD     #6,SP
     13 014734                                  PRINTB  #FMG22,BUFSIZ   ;BUFFER SIZE
        014734  013746  002322                                                        MOV     BUFSIZ,-(SP)
        014740  012746  017515                                                        MOV     #FMG22,-(SP)
        014744  012746  000002                                                        MOV     #2,-(SP)
        014750  010600                                                                MOV     SP,R0
        014752  104414                                                                TRAP    C$PNTB
        014754  062706  000006                                                        ADD     #6,SP
     14 014760  005437  002326                  NEG     INRCV           ;NEGATE BUFFER VALUES
     15 014764  005437  002330                  NEG     INXMIT
     16 014770  005437  002332                  NEG     OUTRCV
     17 014774  005437  002334                  NEG     OUTXMT
     18 015000  063737  002324  002326          ADD     BUFNUM,INRCV    ;CALCULATE BUFFERS ASSIGNED.
     19 015006  063737  002324  002330          ADD     BUFNUM,INXMIT
     20 015014  063737  002324  002332          ADD     BUFNUM,OUTRCV   ;CALCULATE BUFFERS RECEIVED.
     21 015022  063737  002324  002334          ADD     BUFNUM,OUTXMT
     22 015030                                  PRINTB  #FMG23,INRCV,INXMIT
        015030  013746  002330                                                        MOV     INXMIT,-(SP)
        015034  013746  002326                                                        MOV     INRCV,-(SP)
```

```
        015040  012746  017542                                                  MOV     #FMG23,-(SP)
        015044  012746  000003                                                  MOV     #3,-(SP)
        015050  010600                                                          MOV     SP,R0
        015052  104414                                                          TRAP    C$PNTB
        015054  062706  000010                                                  ADD     #10,SP
    23  015060                          PRINTB  #FMG24,OUTRCV,OUTXMT
        015060  013746  002334                                                  MOV     OUTXMT,-(SP)
        015064  013746  002332                                                  MOV     OUTRCV,-(SP)
        015070  012746  017623                                                  MOV     #FMG24,-(SP)
        015074  012746  000003                                                  MOV     #3,-(SP)
        015100  010600                                                          MOV     SP,R0
        015102  104414                                                          TRAP    C$PNTB
        015104  062706  000010                                                  ADD     #10,SP
    24  015110                  ENDMSG
        015110                                                          L10002:
        015110  104423                                                          TRAP    C$MSG
    25
    26
    27  015112                  BGNMSG  ERRG2
        015112                                                          ERRG2::
    28  015112  005737  002372          TST     SUBRPC          ;IS THE ERROR IN A SUBROUTINE?
    29  015116  001412                  BEQ     10$             ;IF NOT, DON'T PRINT SUBR. PC
    30  015120                          PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
        015120  013746  002372                                                  MOV     SUBRPC,-(SP)
        015124  012746  016354                                                  MOV     #FMG3,-(SP)
        015130  012746  000002                                                  MOV     #2,-(SP)
        015134  010600                                                          MOV     SP,R0
        015136  104414                                                          TRAP    C$PNTB
        015140  062706  000006                                                  ADD     #6,SP
    31  015144                  10$:
    32  015144                          PRINTB  #FMG1,@SEL0,@SEL2 ;PRINT SEL0 AND SEL2 CONTENTS.
        015144  017746  165064                                                  MOV     @SEL2,-(SP)
        015150  017746  165056                                                  MOV     @SEL0,-(SP)
        015154  012746  016270                                                  MOV     #FMG1,-(SP)
        015160  012746  000003                                                  MOV     #3,-(SP)
        015164  010600                                                          MOV     SP,R0
        015166  104414                                                          TRAP    C$PNTB
        015170  062706  000010                                                  ADD     #10,SP
    33  015174                          PRINTB  #FMG2,@SEL4,@SEL6 ;PRINT SEL4 AND SEL2 CONTENTS.
        015174  017746  165040                                                  MOV     @SEL6,-(SP)
        015200  017746  165032                                                  MOV     @SEL4,-(SP)
        015204  012746  016322                                                  MOV     #FMG2,-(SP)
        015210  012746  000003                                                  MOV     #3,-(SP)
        015214  010600                                                          MOV     SP,R0
        015216  104414                                                          TRAP    C$PNTB
        015220  062706  000010                                                  ADD     #10,SP
    34  015224                  ENDMSG
        015224                                                          L10003:
        015224  104423                                                          TRAP    C$MSG
    35
    36  015226                  BGNMSG  ERRG3
        015226                                                          ERRG3::
    37  015226  005737  002372          TST     SUBRPC          ;IS THE ERROR IN A SUBROUTINE?
    38  015232  001412                  BEQ     10$             ;IF NOT, DON'T PRINT SUBR. PC
    39  015234                          PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
        015234  013746  002372                                                  MOV     SUBRPC,-(SP)
        015240  012746  016354                                                  MOV     #FMG3,-(SP)
```

```
        015244  012746  000002                                                  MOV     #2,-(SP)
        015250  010600                                                          MOV     SP,R0
        015252  104414                                                          TRAP    C$PNTB
        015254  062706  000006                                                  ADD     #6,SP
    40  015260                          10$:
    41  015260                                  PRINTB  #FMG1,@SEL0,@SEL2 ;PRINT SEL0 AND SEL2 CONTENTS.
        015260  017746  164750                                                  MOV     @SEL2,-(SP)
        015264  017746  164742                                                  MOV     @SEL0,-(SP)
        015270  012746  016270                                                  MOV     #FMG1,-(SP)
        015274  012746  000003                                                  MOV     #3,-(SP)
        015300  010600                                                          MOV     SP,R0
        015302  104414                                                          TRAP    C$PNTB
        015304  062706  000010                                                  ADD     #10,SP
    42  015310  032777  100000  164714          BIT     #RUN,@SEL0      ;IS THE RUN BIT SET
    43  015316  001043                          BNE     20$             ;IF RUN SET, CHECK.
    44  015320  122777  000001  164716          CMPB    #1,@BSEL3       ;DID CPU MICRO. FAIL?
    45  015326  001011                          BNE     12$             ;IF NOT SEE IF LU FAILED.
    46  015330                                  PRINTB  #FMG4           ;CPU MICRO. FAILED.
        015330  012746  016426                                                  MOV     #FMG4,-(SP)
        015334  012746  000001                                                  MOV     #1,-(SP)
        015340  010600                                                          MOV     SP,R0
        015342  104414                                                          TRAP    C$PNTB
        015344  062706  000004                                                  ADD     #4,SP
    47  015350  000441                          BR      25$
    48  015352                          12$:
    49  015352  122777  000002  164664          CMPB    #2,@BSEL3       ;DID LINE UNIT MICRO. FAIL?
    50  015360  001011                          BNE     15$
    51  015362                                  PRINTB  #FMG5           ;LINE UNIT FAILED.
        015362  012746  016457                                                  MOV     #FMG5,-(SP)
        015366  012746  000001                                                  MOV     #1,-(SP)
        015372  010600                                                          MOV     SP,R0
        015374  104414                                                          TRAP    C$PNTB
        015376  062706  000004                                                  ADD     #4,SP
    52  015402  000424                          BR      25$
    53  015404                          15$:
    54  015404                                  PRINTB  #FMG5           ;NO RUN - MASTER CLEAR FAILED.
        015404  012746  016457                                                  MOV     #FMG5,-(SP)
        015410  012746  000001                                                  MOV     #1,-(SP)
        015414  010600                                                          MOV     SP,R0
        015416  104414                                                          TRAP    C$PNTB
        015420  062706  000004                                                  ADD     #4,SP
    55  015424  000413                          BR      25$
    56  015426                          20$:
    57  015426  105777  164612                  TSTB    @BSEL3          ;IS BSEL3 STILL 0?
    58  015432  001010                          BNE     25$             ;IF NOT - SEE IF MICRODIAG. RUN.
    59  015434                                  PRINTB  #FMG19          ;DEVICE IS NOT DMR (DMC?)
        015434  012746  017424                                                  MOV     #FMG19,-(SP)
        015440  012746  000001                                                  MOV     #1,-(SP)
        015444  010600                                                          MOV     SP,R0
        015446  104414                                                          TRAP    C$PNTB
        015450  062706  000004                                                  ADD     #4,SP
    60  015454                          25$:
    61  015454                          ENDMSG
        015454                                                          L10004:
        015454  104423                                                          TRAP    C$MSG
    62
    63
```

```
     64 015456                          BGNMSG  ERRG4
        015456                                                                  ERRG4::
     65 015456  005737  002372                  TST     SUBRPC          ;IS THE ERROR IN A SUBROUTINE?
     66 015462  001412                          BEQ     10$             ;IF NOT, DON'T PRINT SUBR. PC
     67 015464                                  PRINTB  #FMG3,SUBRPC    ;PC THAT SUBROUTINE WAS CALLED.
        015464  013746  002372                                                  MOV     SUBRPC,-(SP)
        015470  012746  016354                                                  MOV     #FMG3,-(SP)
        015474  012746  000002                                                  MOV     #2,-(SP)
        015500  010600                                                          MOV     SP,R0
        015502  104414                                                          TRAP    C$PNTB
        015504  062706  000006                                                  ADD     #6,SP
     68 015510                          10$:
     69 015510  105737  002641                  TSTB    BASE+3          ;ONLY PRINT NON-ZERO VALUES
     70 015514  001003                          BNE     11$
     71 015516  105737  002644                  TSTB    BASE+6
     72 015522  001416                          BEQ     12$
     73 015524                          11$:
     74 015524                                  PRINTB  #FMG7,<B,BASE+3>,<B,BASE+6>
        015524  005046                                                          CLR     -(SP)
        015526  153716  002644                                                  BISB    BASE+6,(SP)
        015532  005046                                                          CLR     -(SP)
        015534  153716  002641                                                  BISB    BASE+3,(SP)
        015540  012746  016510                                                  MOV     #FMG7,-(SP)
        015544  012746  000003                                                  MOV     #3,-(SP)
        015550  010600                                                          MOV     SP,R0
        015552  104414                                                          TRAP    C$PNTB
        015554  062706  000010                                                  ADD     #10,SP
     75 015560                          12$:
     76 015560  105737  002643                  TSTB    BASE+5
     77 015564  001003                          BNE     13$
     78 015566  105737  002646                  TSTB    BASE+8.
     79 015572  001416                          BEQ     14$
     80 015574                          13$:
     81 015574                                  PRINTB  #FMG8,<B,BASE+5>,<B,BASE+8.>
        015574  005046                                                          CLR     -(SP)
        015576  153716  002646                                                  BISB    BASE+8.,(SP)
        015602  005046                                                          CLR     -(SP)
        015604  153716  002643                                                  BISB    BASE+5,(SP)
        015610  012746  016561                                                  MOV     #FMG8,-(SP)
        015614  012746  000003                                                  MOV     #3,-(SP)
        015620  010600                                                          MOV     SP,R0
        015622  104414                                                          TRAP    C$PNTB
        015624  062706  000010                                                  ADD     #10,SP
     82 015630                          14$:
     83 015630  105737  002642                  TSTB    BASE+4
     84 015634  001003                          BNE     15$
     85 015636  105737  002645                  TSTB    BASE+7
     86 015642  001416                          BEQ     16$
     87 015644                          15$:
     88 015644                                  PRINTB  #FMG9,<B,BASE+4>,<B,BASE+7>
        015644  005046                                                          CLR     -(SP)
        015646  153716  002645                                                  BISB    BASE+7,(SP)
        015652  005046                                                          CLR     -(SP)
        015654  153716  002642                                                  BISB    BASE+4,(SP)
        015660  012746  016632                                                  MOV     #FMG9,-(SP)
        015664  012746  000003                                                  MOV     #3,-(SP)
        015670  010600                                                          MOV     SP,R0
```

```
        015672  104414                                                          TRAP    C$PNTB
        015674  062706  000010                                                  ADD     #10.SP
     89 015700                          16$:
     90 015700  105737  002650                  TSTB    BASE+10.
     91 015704  001003                          BNE     17$
     92 015706  105737  002647                  TSTB    BASE+9.
     93 015712  001416                          BEQ     20$
     94 015714                          17$:
     95 015714                                  PRINTB  #FMG10,<B,BASE+10.>,<B,BASE+9.>
        015714  005046                                                          CLR     -(SP)
        015716  153716  002647                                                  BISB    BASE+9.,(SP)
        015722  005046                                                          CLR     -(SP)
        015724  153716  002650                                                  BISB    BASE+10.,(SP)
        015730  012746  016703                                                  MOV     #FMG10,-(SP)
        015734  012746  000003                                                  MOV     #3,-(SP)
        015740  010600                                                          MOV     SP,R0
        015742  104414                                                          TRAP    C$PNTB
        015744  062706  000010                                                  ADD     #10,SP
     96 015750                          20$:
     97 015750                          ENDMSG
        015750                                                          L10005:
        015750  104423                                                          TRAP    C$MSG
     98
     99
    100
    101 015752                          BGNMSG  ERRG7
        015752                                                          ERRG7::
    102 015752                                  PRINTB  #FMG12          ;BA/CC OUT RECV
        015752  012746  016773                                                  MOV     #FMG12,-(SP)
        015756  012746  000001                                                  MOV     #1,-(SP)
        015762  010600                                                          MOV     SP,R0
        015764  104414                                                          TRAP    C$PNTB
        015766  062706  000004                                                  ADD     #4,SP
    103 015772                                  PRINTB  #FMG13,@SEL4,@SEL6 ;ACTUAL BA/CC
        015772  017746  164242                                                  MOV     @SEL6,-(SP)
        015776  017746  164234                                                  MOV     @SEL4,-(SP)
        016002  012746  017024                                                  MOV     #FMG13,-(SP)
        016006  012746  000003                                                  MOV     #3,-(SP)
        016012  010600                                                          MOV     SP,R0
        016014  104414                                                          TRAP    C$PNTB
        016016  062706  000010                                                  ADD     #10,SP
    104 016022                                  PRINTB  #FMG15,-2(R4)       ;EXPECTED BA/CC
        016022  016446  177776                                                  MOV     -2(R4),-(SP)
        016026  012746  017154                                                  MOV     #FMG15,-(SP)
        016032  012746  000002                                                  MOV     #2,-(SP)
        016036  010600                                                          MOV     SP,R0
        016040  104414                                                          TRAP    C$PNTB
        016042  062706  000006                                                  ADD     #6,SP
    105 016046                          ENDMSG
        016046                                                          L10006:
        016046  104423                                                          TRAP    C$MSG
    106
    107 016050                          BGNMSG  ERRG8
        016050                                                          ERRG8::
    108 016050                                  PRINTB  #FMG11          ;BA/CC OUT XMIT
        016050  012746  016741                                                  MOV     #FMG11,-(SP)
        016054  012746  000001                                                  MOV     #1,-(SP)
```

```
        016060  010600                                                          MOV     SP,R0
        016062  104414                                                          TRAP    C$PNTB
        016064  062706  000004                                                  ADD     #4,SP
    109 016070                      PRINTB  #FMG13,@SEL4,@SEL6   ;ACTUAL BA/CC
        016070  017746  164144                                                  MOV     @SEL6,-(SP)
        016074  017746  164136                                                  MOV     @SEL4,-(SP)
        016100  012746  017024                                                  MOV     #FMG13,-(SP)
        016104  012746  000003                                                  MOV     #3,-(SP)
        016110  010600                                                          MOV     SP,R0
        016112  104414                                                          TRAP    C$PNTB
        016114  062706  000010                                                  ADD     #10,SP
    110 016120                      PRINTB  #FMG14,-4(R5),-2(R5) ;EXPECTED BA/CC
        016120  016546  177776                                                  MOV     -2(R5),-(SP)
        016124  016546  177774                                                  MOV     -4(R5),-(SP)
        016130  012746  017100                                                  MOV     #FMG14,-(SP)
        016134  012746  000003                                                  MOV     #3,-(SP)
        016140  010600                                                          MOV     SP,R0
        016142  104414                                                          TRAP    C$PNTB
        016144  062706  000010                                                  ADD     #10,SP
    111 016150              ENDMSG
        016150                                                          L10007:
        016150  104423                                                          TRAP    C$MSG
    112
    113
    114 016152              BGNMSG  ERRG10
        016152                                                          ERRG10::
    115 016152                      PRINTB  #FMG16,-2(R0),-2(R1) ;RCV CC & XMIT CC
        016152  016146  177776                                                  MOV     -2(R1),-(SP)
        016156  016046  177776                                                  MOV     -2(R0),-(SP)
        016162  012746  017203                                                  MOV     #FMG16,-(SP)
        016166  012746  000003                                                  MOV     #3,-(SP)
        016172  010600                                                          MOV     SP,R0
        016174  104414                                                          TRAP    C$PNTB
        016176  062706  000010                                                  ADD     #10,SP
    116 016202              ENDMSG
        016202                                                          L10010:
        016202  104423                                                          TRAP    C$MSG
    117
    118 016204              BGNMSG  ERRG11
        016204                                                          ERRG11::
    119 016204                      PRINTB  #FMG17,-4(R0),-4(R1) ;RCV BUFFER & XMIT BUFFER
        016204  016146  177774                                                  MOV     -4(R1),-(SP)
        016210  016046  177774                                                  MOV     -4(R0),-(SP)
        016214  012746  017262                                                  MOV     #FMG17,-(SP)
        016220  012746  000003                                                  MOV     #3,-(SP)
        016224  010600                                                          MOV     SP,R0
        016226  104414                                                          TRAP    C$PNTB
        016230  062706  000010                                                  ADD     #10,SP
    120 016234              ENDMSG
        016234                                                          L10011:
        016234  104423                                                          TRAP    C$MSG
    121
    122 016236              BGNMSG  ERRG12
        016236                                                          ERRG12::
    123 016236  005303                      DEC     R3              ;BACKUP TO RECEIVE ADDRESS
    124 016240  005304                      DEC     R4              ;BACKUP TO TRANSMIT ADDRESS
    125 016242                      PRINTB  #FMG18,R3,R4    ;PRINT OUT ADDRESS
```

```
        016242  010446                                                          MOV     R4,-(SP)
        016244  010346                                                          MOV     R3,-(SP)
        016246  012746  017335                                                  MOV     #FMG18,-(SP)
        016252  012746  000003                                                  MOV     #3,-(SP)
        016256  010600                                                          MOV     SP,R0
        016260  104414                                                          TRAP    C$PNTB
        016262  062706  000010                                                  ADD     #10,SP
    126 016266                          ENDMSG
        016266                                                          L10012:
        016266  104423                                                          TRAP    C$MSG
    127
    128
    129
    130
    131
    132
    133 016270      045     101     123  FMG1:    .ASCIZ  /%ASEL0: %06%A SEL2: %06%N/
        016273      105     114     060
        016276      072     040     045
        016301      117     066     045
        016304      101     040     123
        016307      105     114     062
        016312      072     040     045
        016315      117     066     045
        016320      116     000
    134 016322      045     101     123  FMG2:    .ASCIZ  /%ASEL4: %06%A SEL6: %06%N/
        016325      105     114     064
        016330      072     040     045
        016333      117     066     045
        016336      101     040     123
        016341      105     114     066
        016344      072     040     045
        016347      117     066     045
        016352      116     000
    135 016354      045     101     105  FMG3:    .ASCIZ  /%AERROR IN SUBROUTINE CALLED AT PC: %06%N/
        016357      122     122     117
        016362      122     040     111
        016365      116     040     123
        016370      125     102     122
        016373      117     125     124
        016376      111     116     105
        016401      040     103     101
        016404      114     114     105
        016407      104     040     101
        016412      124     040     120
        016415      103     072     040
        016420      045     117     066
        016423      045     116     000
    136 016426      045     101     103  FMG4:    .ASCIZ  /%ACPU MICROTEST FAILED%N/
        016431      120     125     040
        016434      115     111     103
        016437      122     117     124
        016442      105     123     124
        016445      040     106     101
        016450      111     114     105
        016453      104     045     116
        016456      000
```

```
    137 016457      045     101     114  FMG5:    .ASCIZ  /%ALU. MICROTEST FAILED%N/
        016462      125     056     040
        016465      115     111     103
        016470      122     117     124
        016473      105     123     124
        016476      040     106     101
        016501      111     114     105
        016504      104     045     116
        016507      000
    138 016510      045     101     116  FMG7:    .ASCIZ  /%ANAKS-NO BUFFER  RCV: %D3%A SENT: %D3%N/
        016513      101     113     123
        016516      055     116     117
        016521      040     102     125
        016524      106     106     105
        016527      122     040     040
        016532      122     103     126
        016535      072     040     045
        016540      104     063     045
        016543      101     040     123
        016546      105     116     124
        016551      072     040     045
        016554      104     063     045
        016557      116     000
    139 016561      045     101     116  FMG8:    .ASCIZ  /%ANAKS-BAD DATA   RCV: %D3%A SENT: %D3%N/
        016564      101     113     123
        016567      055     102     101
        016572      104     040     104
        016575      101     124     101
        016600      040     040     040
        016603      122     103     126
        016606      072     040     045
        016611      104     063     045
        016614      101     040     123
        016617      105     116     124
        016622      072     040     045
        016625      104     063     045
        016630      116     000
    140 016632      045     101     116  FMG9:    .ASCIZ  /%ANAKS-BAD HEADER RCV: %D3%A SENT: %D3%N/
        016635      101     113     123
        016640      055     102     101
        016643      104     040     110
        016646      105     101     104
        016651      105     122     040
        016654      122     103     126
        016657      072     040     045
        016662      104     063     045
        016665      101     040     123
        016670      105     116     124
        016673      072     040     045
        016676      104     063     045
        016701      116     000
    141 016703      045     101     122  FMG10:   .ASCIZ  /%AREPS-RCV: %D3%A SENT: %D3%N/
        016706      105     120     123
        016711      055     122     103
        016714      126     072     040
        016717      045     104     063
        016722      045     101     040
```

```
        016725  123  105  116
        016730  124  072  040
        016733  045  104  063
        016736  045  116  000
    142 016741  045  101  130  FMG11:  .ASCIZ  /%AXMIT BACC OUT COMMAND%N/
        016744  115  111  124
        016747  040  102  101
        016752  103  103  040
        016755  117  125  124
        016760  040  103  117
        016763  115  115  101
        016766  116  104  045
        016771  116  000
    143 016773  045  101  122  FMG12:  .ASCIZ  /%ARCV BACC OUT COMMAND%N/
        016776  103  126  040
        017001  102  101  103
        017004  103  040  117
        017007  125  124  040
        017012  103  117  115
        017015  115  101  116
        017020  104  045  116
        017023  000
    144 017024  045  101  101  FMG13:  .ASCIZ  /%AACTUAL   ADDR. %06%A ACTUAL COUNT   %D5%N/
        017027  103  124  125
        017032  101  114  040
        017035  040  040  101
        017040  104  104  122
        017043  056  040  045
        017046  117  066  045
        017051  101  040  101
        017054  103  124  125
        017057  101  114  040
        017062  103  117  125
        017065  116  124  040
        017070  040  040  045
        017073  104  065  045
        017076  116  000
    145 017100  045  101  105  FMG14:  .ASCIZ  /%AEXPECTED ADDR. %06%A EXPECTED COUNT %D5%N/
        017103  130  120  105
        017106  103  124  105
        017111  104  040  101
        017114  104  104  122
        017117  056  040  045
        017122  117  066  045
        017125  101  040  105
        017130  130  120  105
        017133  103  124  105
        017136  104  040  103
        017141  117  125  116
        017144  124  040  045
        017147  104  065  045
        017152  116  000
    146 017154  045  101  105  FMG15:  .ASCIZ  /%AEXPECTED ADDR. %06%N/
        017157  130  120  105
        017162  103  124  105
        017165  104  040  101
        017170  104  104  122
```

```
                017173  056     040     045
                017176  117     066     045
                017201  116     000
    147         017203  045     101     122     FMG16:  .ASCIZ  /%ARCV CHAR. COUNT %D5%A XMIT CHAR. COUNT %D5%N/
                017206  103     126     040
                017211  103     110     101
                017214  122     056     040
                017217  103     117     125
                017222  116     124     040
                017225  045     104     065
                017230  045     101     040
                017233  130     115     111
                017236  124     040     103
                017241  110     101     122
                017244  056     040     103
                017247  117     125     116
                017252  124     040     045
                017255  104     065     045
                017260  116     000
    148         017262  045     101     122     FMG17:  .ASCIZ  /%ARCV BUFFER AT %06%A XMIT BUFFER AT %06%N/
                017265  103     126     040
                017270  102     125     106
                017273  106     105     122
                017276  040     101     124
                017301  040     045     117
                017304  066     045     101
                017307  040     130     115
                017312  111     124     040
                017315  102     125     106
                017320  106     105     122
                017323  040     101     124
                017326  040     045     117
                017331  066     045     116
                017334  000
    149         017335  045     101     104     FMG18:  .ASCIZ  /%ADATA DIFFERS AT RCV ADDR. %06%A AND XMIT ADDR. %06%N/
                017340  101     124     101
                017343  040     104     111
                017346  106     106     105
                017351  122     123     040
                017354  101     124     040
                017357  122     103     126
                017362  040     101     104
                017365  104     122     056
                017370  040     045     117
                017373  066     045     101
                017376  040     101     116
                017401  104     040     130
                017404  115     111     124
                017407  040     101     104
                017412  104     122     056
                017415  040     045     117
                017420  066     045     116
                017423  000
    150         017424  045     101     104     FMG19:  .ASCIZ  /%ADEVICE NOT DMR%N/
                017427  105     126     111
                017432  103     105     040
                017435  116     117     124
```

```
        017440      040      104      115
        017443      122      045      116
        017446      000
    151 017447      045      101      102  FMG21:  .ASCIZ  /%ABUFFER STATUS%N%A# OF BUFFERS:%D3%N/
        017452      125      106      106
        017455      105      122      040
        017460      123      124      101
        017463      124      125      123
        017466      045      116      045
        017471      101      043      040
        017474      117      106      040
        017477      102      125      106
        017502      106      105      122
        017505      123      072      045
        017510      104      063      045
        017513      116      000
    152 017515      045      101      102  FMG22:  .ASCIZ  /%ABUFFER SIZE: %D5%N/
        017520      125      106      106
        017523      105      122      040
        017526      123      111      132
        017531      105      072      040
        017534      045      104      065
        017537      045      116      000
    153 017542      045      101      111  FMG23:  .ASCIZ  /%AIN  - RCV ASSIGNED:%D3%A   XMIT ASSIGNED:%D3%N/
        017545      116      040      040
        017550      055      040      122
        017553      103      126      040
        017556      101      123      123
        017561      111      107      116
        017564      105      104      072
        017567      045      104      063
        017572      045      101      040
        017575      040      040      130
        017600      115      111      124
        017603      040      101      123
        017606      123      111      107
        017611      116      105      104
        017614      072      045      104
        017617      063      045      116
        017622      000
    154 017623      045      101      117  FMG24:  .ASCIZ  /%AOUT - RCV RETURNED:%D3%A   XMIT RETURNED:%D3%N/
        017626      125      124      040
        017631      055      040      122
        017634      103      126      040
        017637      122      105      124
        017642      125      122      116
        017645      105      104      072
        017650      045      104      063
        017653      045      101      040
        017656      040      040      130
        017661      115      111      124
        017664      040      122      105
        017667      124      125      122
        017672      116      105      104
        017675      072      045      104
        017700      063      045      116
        017703      000
```

```
                                                                    H 7
    155
    156 017704      124     111     115  EMG1:   .ASCIZ  /TIME OUT/
         017707      105     040     117
         017712      125     124     000
    157 017715      124     111     115  EMG2:   .ASCIZ  /TIME OUT - DURING INTERRUPT EXERCISE/
         017720      105     040     117
         017723      125     124     040
         017726      055     040     104
         017731      125     122     111
         017734      116     107     040
         017737      111     116     124
         017742      105     122     122
         017745      125     120     124
         017750      040     105     130
         017753      105     122     103
         017756      111     123     105
         017761      000
    158 017762      105     130     120  EMG8:   .ASCIZ  /EXPECTED CONTROL OUT - NOT RECEIVED/
         017765      105     103     124
         017770      105     104     040
         017773      103     117     116
         017776      124     122     117
         020001      114     040     117
         020004      125     124     040
         020007      055     040     116
         020012      117     124     040
         020015      122     105     103
         020020      105     111     126
         020023      105     104     000
    159 020026      125     116     105  EMG9:   .ASCIZ  /UNEXPECTED CONTROL OUT/
         020031      130     120     105
         020034      103     124     105
         020037      104     040     103
         020042      117     116     124
         020045      122     117     114
         020050      040     117     125
         020053      124     000
    160 020055      105     122     122  EMG10:  .ASCIZ  /ERROR - MULTIPLE XMITS/
         020060      117     122     040
         020063      055     040     115
         020066      125     114     124
         020071      111     120     114
         020074      105     040     130
         020077      115     111     124
         020102      123     000
    161 020104      102     125     106  EMG11:  .ASCIZ  /BUFFER ADDR. ERROR/
         020107      106     105     122
         020112      040     101     104
         020115      104     122     056
         020120      040     105     122
         020123      122     117     122
         020126      000
    162 020127      103     110     101  EMG12:  .ASCIZ  /CHARACTER COUNT ERROR/
         020132      122     101     103
         020135      124     105     122
         020140      040     103     117
         020143      125     116     124
```

```
        020146  040     105     122
        020151  122     117     122
        020154  000
    163 020155  105     122     122     EMG13:  .ASCIZ  /ERROR - MULTIPLE RCVS/
        020160  117     122     040
        020163  055     040     115
        020166  125     114     124
        020171  111     120     114
        020174  105     040     122
        020177  103     126     123
        020202  000
    164 020203  122     103     126     EMG14:  .ASCIZ  /RCVD EXTRA DATA/
        020206  104     040     105
        020211  130     124     122
        020214  101     040     104
        020217  101     124     101
        020222  000
    165 020223  104     101     124     EMG15:  .ASCIZ  /DATA ERROR/
        020226  101     040     105
        020231  122     122     117
        020234  122     000
    166 020236  125     116     105     EMG16:  .ASCIZ  /UNEXPECTED HALT RECEIVED/
        020241  130     120     105
        020244  103     124     105
        020247  104     040     110
        020252  101     114     124
        020255  040     122     105
        020260  103     105     111
        020263  126     105     104
        020266  000
    167 020267  103     117     116     EMG17:  .ASCIZ  /CONTROL IN PROBLEM - IN INTERRUPT ROUTINE/
        020272  124     122     117
        020275  114     040     111
        020300  116     040     120
        020303  122     117     102
        020306  114     105     115
        020311  040     055     040
        020314  111     116     040
        020317  111     116     124
        020322  105     122     122
        020325  125     120     124
        020330  040     122     117
        020333  125     124     111
        020336  116     105     000
    168 020341  123     120     125     EMG18:  .ASCIZ  /SPURIOUS RDO INTERRUPT/
        020344  122     111     117
        020347  125     123     040
        020352  122     104     117
        020355  040     111     116
        020360  124     105     122
        020363  122     125     120
        020366  124     000
    169 020370  115     070     062     EMG19:  .ASCIZ  /M8207 PROGRAM TIMER OUT OF RANGE/
        020373  060     067     040
        020376  120     122     117
        020401  107     122     101
        020404  115     040     124
```

```
        020407      111     115     105
        020412      122     040     117
        020415      125     124     040
        020420      117     106     040
        020423      122     101     116
        020426      107     105     000
    170                                 .EVEN
```

```
                        .SBTTL  LOAD DEVICE PROTECTION TABLE

                        ;////////////////////////////////////////////////////////////////////////
                        ;/ THIS TABLE IDENTIFIES THE LOAD DEVICE TO THE SUPERVISOR, SO THAT IT CAN BE
                        ;/ PROTECTED FROM TESTING. IF DESIRED.
                        ;////////////////////////////////////////////////////////////////////////

020432                          BGNPROT
020432                                                          L$PROT::

020432  177777                  .WORD   -1              ;DON'T CHECK CSR ADDRESS
020434  177777                  .WORD   -1              ;DON'T CHECK MASSBUS UNIT NUMBER
020436  177777                  .WORD   -1              ;DON'T CHECK DRIVE NUMBER

020440                          ENDPROT
```

```
                        .SBTTL  INITIALIZE SECTION

                        ;////////////////////////////////////////////////////////////////
                        ;/ THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                        ;/ AT THE BEGINNING OF THE TEST SEQUENCE ON THE NEXT UNIT.
                        ;////////////////////////////////////////////////////////////////

020440                  BGNINIT
020440                                                          L$INIT::

020440                          SETPRI  #PRIO7          ;SET DIAGNOSTIC PRIORITY = 7
020440  012700  000340                                                  MOV     #PRIO7,R0
020444  104441                                                          TRAP    C$SPRI
020446  010637  002370          MOV     SP,PSTACK       ;STORE BASE LEVEL PROGRAM STACK POINTER
020452  005037  002372          CLR     SUBRPC          ;CLEAR STORAGE WORD FOR SUBROUTINE PC CALL
020456  005037  002364          CLR     ERROR           ;CLEAR ERROR FLAGS
020462  005037  002274          CLR     RESUME          ;CLEAR FLAG USED TO ALLOW BASE IN - RESUME.
020466  005037  002276          CLR     DMCMDE          ;CLEAR FLAG USED TO INDICATE DMC MODE
020472  005037  002376          CLR     CLRNO           ;CLEAR WORD USED TO RUN MICRO TESTS ON
                                                        ;EVERY OTHER MASTER CLEAR.
020476  005037  002350          CLR     NXMFLG          ;FLAG USED TO MARK A NXM DMR ADDRESS.
020502  005737  002264          TST     FRSTIM          ;IS THIS THE TIME THROUGH AFTER LOAD?
020506  001005                  BNE     1$              ;IF NOT - ERROR TRAP VECTOR ALREADY SAVED
020510  012737  000001  002264  MOV     #1,FRSTIM       ;FLAG THAT WE'VE BEEN THRU THE 1ST TIME
020516  005037  002266          CLR     FRSPAS          ;CLEAR COUNTER FOR # OF PASSES AFTER LOAD

020522                  1$:
020522                          CLRVEC  #4              ;ENSURE VECTOR 4 IS IN NORMAL STATE.
020522  012700  000004                                                  MOV     #4,R0
020526  104436                                                          TRAP    C$CVEC

020530                          READEF  #EF.START       ;IS THIS JUST STARTED?
020530  012700  000040                                                  MOV     #EF.START,R0
020534  104447                                                          TRAP    C$REFG
020536                          BCOMPLETE STARST        ;IF YES - BRANCH.
020536  103416                                                          BCS     STARST
020540                          READEF  #EF.RESTART     ;IS THIS A RESTART ?
020540  012700  000037                                                  MOV     #EF.RESTART,R0
020544  104447                                                          TRAP    C$REFG
020546                          BCOMPLETE STARST        ;IF YES - BRANCH.
020546  103412                                                          BCS     STARST
020550                          READEF  #EF.NEW         ;IS THIS A NEW PASS?
020550  012700  000035                                                  MOV     #EF.NEW,R0
020554  10444?                                                         TRAP    C$REFG
020556                          BCOMPLETE NEWST         ;IF YES - BRANCH
020556  103410                                                          BCS     NEWST
020560                          READEF  #EF.CONTINUE    ;IS THIS A CONTINUATION?
020560  012700  000036                                                  MOV     #EF.CONTINUE,R0
020564  104447                                                          TRAP    C$REFG
020566                          BNCOMPLETE GETPRM       ;IF NOT - GET PARAMETERS
020566  103013                                                          BCC     GETPRM
020570  000137  021476          JMP     END             ;OTHERWISE - DON'T INITIALIZE.

020574                  STARST:
020574  005037  002270          CLR     STARES          ;CLEAR THE FLAG TO SHOW START/RESTART.

020600                  NEWST:
```

INITIALIZE SECTION

```
     41 020600  012737  177777  002366          MOV     #-1,LOGDEV      ;INITIALIZE LOGICAL UNIT NUMBER.
     42 020606  005237  002266                  INC     FRSPAS          ;INCREMENT # OF PASSES AFTER LOAD.
     43 020612  005237  002270                  INC     STARES          ;INCREMENT # OF PASSES SINCE START/RESTART.
     44 020616                          GETPRM:
     45 020616  005237  002366                  INC     LOGDEV          ;NEXT LOGICAL UNIT TO BE TESTED
     46 020622  023737  002366  002012          CMP     LOGDEV,L$UNIT   ;IS THE MAXIMUM UNIT # EXCEEDED?
     47 020630  002363                          BGE     NEWST           ;IF YES - DO A NEW START
     48 020632                                  GPHARD  LOGDEV,R1       ;GET THE P-TABLE POINTER INTO R1
        020632  013700  002366                                                  MOV     LOGDEV,R0
        020636  104442                                                          TRAP    C$GPHRD
        020640  010001                                                          MOV     R0,R1
     49 020642                                  BNCOMPLETE  GETPRM      ;IF NOT AVAILABLE, GET THE NEXT ONE
        020642  103365                                                          BCC     GETPRM
     50 020644  012137  002252                  MOV     (R1)+,WTYPE     ;MICROPROCESSOR TYPE
     51 020650  011100                          MOV     (R1),R0         ;SAVE THE ADDRESS
     52 020652  032700  000007                  BIT     #7,R0           ;DOES THIS DEVICE ADDRESS END IN NON-ZERO?
     53 020656  001414                          BEQ     10$             ;IF NOT - OK (76XXX0)
     54 020660  042711  000007                  BIC     #7,(R1)         ;MAKE IT 76XXX0
     55 020664                                  PRINTB  #FINIT1,(R1),R0 ;INFORM THE USER
        020664  010046                                                          MOV     R0,-(SP)
        020666  011146                                                          MOV     (R1),-(SP)
        020670  012746  021500                                                  MOV     #FINIT1,-(SP)
        020674  012746  000003                                                  MOV     #3,-(SP)
        020700  010600                                                          MOV     SP,R0
        020702  104414                                                          TRAP    C$PNTB
        020704  062706  000010                                                  ADD     #10,SP
     56 020710                          10$:
     57 020710  011137  002232                  MOV     (R1),CSR        ;CSR ADDRESS
     58 020714  011137  002242                  MOV     (R1),BSEL1
     59 020720  005237  002242                  INC     BSEL1           ;HIGH BYTE ADDRESS OF CSR
     60 020724  011137  002234                  MOV     (R1),SEL2
     61 020730  062737  000002  002234          ADD     #2,SEL2         ;CONTROL OUT REGISTER ADDRESS
     62 020736  011137  002244                  MOV     (R1),BSEL3
     63 020742  062737  000003  002244          ADD     #3,BSEL3        ;HIGH BYTE OF SEL2
     64 020750  011137  002236                  MOV     (R1),SEL4
     65 020754  062737  000004  002236          ADD     #4,SEL4         ;PORT REG (SEL 4) ADDRESS
     66 020762  011137  002246                  MOV     (R1),BSEL5
     67 020766  062737  000005  002246          ADD     #5,BSEL5        ;HIGH BYTE OF SEL4
     68 020774  011137  002240                  MOV     (R1),SEL6
     69 021000  062737  000006  002240          ADD     #6,SEL6         ;PORT REG (SEL 6) ADDRESS
     70 021006  012137  002250                  MOV     (R1)+,BSEL7
     71 021012  062737  000007  002250          ADD     #7,BSEL7        ;HIGH BYTE OF SEL6
     72 021020  011100                          MOV     (R1),R0         ;GET VECTOR
     73 021022  032700  000007                  BIT     #7,R0           ;DOES THIS VECTOR END IN NON-ZERO?
     74 021026  001414                          BEQ     11$             ;IF NOT - OK (XX0)
     75 021030  042711  000007                  BIC     #7,(R1)         ;MAKE IT XX0
     76 021034                                  PRINTB  #FINIT2,(R1),R0 ;INFORM THE USER
        021034  010046                                                          MOV     R0,-(SP)
        021036  011146                                                          MOV     (R1),-(SP)
        021040  012746  021567                                                  MOV     #FINIT2,-(SP)
        021044  012746  000003                                                  MOV     #3,-(SP)
        021050  010600                                                          MOV     SP,R0
        021052  104414                                                          TRAP    C$PNTB
        021054  062706  000010                                                  ADD     #10,SP
     77 021060                          11$:
     78 021060  011137  002226                  MOV     (R1),DMRVEC     ;RCV. VECTOR
     79 021064  011137  002230                  MOV     (R1),DMTVEC     ;TRANSMIT VECTOR
```

```
     80 021070  011100                    MOV     (R1),R0         ;RCV. VECTOR
     81 021072  105060  000003            CLRB    3(R0)           ;CLEAR HI BYTE OF PSW FOR RCV. VECTOR.
     82 021076  105060  000007            CLRB    7(R0)           ;CLEAR HI BYTE OF PSW FOR XMIT. VECTOR.
     83                                                           ;THIS WILL ENSURE THAT WE DON'T PICK
     84                                                           ;UP ANY UNEXPECTED BITS IN PROCESSORS
     85                                                           ;WHICH USE BITS 11-15 OF THE PSW.  IE
     86                                                           ;IF BIT 11 IS SET IN AN 11/70 ANOTHER
     87                                                           ;REGISTER SET MAY BE USED.
     88 021102  062737  000004  002230    ADD     #4,DMTVEC       ;ADJUST XMIT VECTOR
     89
     90                                                           ;SET UP ISRS FOR DMR. INTERRUPTS ENABLED IN
     91                                                           ;TESTS 15-19.
     92
     93 021110                            SETVEC  DMRVEC,#INISR,#PRIO5    ;INPUT ISR
        021110  012746  000240                                                       MOV     #PRIO5,-(SP)
        021114  012746  022052                                                       MOV     #INISR,-(SP)
        021120  013746  002226                                                       MOV     DMRVEC,-(SP)
        021124  012746  000003                                                       MOV     #3,-(SP)
        021130  104437                                                               TRAP    C$SVEC
        021132  062706  000010                                                       ADD     #10,SP
     94 021136                            SETVEC  DMTVEC,#OUTISR,#PRIO5   ;OUTPUT ISR
        021136  012746  000240                                                       MOV     #PRIO5,-(SP)
        021142  012746  023134                                                       MOV     #OUTISR,-(SP)
        021146  013746  002230                                                       MOV     DMTVEC,-(SP)
        021152  012746  000003                                                       MOV     #3,-(SP)
        021156  104437                                                               TRAP    C$SVEC
        021160  062706  000010                                                       ADD     #10,SP
     95
     96 021164  062701  000014            ADD     #14,R1          ;INCR. P-TABLE POINTER.
     97 021170  012137  002254            MOV     (R1)+,DMTURN    ;TURNAROUND
     98
     99
    100 021174  013700  002224            MOV     SPEED,R0        ;GET THE SOFTWARE P-TABLE VALUE GIVEN
    101                                                          ;BY THE USER
    102
    103
    104 021200                      13$:
    105 021200  012701  000002            MOV     #2,R1           ;GET FIRST TIMER VALUE
    106 021204  012702  000012            MOV     #10.,R2         ;GET SECOND TIMER VALUE
    107 021210                      14$:
    108 021210  006301                    ASL     R1              ; TIMER VALUES X 2
    109 021212  006302                    ASL     R2
    110 021214  005300                    DEC     R0              ; DEC SPEED VARIABLE
    111 021216  001374                    BNE     14$             ; CONTINUE UNTIL DONE INCREASING WAIT VALUES
    112
    113 021220  010137  002312            MOV     R1,WAIT1        ;SAVE TIMER VALUE FOR $WAIT
    114 021224  006201                    ASR     R1              ;HALF THAT VALUE
    115 021226  006201                    ASR     R1              ;HALF IT AGAIN.
    116 021230  010137  002314            MOV     R1,WAIT2        ;SAVE TIMER VALUE FOR $MSCLR AND $CLRQI
    117                                                          ;SUBROUTINES.
    118 021234  010237  002316            MOV     R2,WAIT3        ;TIMER VALUE FOR $INOUT SUBROUTINE.
    119
    120                                                          ;CHECK TURNAROUND.
    121 021240  012737  000333  002304    MOV     #333,AX3        ;MASK FOR AX3-15 - BIT CLEARED WILL
    122                                                          ;BE THE INTERFACE SELECTED.
    123 021246  022737  000001  002254    CMP     #1,DMTURN       ;IS V.35 REQUESTED?
    124 021254  001004                    BNE     20$             ;IF NOT - CONTINUE
```

```
    125 021256  042737  000020  002304          BIC     #BIT4,AX3       ;SELECT V.35
    126 021264  000427                          BR      30$
    127 021266                          20$:
    128 021266  022737  000002  002254          CMP     #2,DMTURN       ;IS INTEGRAL REQUESTED?
    129 021274  001004                          BNE     22$             ;IF NOT - CONTINUE.
    130 021276  042737  000010  002304          BIC     #BIT3,AX3       ;SELECT INTEGRAL MODEM.
    131 021304  000417                          BR      30$
    132 021306                          22$:
    133 021306  022737  000003  002254          CMP     #3,DMTURN       ;IS EIA REQUESTED?
    134 021314  001004                          BNE     25$             ;IF NOT - CONTINUE.
    135 021316  042737  000100  002304          BIC     #BIT6,AX3       ;SELECT EIA(XYZ).
    136 021324  000407                          BR      30$
    137 021326                          25$:
    138 021326  022737  000004  002254          CMP     #4,DMTURN       ;IS RS422 REQUESTED?
    139 021334  001007                          BNE     35$             ;IF NOT, DON'T ALLOW INTERFACE CHANGE.
    140 021336  042737  000200  002304          BIC     #BIT7,AX3       ;SELECT RS422.
    141 021344                          30$:
    142 021344  012737  000001  002262          MOV     #1,INFACE       ;SET FLAG THAT ALLOWS INTERFACE CHANGE.
    143 021352  000404                          BR      40$
    144 021354                          35$:
    145 021354  005037  002262                  CLR     INFACE          ;CLEAR FLAG - NO INTERFACE CHANGE.
    146 021360  005037  002304                  CLR     AX3             ;CLEAR AX3 BITS
    147 021364                          40$:
    148                                                                 ;*****************************************
    149 021364  005737  002310                  TST     MANUF           ;IS THIS A SPECIAL MANUFACTURING TEST CON.?
    150 021370  001410                          BEQ     42$             ;IF NOT - SET MAINT BIT ONLY FOR MODEM LOOP
    151                                                                 ;*****************************************
    152 021372  022737  000001  002254          CMP     #1,DMTURN       ;IS THIS V.35 WITH SPECIAL CONNECTOR?
    153 021400  001430                          BEQ     45$             ;IF YES - SET WRITE MAINT. BIT
    154 021402  022737  000003  002254          CMP     #3,DMTURN       ;IS THIS EIA WITH SPECIAL CONNECTOR?
    155 021410  001424                          BEQ     45$             ;IF YES - SET WRITE MAINT. BIT
    156 021412                          42$:
    157 021412  022737  000006  002254          CMP     #6,DMTURN       ;IS THIS LOCAL LOOP?
    158 021420  001420                          BEQ     45$             ;IF YES - SET WRITE MAINT. BIT.
    159 021422  022737  000007  002254          CMP     #7,DMTURN       ;IS THIS REMOTE LOOP?
    160 021430  001020                          BNE     50$             ;IF NOT - CLEAR MAINT. BIT FLAG
    161 021432  022737  000001  002270          CMP     #1,STARES       ;IS THIS THE FIRST PASS?
    162 021440  001010                          BNE     45$             ;IF NOT - SKIP MESSAGE
    163 021442                                  PRINTB  #FINIT3         ;WARN TO USE ONLY TESTS 17-19
        021442  012746  021656                                                  MOV     #FINIT3,-(SP)
        021446  012746  000001                                                  MOV     #1,-(SP)
        021452  010600                                                          MOV     SP,R0
        021454  104414                                                          TRAP    C$PNTB
        021456  062706  000004                                                  ADD     #4,SP
    164
    165 021462                          45$:
    166 021462  012737  000001  002306          MOV     #1,WMAINT       ;SET FLAG TO WRITE MODEM MAINTENANCE BITS.
    167 021470  000402                          BR      END
    168 021472                          50$:
    169 021472  005037  002306                  CLR     WMAINT          ;CLEAR FLAG - DON'T WRITE MAINT. 1 OR 2.
    170 021476                          END:
    171 021476                          ENDINIT
        021476                                                                  L10014:
        021476  104411                                                                  TRAP    C$INIT
    172 021500     045     101     052  FINIT1: .ASCIZ  /%A** WARNING - WILL ASSUME ADDRESS %06%A (NOT %06%A)%N/
        021503     052     040     127
        021506     101     122     116
```

```
        021511  111     116     107
        021514  040     055     040
        021517  127     111     114
        021522  114     040     101
        021525  123     123     125
        021530  115     105     040
        021533  101     104     104
        021536  122     105     123
        021541  123     040     045
        021544  117     066     045
        021547  101     040     050
        021552  116     117     124
        021555  040     045     117
        021560  066     045     101
        021563  051     045     116
        021566  000
173     021567  045     101     052  FINIT2: .ASCIZ  /%A** WARNING - WILL ASSUME VECTOR  %03%A (NOT %03%A)%N/
        021572  052     040     127
        021575  101     122     116
        021600  111     116     107
        021603  040     055     040
        021606  127     111     114
        021611  114     040     101
        021614  123     123     125
        021617  115     105     040
        021622  126     105     103
        021625  124     117     122
        021630  040     040     045
        021633  117     063     045
        021636  101     040     050
        021641  116     117     124
        021644  040     045     117
        021647  063     045     101
        021652  051     045     116
        021655  000
174     021656  045     101     052  FINIT3: .ASCIZ  /%A** WITH REMOTE LOOPBACK USE TESTS 17 - 19 ONLY **%N/
        021661  052     040     127
        021664  111     124     110
        021667  040     122     105
        021672  115     117     124
        021675  105     040     114
        021700  117     117     120
        021703  102     101     103
        021706  113     040     125
        021711  123     105     040
        021714  124     105     123
        021717  124     123     040
        021722  061     067     040
        021725  055     040     061
        021730  071     040     117
        021733  116     114     131
        021736  040     052     052
        021741  045     116     000
175                                  .EVEN
```

```
                                .SBTTL  AUTO DROP UNIT SECTION

                                ;////////////////////////////////////////////////////////////////////////
                                ;/ THE AUTO DROP CODING DETERMINES WHETHER OR NOT THE DEVICE WHOSE P-TABLE
                                ;/ WAS JUST OBTAINED IS READY FOR TESTING, AND IT IS DROPPED IF NOT READY.
                                ;////////////////////////////////////////////////////////////////////////

021744                          BGNAUTO
021744                                                                  L$AUTO::

                                        SETVEC  #4,#NOXMEM,#PRI07 ;SET UP NON -EXISTENT MEMORY TRAP VECTOR.
021744  012746  000340                                                  MOV     #PRI07,-(SP)
021750  012746  023572                                                  MOV     #NOXMEM,-(SP)
021754  012746  000004                                                  MOV     #4,-(SP)
021760  012746  000003                                                  MOV     #3,-(SP)
021764  104437                                                          TRAP    C$SVEC
021766  062706  000010                                                  ADD     #10,SP
021772  005037  002350                CLR     NXMFLG          ;CLEAR FLAG THAT WILL BE SET IF NXM OCCURS.
021776  005777  160230                TST     @CSR            ;REFERENCE MEMORY ADDRESS FOR THE DEVICE
                                                                ;TO SEE IF IT EXISTS.

                                ;;**********************************************************************
                                ; IF THE DEVICE DOESN'T EXIST THE RESULTANT TRAP TO VECTOR 04 WILL
                                ; CAUSE THE DEVICE TO BE DROPPED (SEE INTERRUPT ROUTINE 'DROP04').
                                ; OTHERWISE THE MEMORY REFERENCE IS UNEVENTFUL AND THE DEVICE IS READY.
                                ;;**********************************************************************

022002                                  CLRVEC  #4              ;RETURN VECTOR 04 TO NORMAL STATE
022002  012700  000004                                                  MOV     #4,R0
022006  104436                                                          TRAP    C$CVEC
022010  005737  002350                TST     NXMFLG          ;DID NXM OCCUR?
022014  001406                        BEQ     1$              ;IF NOT EXIT
022016                                  DODU    LOGDEV          ;DROP THE DEVICE
022016  013700  002366                                                  MOV     LOGDEV,R0
022022  104451                                                          TRAP    C$DODU
022024                                  DOCLN                   ;DO CLEAN UP - FORCE BACK TO INIT CODE.
022024  104444                                                          TRAP    C$DCLN
022026  005037  002350                CLR     NXMFLG          ;RESTORE FLAG.
022032                          1$:
022032                          ENDAUTO
022032                                                                  L10015:
022032  104461                                                          TRAP    C$AUTO
```

```
                                .SBTTL  CLEANUP CODING SECTION

                                ;////////////////////////////////////////////////////////////////////////////
                                ;/  THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED AT THE
                                ;/  END OF THE TEST SEQUENCE ON A PARTICULAR UNIT.  THIS SECTION IS REQUIRED
                                ;/  EVEN IF IT IS A NULL CLEANUP
                                ;////////////////////////////////////////////////////////////////////////////

022034                          BGNCLN
022034                                                                          L$CLEAN::

022034  005737  002350                  TST     NXMFLG          ;WAS THERE A NXM ERROR?
022040  001003                          BNE     10$             ;IF YES - SKIP MASTER CLEAR.
022042  012777  040000  160162          MOV     #MCLR,@SEL0     ;ISSUE A MASTER CLEAR.
022050                          10$:

022050                          ENDCLN
022050                                                                          L10016:
022050  104412                                                                          TRAP    C$CLEAN
```

```
                                .SBTTL  GLOBAL INTERRUPT HANDLING ROUTINES

                                ;////////////////////////////////////////////////////////////////
                                ;/ THE INTERRUPT HANDLING SECTION CONTAINS CODING REQUIRED TO USE
                                ;/ THE 'SETVEC' MACRO.  NOTE EVERY INTERRUPT ROUTINE SHOULD SAVE
                                ;/ AND RESTORE R0.
                                ;////////////////////////////////////////////////////////////////

022052                          BGNSRV  INISR                   ;INPUT INTERRUPT SERVICE ROUTINE
022052                                                                          INISR::
022052  010046                          MOV     R0,-(SP)        ;SAVE R0
022054  010146                          MOV     R1,-(SP)        ;SAVE R1
022056  017701  160150                  MOV     @SEL0,R1        ;SAVE THE CONTROL IN COMMAND.
022062  042701  177760                  BIC     #177760,R1      ;CLEAR ALL BUT THE COMMAND BITS (0-3)
022066  032777  000200  160136          BIT     #RDI,@SEL0      ;IS RDI SET
022074  001002                          BNE     1$              ;IF YES - PROCESS INPUT COMMAND.
022076  000137  022606                  JMP     NEXT            ;ISSUE NEXT INPUT COMMAND.
                                        ;*****************************************************************
                                        ;
                                        ; PROCESS INPUT COMMAND
                                        ;
                                        ;*****************************************************************
022102                          1$:
022102  022701  000004                  CMP     #BACCR,R1       ;IS THIS A RCV. BA/CC?
022106  001533                          BEQ     29$             ;BR IF YES.
022110  022701  000000                  CMP     #BACCT,R1       ;IS THIS A XMIT. BA/CC?
022114  001537                          BEQ     30$             ;BR IF YES.
022116  022701  000003                  CMP     #BASEI,R1       ;IS THIS A BASE IN?
022122  001461                          BEQ     20$             ;BR IF YES.
022124  022701  000001                  CMP     #CNTRL,R1       ;IS THIS A CONTROL IN?
022130  001444                          BEQ     15$             ;BR IF YES.
022132  022701  000005                  CMP     #WMODEM,R1      ;IS THIS A WRITE MODEM?
022136  001417                          BEQ     10$             ;BR IF YES.
022140  022701  000015                  CMP     #INTER,R1       ;IS THIS AN INTERFACE WRITE.
022144  001410                          BEQ     5$              ;BR IF YES.
022146  022701  000002                  CMP     #HLT,R1         ;IS THIS A HALT?
022152  001572                          BEQ     70$             ;EXIT - IF YES (NOTHING TO SET UP)
022154                                  ERRDF   17,EMG17,ERRG2  ;PROBLEM IF IT'S NOT ONE OF THE ABOVE.
022154  104455                                                                  TRAP    C$ERDF
022156  000021                                                                  .WORD   17
022160  020267                                                                  .WORD   EMG17
022162  015112                                                                  .WORD   ERRG2
022164  000565                          BR      70$             ;EXIT

022166                          5$:
                                        ;
                                        ; WRITE AX3-15
                                        ;
022166  113777  002304  160054          MOVB    AX3,@BSEL7      ;WRITE NECESSARY AX3-15 INTERFACE.
                                                                ;AX3 HAS BEEN DETERMINED IN THE INIT
                                                                ;CODE.
022174  000561                          BR      70$

022176                          10$:
                                        ;
                                        ; MODEM WRITE
```

```
                                                ;
022176  022737  000006  002254                CMP     #LLOOP,DMTURN   ;IS LOCAL MODEM LOOPBACK DESIRED?
022204  001007                                BNE     11$             ;BR IF NOT
022206  042777  000004  160024                BIC     #MAINT2,@SEL6   ;ENSURE REMOTE LOOPBACK IS CLEAR.
022214  052777  000110  160016                BIS     #DTR!MAINT1,@SEL6 ;SET MAINTENANCE 1 BIT AND DTR.
022222  000546                                BR      70$
022224                                  11$:
022224  042777  000010  160006                BIC     #MAINT1,@SEL6   ;ENSURE LOCAL LOOPBACK IS CLEAR.
022232  052777  000104  160000                BIS     #DTR.MAINT2,@SEL6 ;SET MAINTENANCE 2 BIT AND DTR.
022240  000537                                BR      70$             ;CLEAR RQI
022242                                  15$:
                                                ;
                                                ;CONTROL IN
                                                ;
022242  005737  002300                        TST     MNTMDE          ;IS MAINTENANCE MODE REQUESTED
022246  001404                                BEQ     17$             ;BR IF NOT
022250  012777  000400  157762                MOV     #MAINT,@SEL6    ;REQUEST MAINT. MODE
022256  000530                                BR      70$
022260                                  17$:
022260  005077  157754                        CLR     @SEL6           ;FULL DUPLEX - NON-MAINT. MODE.
022264  000525                                BR      70$
022266                                  20$:
                                                ;
                                                ;BASE IN
                                                ;
022266  012777  002636  157742                MOV     #BASE,@SEL4     ;BASE TABLE ADDRESS.

022274  005737  002276                        TST     DMCMDE          ;ARE WE IN DMC MODE?
022300  001004                                BNE     22$             ;BR IF YES
022302  012777  000522  157730                MOV     #DMR,@SEL6      ;DMR MODE.
022310  000402                                BR      23$             ;CHECK LOOPBACK.
022312                                  22$:
022312  005077  157722                        CLR     @SEL6           ;DMC MODE
022316                                  23$:
022316  005737  002272                        TST     START           ;IS THIS THE FIRST BASE IN?
022322  001004                                BNE     24$             ;IF NOT - SET RESUME.
022324  052777  000100  157702                BIS     #IEO,@SEL2      ;ON FIRST BASE IN SET RDO INT.ENABLE.
022332  000406                                BR      25$
022334                                  24$:
022334  052777  010000  157676                BIS     #RES,@SEL6      ;SET RESUME
022342  012737  177777  002356                MOV     #-1,RESFLG      ;FLAG THAT THIS IS A BASE IN RESUME COMMAND
                                                ;(THIS WILL BE USED LATER IN THIS ISR TO
                                                ;DECIDE WHAT THE NEXT COMMAND WILL BE)
022350                                  25$:
022350  005737  002254                        TST     DMTURN          ;IS INTERNAL LOOPACK REQUESTED?
022354  001004                                BNE     27$             ;BR IF NOT - CLEAR LU LOOP
022356  052777  004000  157646                BIS     #LPLU,@SEL0     ;SET THE LINE UNIT LOOPBACK BIT
022364  000465                                BR      70$             ;CLEAR RQI AND EXIT.
022366                                  27$:
022366  042777  004000  157636                BIC     #LPLU,@SEL0     ;CLEAR LINE UNIT LOOPBACK (CONNECTOR OR
                                                ;CABLE)
022374  000461                                BR      70$             ;CLEAR RQI AND EXIT

                                                ;
                                                ;BA/CC IN RCV
                                                ;
022376                                  29$:
```

```
                                                DEC     INRCV           ;DECREMENT COUNTER
                                                MOV     (R2)+,@SEL4     ;RCV BUFFER ADDRESS
                                                MOV     (R2)+,@SEL6     ;RCV CHARACTER COUNT
                                                BR      40$
                                                ;
                                                ;BA/CC IN XMIT
                                                ;
                                        30$:
                                                DEC     INXMIT          ;DECREMENT COUNTER
                                                MOV     (R3)+,@SEL4     ;XMIT BUFFER ADDRESS.
                                                MOV     (R3)+,@SEL6     ;XMIT CHARACTER COUNT.
                                        40$:
                                                TST     MMANAG          ;ARE THE BUFFERS MEMORY MANAGED?
                                                BEQ     70$             ;IF NOT SKIP CONVERTING VIRTUAL ADDR
                                                                        ;TO PHYSICAL ADDR.
                                                BIS     #BIT14,@SEL6    ;SET BIT 16 OF PHSICAL ADDRESS (I.E.
                                                                        ;VIRTUAL ADDR 60000 = PHYSICAL ADDR 200000
                                                MOV     R2,-(SP)        ;SAVE R2 (NEXT RCV BUFFER ADDRESS)
                                                MOV     @SEL4,R2        ;SAVE THE VIRTUAL ADDRESS.
                                                BIC     #160000,@SEL4   ;CLEAR BITS CORRESPONDING TO THE PAGE #
                                                                        ;IN THE VIRTUAL ADDRESS.
                                                BIC     #17777,R2       ;SAVE ONLY THE PAGE # IN THE SAVED ADDR.
                                                CMP     #60000,R2       ;IS THIS PAGE 3?
                                                BEQ     44$             ;IF YES, PHYSICAL ADDRESS CALCULATED
                                                CMP     #100000,R2      ;IS THIS PAGE 4?
                                                BNE     41$             ;IF NOT SEE IF IT'S PAGE 4 OR 5
                                                BIS     #BIT13,@SEL4    ;SET BIT FOR PHYSICAL ADDR (I.E. VIRTUAL
                                                                        ;ADDR 100000 = PHYSICAL ADDR. 220000
                                                BR      44$
                                        41$:
                                                CMP     #120000,R2      ;IS THIS PAGE 4?
                                                BNE     42$             ;IF NOT, MUST BE PAGE 5.
                                                BIS     #BIT14,@SEL4    ;SET BIT FOR PHYSICAL ADDR (I.E. VIRTUAL
                                                                        ;ADDR 120000 = PHYSICAL ADDR. 240000
                                                BR      44$
                                        42$:
                                                BIS     #BIT14!BIT13,@SEL4 ;SET BIT FOR PHYSICAL ADDR (I.E. VIRTUAL
                                                                        ;ADDR 140000 = PHYSICAL ADDR. 260000
                                        44$:
                                                MOV     (SP)+,R2        ;RESTORE R2 (NEXT RCV BUFFER ADDRESS)
                                                BR      70$             ;CLEAR RQI AND EXIT


                                        70$:
                                                MOV     R1,LAST         ;SAVE THE INPUT COMMAND (USED
                                                                        ;TO DETERMINE NEXT INPUT COMMAND)
                                                TST     DMCMDE          ;ARE WE IN DMC MODE?
                                                BNE     80$             ;IF YES - DON'T USE IECLR
                                                                        ;NOTE: INTERRUPT CAPABILITY FOR RQI
                                                                        ;CLEAR IS ONLY AVAILABLE IN DMR MODE.
                                                MOV     (SP)+,R1        ;RESTORE R1
                                                MOV     (SP)+,R0        ;RESTORE R0
                                                BIS     #IECLR,@SEL0    ;SET INTERRUPT ENABLE FOR RDI CLEAR.
                                                BIC     #RQI,@SEL0      ;CLEAR RQI - INT. GENERATED WHEN RDI
                                                                        ;CLEARS IN RESPONSE.
                                                RTI                     ;RETURN AND WAIT FOR RQI CLEAR INTERRUPT.

```

```
                                        80$:
                        042777  000020  157430          BIC     #IECLR,@SELO    ;ENSURE INTERRUPT ENABLE FOR RDI CLEAR IS CLR.
                                                        CALL    $CLRQI          ;CLEAR RQI AND WAIT FOR RDI TO CLEAR.
                                                        ;*******************************************************************
                                                        ;
                                                        ; RDI CLEAR - DETERMINE NEXT INPUT COMMAND.
                                                        ;
                                                        ;*******************************************************************
                                        NEXT:
                        022737  000002  002362          CMP     #HLT,LAST       ;WAS THE LAST COMMAND A HALT?
                        001015                          BNE     110$            ;IF NOT - PROCEED.
                        005737  002274                  TST     RESUME          ;ARE WE TESTING RESUME?
                        001541                          BEQ     170$            ;IF NOT, DON'T ISSUE ANOTHER COMMAND.
                        005737  002352                  TST     INFLAG          ;INPUT BUFFER DONE?
                        001403                          BEQ     106$            ;IF NOT, BASE IN.
                        005737  002354                  TST     OUTFLG          ;OUTPUT BUFFER DONE?
                        001133                          BNE     170$            ;IF YES, DON'T ISSUE ANOTHER COMMAND.
                                        106$:
                        112777  000143  157364          MOVB    #IESET!RQI!BASEI,@SELO ;ISSUE A BASE IN.
                        000527                          BR      170$            ;EXIT
                                        110$:
                        005737  002276                  TST     DMCMDE          ;ARE WE IN DMC MODE?
                        001032                          BNE     130$            ;IF YES - DON'T BOTHER CHECKING MODEM
                                                                                ;WRITE AND AX3-15 WRITE COMMANDS
                        022737  000003  002362          CMP     #BASEI,LAST     ;WAS THE LAST COMMAND A BASE IN ?
                        001405                          BEQ     115$            ;IF YES - SEE IF INTER. OR M. WRITE IS NEEDED?
                        022737  000015  002362          CMP     #INTER,LAST     ;WAS THE LAST COMMAND AN AX3-15 WRITE?
                        001413                          BEQ     117$
                        000421                          BR      130$            ;KEEP CHECKING FOR NEXT COMMAND.
                                        115$:
                        005737  002262                  TST     INFACE          ;IS AN AX3-15 WRITE NEEDED?
                        001407                          BEQ     117$            ;BR IF NOT
                        005737  002272                  TST     START           ;WAS CONTROL IN ISSUED?
                        001004                          BNE     117$            ;IF YES - NO NEED TO REWRITE AX3-15. THIS
                                                                                ;SHOULD HAVE BEEN DONE ON THE 1ST BASE IN.
                        112777  000155  157310          MOVB    #IESET!RQI!INTER,@BSELO ;ISSUE AN AX3-15 WRITE COMMAND.
                        000501                          BR      170$
                                        117$:
                        005737  002306                  TST     WMAINT          ;WRITE MAINT 1 OR 2?
                        001404                          BEQ     130$            ;IF NOT - SKIP WRITE MODEM COMMAND.
                        112777  000145  157272          MOVB    #IESET!RQI!WMODEM,@BSELO ;ISSUE A MODEM WRITE COMMAND
                        000472                          BR      170$
                                        130$:
                        005737  002272                  TST     START           ;WAS A CONTROL IN ISSUED?
                        001006                          BNE     150$            ;IF YES - SKIP
                        005237  002272                  INC     START           ;SET FLAG.
                        112777  000141  157250          MOVB    #IESET!RQI!CNTRL,@BSELO ;ISSUE A CONTROL IN
                        000461                          BR      170$
                                        150$:
                        005737  002326                  TST     INRCV           ;ARE ALL THE BA/CC IN RCVS DONE?
                        001424                          BEQ     160$            ;IF YES - BR TO SEE IF XMITS DONE.
                        005737  002274                  TST     RESUME          ;IS A TEST OF RESUME REQUESTED?
                        001415                          BEQ     153$            ;BR IF NOT.
                        032737  000001  002326          BIT     #BIT0,INRCV     ;IS THIS AN ODD COUNT?
                        001411                          BEQ     153$            ;BR IF NOT.
                        005737  002356                  TST     RESFLG          ;WAS THE LAST COMMAND A BASE IN RESUME?
                        001004                          BNE     152$            ;IF YES, ISSUE BA/CC
```

```
                                                                ;HALT - TO TEST RESUME.  NOTE: THIS WILL
                                                                ;OCCUR ONLY WHEN RESUME IS REQUESTED,
                                                                ;FOLLOWING EVERY OTHER BA/CC
                                                                ;COMMAND  (NEVER FOLLOWING A RESUME)
023016  112777  000142  157206          MOVB    #IESET!RQI!HLT,@BSEL0 ;HALT IT
023024  000440                          BR      170$
023026                          152$:
023026  005037  002356                  CLR     RESFLG          ;CLEAR FLAG.
023032                          153$:
023032  112777  000144  157172          MOVB    #IESET!RQI!BACCR,@BSEL0 ;ISSUE A BA/CC IN RCV. COMMAND.
023040  000432                          BR      170$
023042                          160$:
023042  005737  002330                  TST     INXMIT          ;ARE ALL THE BA/CC IN XMITS DONE?
023046  001424                          BEQ     165$            ;IF YES, SET THE FLAG
023050  005737  002274                  TST     RESUME          ;IS A TEST OF RESUME REQUESTED?
023054  001415                          BEQ     163$            ;BR IF NOT.
023056  032737  000001  002330          BIT     #BIT0,INXMIT    ;IS THIS AN ODD COUNT?
023064  001411                          BEQ     163$            ;BR IF NOT.
023066  005737  002356                  TST     RESFLG          ;WAS THE LAST COMMAND A BASE IN RESUME?
023072  001004                          BNE     162$            ;IF YES, ISSUE BA/CC
                                                                ;HALT - TO TEST RESUME.  NOTE: THIS WILL
                                                                ;OCCUR ONLY WHEN RESUME IS REQUESTED,
                                                                ;FOLLOWING EVERY OTHER BA/CC
                                                                ;COMMAND  (NEVER FOLLOWING A RESUME)
023074  112777  000142  157130          MOVB    #IESET!RQI!HLT,@BSEL0 ;HALT IT
023102  000411                          BR      170$
023104                          162$:
023104  005037  002356                  CLR     RESFLG          ;CLEAR BASE IN RESUME FLAG.
023110                          163$:
023110  112777  000140  157114          MOVB    #IESET!RQI!BACCT,@BSEL0 ;ISSUE A BA/CC IN XMIT COMMAND.
023116  000403                          BR      170$
023120                          165$:
023120  012737  177777  002352          MOV     #-1,INFLAG      ;FLAG THAT ALL BA/CC INS DONE.

023126                          170$:
023126  012601                          MOV     (SP)+,R1        ;RESTORE R1
023130  012600                          MOV     (SP)+,R0        ;RESTORE R0

023132                          ENDSRV
023132                                                                  L10017:
023132  000002                                                                RTI

                                ;*****************************************************************
                                ;*****************************************************************

023134                          BGNSRV  OUTISR                  ;OUTPUT INTERRUPT SERVICE ROUTINE
023134                                                                  OUTISR::
023134  010046                          MOV     R0,-(SP)        ;SAVE R0
023136  032777  000200  157070          BIT     #RDO,@SEL2      ;IS THE RDO OUT BIT SET?
023144  001006                          BNE     5$              ;IF YES - OK TO PROCEED.
                                                                ;OTHERWISE REPORT SPURIOUS INTERRUPT
023146                                  ERRDF   18,EMG18,ERRG2
023146  104455                                                          TRAP    C$ERDF
023150  000022                                                          .WORD   18
023152  020341                                                          .WORD   EMG18
023154  015112                                                          .WORD   ERRG2
023156  000137  023530                  JMP     60$
```

```
                                5$:
                                        BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT
                                        BEQ     20$             ;IF NOT - PROCESS BA/CC OUT
                                        BIT     #HALTC,@SEL6    ;IS THIS CONTROL OUT A HALT?
                                        BNE     10$             ;IF IT IS - SEE IF WE SHOULD RESUME.
                                        BIT     #DMRRUN,@SEL6   ;IS THIS DMR RUN MODE ACKNOWLEDGE?
                                        BEQ     10$             ;IF NOT - REPORT ERROR
                                        JMP     65$             ;EXIT
                                7$:
                                        ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT.
                                                                                TRAP    C$ERDF
                                                                                .WORD   9
                                                                                .WORD   EMG9
                                                                                .WORD   ERRG2
                                        BR      65$             ;EXIT ROUTINE
                                10$:
                                        TST     INFLAG          ;ARE THE INPUTS DONE?
                                        BEQ     15$             ;BR IF NOT
                                        TST     OUTFLG          ;ARE THE OUTPUTS DONE?
                                        BNE     60$             ;IF YES - ALL DONE, EXIT
                                15$:
                                        TST     RESUME          ;IS A RESUME REQUESTED?
                                        BNE     65$             ;IF YES - OK, BR TO EXIT
                                16$:
                                        ERRDF   16,EMG16        ;ERROR - UNEXPECTED HALT.
                                                                                TRAP    C$ERDF
                                                                                .WORD   16
                                                                                .WORD   EMG16
                                                                                .WORD   0
                                        JMP     60$
                                20$:
                                        TST     MMANAG          ;ARE THE BUFFERS MEMORY MANAGED?
                                        BEQ     40$             ;IF NOT - NO NEED TO DETERMINE PHYS. ADDR.
                                        BIT     #BIT14,@SEL6    ;IS BIT 16 OF THE PHYSICAL ADDR SET?
                                                                ;(I.E. BUFFER SHOULD BE IN PHYSICAL
                                                                ;ADDRESS RANGE: 200000 - 277776)
                                        BNE     21$             ;PROCEED - IF BIT SET.
                                        ERRDF   11,EMG11,ERRG2
                                                                                TRAP    C$ERDF
                                                                                .WORD   11
                                                                                .WORD   EMG11
                                                                                .WORD   ERRG2
                                        BR      60$
                                21$:
                                        BIC     #BIT15!BIT14,@SEL6 ;CLEAR THE EXTENDED ADDRESS BITS.
                                        MOV     @SEL4,R2        ;SAVE BITS 0-15 OF THE PHYSICAL ADDRESS.
                                        BIC     #17777,R2       ;SAVE ONLY PAGE ADDRESS BITS.
                                        BIC     #160000,@SEL4   ;CLEAR PAGE ADDRESS BITS IN SEL4
                                                                ;DETERMINE PAGE # FOR VIRTUAL ADDRESS.
                                        TST     R2              ;IS THIS PAGE 3?
                                        BNE     22$             ;IF NOT CHECK FOR OTHER PAGES
                                        BIS     #60000,@SEL4    ;SET BITS FOR PAGE 3.
                                        BR      40$
                                22$:
                                        CMP     #20000,R2       ;IS THIS PAGE 4?
                                        BNE     23$             ;IF NOT - KEEP CHECKING
                                        BIS     #100000,@SEL4   ;SET BITS FOR PAGE 4.
```

```
                                        BR      40$
                                23$:
                                        CMP     #40000,R.       ;IS THIS PAGE 5?
                                        BNE     24$             ;IF NOT - MUST BE PAGE 6
                                        BIS     #120000,@SEL4   ;SET BITS FOR PAGE 5.
                                        BR      40$
                                24$:
                                        BIS     #140000,@SEL4   ;SET BITS FOR PAGE 6.
                                40$:
                                        BIT     #RCV,@SEL2      ;IS THIS A RECV. BUFFER?
                                        BNE     50$             ;IF YES - PROCESS THE BUFFER.
                                        DEC     OUTXMT          ;DECREMENT BA/CC OUT XMIT.
                                        CMP     (R5)+,@SEL4     ;IS THE XMIT BUFFER ADDRESS CORRECT?
                                        BEQ     41$             ;IF YES - PROCEED.
                                        TST     (R5)+           ;INCR. POINTER FOR ERROR MESSAGE.
                                        ERRDF   11,EMG11,ERRG8  ;IF NOT - ERROR
023444  104455                                                                    TRAP    C$ERDF
023446  000013                                                                    .WORD   11
023450  020104                                                                    .WORD   EMG11
023452  016050                                                                    .WORD   ERRG8
                                        BR      60$             ;EXIT ROUTINE
                                41$:
                                        CMP     (R5)+,@SEL6     ;IS THE CHAR. COUNT CORRECT?
                                        BEQ     60$             ;IF OK - EXIT ROUTINE.
                                        ERRDF   12,EMG12,ERRG8  ;IF NOT - ERROR
023464  104455                                                                    TRAP    C$ERDF
023466  000014                                                                    .WORD   12
023470  020127                                                                    .WORD   EMG12
023472  016050                                                                    .WORD   ERRG8
                                        BR      60$             ;EXIT
                                50$:
                                        DEC     OUTRCV          ;DECREMENT BA/CC OUT RCV
                                        CMP     (R4)+,@SEL4     ;IS THE RCV BUFFER ADDRESS CORRECT?
                                        BEQ     51$             ;IF OK - PROCEED
                                        ERRDF   11,EMG11,ERRG7
023510  104455                                                                    TRAP    C$ERDF
023512  000013                                                                    .WORD   11
023514  020104                                                                    .WORD   EMG11
023516  015752                                                                    .WORD   ERRG7
                                        TST     (R4)+           ;UPDATE POINTER
                                        BR      60$             ;EXIT ROUTINE
                                51$:
                                        MOV     @SEL6,(R4)+     ;CHANGE THE CHARACTER COUNT TO WHAT
                                                                ;WAS RECEIVED.
                                60$:
                                        TST     OUTXMT          ;HAVE ALL THE XMITS BEEN DONE?
                                        BNE     65$             ;IF NOT, CONTINUE
                                        TST     OUTRCV          ;HAVE ALL THE RECEIVES BEEN DONE?
                                        BNE     65$             ;IF NOT, CONTINUE
                                61$:
                                        BIC     #IEO,@SEL2      ;CLEAR THE OUTPUT INTERRUPT
                                        MOV     #-1,OUTFLG      ;FLAG AS DONE.
                                65$:
                                        BIC     #RDO!CMD,@SEL2  ;CLEAR THE RDC BIT.
                                        MOV     (SP)+,R0        ;RESTORE R0
                                ENDSRV
023570                                                                  L10020:
```

```
023570  000002                                                                  RTI
363
364                             ;*************************************************************************
365                             ;*************************************************************************
366
367 023572                      BGNSRV  NOXMEM
    023572                                                                  NOXMEM::
368
369 023572  012737  000001  002350          MOV     #1,NXMFLG       ;SET FLAG IF MEMORY ADDRESSED IS NON-EXISTENT.
370
371 023600                      ENDSRV
    023600                                                                  L10021:
    023600  000002                                                                 RTI
372
373
```

DROP UNIT SECTION

```
                                .SBTTL  DROP UNIT SECTION

                                ;////////////////////////////////////////////////////////////////////////
                                ;/ THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ;/ TO NO LONGER BE TESTED.
                                ;////////////////////////////////////////////////////////////////////////

023602                          BGNDU
023602                                                                  L$DU::
                        BRESET                  ;ISSUE UNIBUS RESET TO CLEAN UP
023602  104433                                                          TRAP    C$RESET
                        PRINTF  #FMDROP,LOGDEV
023604  013746  002366                                                  MOV     LOGDEV,-(SP)
023610  012746  023632                                                  MOV     #FMDROP,-(SP)
023614  012746  000002                                                  MOV     #2,-(SP)
023620  010600                                                          MOV     SP,R0
023622  104417                                                          TRAP    C$PNTF
023624  062706  000006                                                  ADD     #6,SP

023630                          ENDDU
023630                                                                  L10022:
023630  104453                                                          TRAP    C$DU


023632  045  116  045  FMDROP: .ASCIZ  /%N%AUNIT %D2%A DROPPED/
023635  101  125  116
023640  111  124  040
023643  045  104  062
023646  045  101  040
023651  104  122  117
023654  120  120  105
023657  104  000
                                .EVEN
```

```
TEST 1 - DMR CSR VERIFICATION

                        .SBTTL          TEST 1 - DMR CSR VERIFICATION
                        ;
                        ;*********************************************************************
                        ;*              TEST 1 - DMR-11
                        ;* VERIFY THAT ADDRESSING THE 4 UNIBUS CSRS DOES NOT CAUSE A NON-
                        ;* EXISTENT MEMORY TRAP.
                        ;*
                        ;* THE DMR IS AN NPR DEVICE RESIDING ON A UNIBUS.  COMMUNICATION
                        ;* BETWEEN THE MAIN CPU AND THE DMR IS ACCOMPLISHED THROUGH A
                        ;* SET OF FOUR 16-BIT UNIBUS CONTROL AND STATUS REGISTERS (CSRS).
                        ;* THE FOUR REGISTERS ARE ASSIGNED ADDRESSES IN THE I/O PAGE
                        ;* FLOATING ADDRESS SPACE: 76XXX0 - 76XXX6
                        ;*
                        ;* NOTE: THIS TEST IS REDUNDANT IN THAT STATIC LOGIC TESTS SHOULD
                        ;* HAVE BEEN RUN BEFORE THESE FREE-RUNNING TESTS WERE STARTED, AND
                        ;* THEY SHOULD HAVE DETECTED ANY CSR ADDRESSING PROBLEMS.
                        ;* BUT JUST IN CASE THOSE STATIC TESTS AREN'T RUN, WE'LL BE SAFE.
                        ;*********************************************************************
 023662                 BGNTST
 023662                                                          T1::

                                SETVEC  #4,#LOCATE,#PRIO7 ;SET UP NON -EXISTENT MEMORY TRAP VECTOR.
 023662  012746  000340                                                 MOV     #PRIO7,-(SP)
 023666  012746  024004                                                 MOV     #LOCATE,-(SP)
 023672  012746  000004                                                 MOV     #4,-(SP)
 023676  012746  000003                                                 MOV     #3,-(SP)
 023702  104437                                                        TRAP    C$SVEC
 023704  062706  000010                                                 ADD     #10,SP
 023710  005037  002350         CLR     NXMFLG          ;FLAG USED IN THE TRAP ROUTINE.
 023714  005001                 CLR     R1              ;USE REGISTER TO REMEMBER WHICH OF THE
                                                         ;4 CSRS WE ARE ADDRESSING.


                        ;;*********************************************************************
                        ; IF ADDRESSING ANY ONE OF THE CSRS RESULTS IN A TRAP TO VECTOR 04, THE TRAP
                        ; WILL REPORT THE ERROR (SEE INTERRUPT ROUTINE 'LOCATE').  OTHERWISE THE
                        ; MEMORY REFERENCE IS UNEVENTFUL AND THE DEVICE IS READY FOR FURTHER TESTS
                        ;;*********************************************************************

 023716  005777  156310         TST     @SEL0           ;TEST THE CSR AT 76XXX0
 023722  012701  000002         MOV     #2,R1           ;SAVE THE OFFSET OF THE NEXT CSR
 023726  005777  156302         TST     @SEL2           ;TEST THE CSR AT 76XXX2
 023732  012701  000004         MOV     #4,R1           ;SAVE THE OFFSET OF THE NEXT CSR
 023736  005777  156274         TST     @SEL4           ;TEST THE CSR AT 76XXX4
 023742  012701  000006         MOV     #6,R1           ;SAVE THE OFFSET OF THE NEXT CSR
 023746  005777  156266         TST     @SEL6           ;TEST THE CSR AT 76XXX6
 023752  005737  002350         TST     NXMFLG          ;WAS THERE A TRAP?
 023756  001406                 BEQ     10$             ;IF NOT - EXIT.
 023760                         DODU    LOGDEV          ;DROP THE DEVICE
 023760  013700  002366                                                 MOV     LOGDEV,R0
 023764  104451                                                        TRAP    C$DODU
 023766                         DOCLN                   ,DO CLEAN UP - FORCE BACK TO INIT CODE.
 023766  104444                                                        TRAP    C$DCLN
 023770  005037  002350         CLR     NXMFLG          ;RESTORE THE FLAG.
 023774                 10$:
 023774                         CLRVEC  #4              ;RETURN VECTOR 04 TO NORMAL STATE
 023774  012700  000004                                                 MOV     #4,R0
 024000  104436                                                        TRAP    C$CVEC
```

```
     46
     47 024002                          ENDTST
        024002                                                          L10023:
        024002  104401                                                          TRAP    C$ETST
     48
     49
     50 024004                          BGNSRV  LOCATE                  ;INTERRUPT SERVICE ROUTINE
        024004                                                                  LOCATE::
     51 024004  010046                          MOV     R0,-(SP)        ;SAVE R0
     52 024006  005737  002350                TST     NXMFLG          ;HAVE WE HAD AT LEAST 1 PREVIOUS TRAP?
     53 024012  001006                          BNE     10$             ;IF YES, DON'T BOTHER DECLARING ANOTHER
     54                                                                 ;DEVICE FATAL ERROR
     55 024014                                  ERRDF   6,EMTO          ;NON-EXISTENT DEVICE ERROR
        024014  104455                                                          TRAP    C$ERDF
        024016  000006                                                          .WORD   6
        024020  024062                                                          .WORD   EMTO
        024022  000000                                                          .WORD   0
     56 024024  005237  002350                INC     NXMFLG          ;SET THE FLAG
     57 024030                          10$:
     58 024030                                  PRINTX  #FMTO,R1,CSR(R1) ;PRINT THE CSR THAT DOESN'T RESPOND.
        024030  016146  002232                                                  MOV     CSR(R1),-(SP)
        024034  010146                                                          MOV     R1,-(SP)
        024036  012746  024111                                                  MOV     #FMTO,-(SP)
        024042  012746  000003                                                  MOV     #3,-(SP)
        024046  010600                                                          MOV     SP,R0
        024050  104415                                                          TRAP    C$PNTX
        024052  062706  000010                                                  ADD     #10,SP
     59 024056  012600                          MOV     (SP)+,R0        ;RESTORE R0
     60 024060                          ENDSRV
        024060                                                          L10024:
        024060  000002                                                          RTI
     61
     62 024062      101     104     104  EMTO:   .ASCIZ  /ADDRESS ERROR - TRAP 4/
        024065      122     105     123
        024070      123     040     105
        024073      122     122     117
        024076      122     040     055
        024101      040     124     122
        024104      101     120     040
        024107      064     000
     63 024111      045     123     063  FMTO:   .ASCIZ  /%S3%ACSR (SEL%D1%A) AT %O6%A DOES NOT RESPOND%N/
        024114      045     101     103
        024117      123     122     040
        024122      050     123     105
        024125      114     045     104
        024130      061     045     101
        024133      051     040     101
        024136      124     040     045
        024141      117     066     045
        024144      101     040     104
        024147      117     105     123
        024152      040     116     117
        024155      124     040     122
        024160      105     123     120
        024163      117     116     104
        024166      045     116     000
     64                                 .EVEN
```

TEST 2 - ROM CHECK

```
                        .SBTTL          TEST 2 - ROM CHECK
                        ;*******************************************************************************
                        ;*              TEST 2 - DMR-11
                        ;* ROM CRC/CCITT - CHECK ROM POSITION AND CALCULATE CRC/CCITT.  THE
                        ;* LAST 4 BYTES CONTAIN INFORMATION ABOUT THE ROM TO CHECK.  THE 1ST
                        ;* OF THESE BYTES CONTAINS THE ASCII VERSION NUMBER.  THE 2ND BYTE
                        ;* CONTAINS THE ROM NUMBER.  THE 3RD AND 4TH BYTES CONTAIN A NEGATIVE
                        ;* CRC/CCITT WORD FOR THE ROM.
                        ;*                          CHIP ADDRESS RANGE
                        ;*    LOCATION  CHIP NO.        BYTE    ADDRESS RANGE
                        ;*      E03         0           LOW     0000 - 1777
                        ;*      E02         1           HIGH    0000 - 1777
                        ;*      E04         2           LOW     2000 - 3777
                        ;*      E01         3           HIGH    2000 - 3777
                        ;*      E05         4           LOW     4000 - 5777
                        ;*      E14         5           HIGH    4000 - 5777
                        ;*
                        ;************** IMPORTANT !!!!!!!!!! ********************************
                        ;* FOR THIS TEST TO RUN CORRECTLY, ENSURE THAT SWITCH 1 AT LOCATION
                        ;* E85 ON THE M8207 IS ON.  IF THIS SWITCH IS OFF, BSEL1 WILL BE
                        ;* LOCKED OUT AND THE MAINTENANCE FEATURES WILL NOT BE ENABLED.
                        ;*******************************************************************************
                        ;*
                        ;*      SUBTEST 1 - ON THE FIRST PASS PRINT THE VERSION # IN EACH ROM
                        ;*      SUBTEST 2 - GENERATE THE CRC-CCITT IN EACH ROM AND COMPARE IT
                        ;*                  IT AGAINST THE CRC BLASTED IN THE ROM
                        ;*      SUBTEST 3 - COMPARE THE ROM # BLASTED IN THE ROM AGAINST THE
                        ;*                  EXPECTED ROM #.
                        ;*
                        ;*******************************************************************************
024172                  BGNTST
024172                                                                  T2::
024172                    BGNSUB
024172                                                                  T2.1:
024172  104402                                                                  TRAP    C$BSUB
024174  022737  000001  002270          CMP     #1,STARES       ;IS THIS THE FIRST PASS?
024202  001061                        BNE     5$              ;IF NOT - SKIP THIS SUBROUTINE.
                                                                ;GET VERSION # FROM EACH ROM AND PRINT IT OUT
024204  005004                        CLR     R4              ;# OF THE 1ST ROM
024206  012705  000001                MOV     #1,R5           ;# OF NEXT ROM
024212  012737  001774  002410        MOV     #1774,ROMADR    ;ADDRESS OF BYTE CONTAINING # IN ROMS 0 & 1
024220                                PRINTB  #FMT1,LOGDEV    ;MICROCODE VERSION
024220  013746  002366                                                          MOV     LOGDEV,-(SP)
024224  012746  025146                                                          MOV     #FMT1,-(SP)
024230  012746  000002                                                          MOV     #2,-(SP)
024234  010600                                                                  MOV     SP,R0
024236  104414                                                                  TRAP    C$PNTB
024240  062706  000006                                                          ADD     #6,SP
024244                          1$:
024244                                CALL    $ROMO           ;GET ROM CONTENTS.
024250  117737  155764  025502        MOVB    @BSEL6,REV1     ;SAVE THE ASCII REVISION # OF THE ROM
024256  117737  155766  025504        MOVB    @BSEL7,REV2     ;SAVE THE REV. # OF THE NEXT ROM
                                                                ;PRINT
024264                                PRINTB  #FMT2,R4,#REV1,R5,#REV2
024264  012746  025504                                                          MOV     #REV2,-(SP)
024270  010546                                                                  MOV     R5,-(SP)
```

```
        024272  012746  025502                                                  MOV     #REV1,-(SP)
        024276  010446                                                          MOV     R4,-(SP)
        024300  012746  025215                                                  MOV     #FMT2,-(SP)
        024304  012746  000005                                                  MOV     #5,-(SP)
        024310  010600                                                          MOV     SP,R0
        024312  104414                                                          TRAP    C$PNTB
        024314  062706  000014                                                  ADD     #14,SP
    47
    48 024320  022705  000005                  CMP     #5,R5           ;ARE WE DONE?
    49 024324  001410                          BEQ     5$              ;IF YES - EXIT
    50 024326  062704  000002                  ADD     #2,R4           ;INCR. ROM NUMBERS
    51 024332  062705  000002                  ADD     #2,R5           ;
    52 024336  062737  002000  002410          ADD     #2000,ROMADR    ;ADDRESS OF BYTES CONTAINING NEXT ROM REV #S.
    53 024344  000737                          BR      1$
    54
    55 024346                          5$:
    56 024346                            ENDSUB
       024346                                                                   L10026:
       024346  104403                                                                  TRAP    C$ESUB
    57
    58
    59 024350                            BGNSUB
       024350                                                                   T2.2:
       024350  104402                                                                  TRAP    C$BSUB
    60 024352  005037  002342                  CLR     FLAG            ;USE THE FLAG TO MARK WHEN AN ERRDF
    61                                                                  ;HAS BEEN DETECTED IN THIS TEST.
    62 024356  005004                          CLR     R4              ;START CRC CHECK WITH ROM 0
    63                                                                  ;R4 IS THE ROM #.  THE LOCATION FOR THE
    64                                                                  ;ROM IS CONTAINED IN THE TABLE 'ROMLOC'.
    65 024360  005037  002410                  CLR     ROMADR          ;BEGIN AT ROM ADDRESS 0
    66
    67 024364                          10$:
    68 024364  012737  177777  002400          MOV     #-1,LOCRC       ;INITIALIZE CRC WORD FOR THE LOW BYTE
    69                                                                  ;CALCULATION.
    70 024372  012737  177777  002402          MOV     #-1,HICRC       ;INIT. CRC WORD FOR THE HIGH BYTE.
    71 024400  012701  001000                  MOV     #1000,R1        ;COUNTER FOR LOOP TO READ THE ROM CONTENTS
    72                                                                  ;AND CALCULATE THE CRC - THE COUNTER IS 512.,
    73                                                                  ;BECAUSE 2 ADDRESS LOCATIONS ARE READ FOR EACH
    74                                                                  ;PASS (I.E. THE ROMS ARE 1K X 8 BITS)
    75
    76                                                                  ;
    77                                                                  ; BECAUSE A ROM OUT WILL OUTPUT THE ROM CONTENTS (I.E. 16 BITS)
    78                                                                  ; THIS ROUTINE WILL CALCULATE/CHECK THE CRC 2 ROMS AT A TIME.
    79                                                                  ;
    80 024404                          20$:
    81 024404                                  CALL    $ROMO           ;GET THE ROM CONTENTS
    82 024410  117737  155624  002404          MOVB    @BSEL6,LOWORD   ;SAVE THE LOW BYTE OF THE ROM CONTENTS.
    83 024416  117737  155626  002406          MOVB    @BSEL7,HIWORD   ;SAVE THE HIGH BYTE OF THE ROM CONTENTS.
    84 024424  005237  002410                  INC     ROMADR          ;INCREMENT THE ROM ADDRESS POINTER
    85 024430                                  CALL    $ROMO           ;GET THE CONTENTS OF THE NEXT ROM ADDRESS
    86 024434  117737  155600  002405          MOVB    @BSEL6,LOWORD+1 ;SAVE THE NEXT LOW BYTE.
    87 024442  117737  155602  002407          MOVB    @BSEL7,HIWORD+1 ;SAVE THE NEXT HIGH BYTE.
    88                                                                  ;NOTE: AT THIS POINT LOWORD IS A WORD WHICH
    89                                                                  ;HAS 2 CONSECUTIVE LOW BYTES OF ROM CONTENTS.
    90 024450  005237  002410                  INC     ROMADR          ;INCREMENT THE ROM ADDRESS POINTER
    91 024454  005301                          DEC     R1              ;ARE WE FINISHED WITH THESE 2 ROMS?
    92 024456  001443                          BEQ     40$             ;IF YES, CHECK CRC
```

```
                                                ;
                                                ; CRC/CCITT CALCULATION - CONVERT THE WORD (LOWORD & HIWORD) TO
                                                ;                        A SERIAL STREAM FOR CALCULATION.
                                                ;
024460  012703  000020                          MOV     #16.,R3         ;16 BITS TO CONSIDER
024464                              25$:
024464  000241                                  CLC                     ;CLEAR THE CARRY
024466  006037  002400                          ROR     LOCRC           ;ROTATE BIT0 INTO THE CARRY BIT
024472  006037  002404                          ROR     LOWORD          ;ROTATE BIT0 INTO C AND THE OLD C INTO BIT15
                                                ;ARE THE BITS 15 & BITS 0 THE SAME?
                                                ;IF YES (V IS CLEAR), DON'T DO THE CRC
024476  102011                                  BVC     30$             ;NOTE: V IS THE EXCLUSIVE OR OF BIT0 & BIT15.
024500  012702  102010                          MOV     #102010,R2      ;CRC/CCITT POLYNOMIAL
024504  043702  002400                          BIC     LOCRC,R2
024510  042737  102010  002400                  BIC     #102010,LOCRC
024516  050237  002400                          BIS     R2,LOCRC
024522                              30$:
024522  000241                                  CLC                     ;CLEAR THE CARRY
024524  006037  002402                          ROR     HICRC           ;ROTATE BIT 0 INTO C
024530  006037  002406                          ROR     HIWORD          ;ROTATE OLD C INTO BIT15 (SIGN) & BIT0 INTO C
                                                ;ARE THE BITS 0 OF HICRC & HIWORD THE SAME?
024534  102011                                  BVC     35$             ;IF YES (V IS CLEAR), DON'T DO THE CRC.
                                                ;NOTE: V IS THE EXCLUSIVE OR OF BIT0 & BIT15.
024536  012702  102010                          MOV     #102010,R2      ;CRC/CCITT POLYNOMIAL
024542  043702  002402                          BIC     HICRC,R2
024546  042737  102010  002402                  BIC     #102010,HICRC
024554  050237  002402                          BIS     R2,HICRC
024560                              35$:
024560  005303                                  DEC     R3              ;DO ALL 16 BITS
024562  001340                                  BNE     25$
024564  000707                                  BR      20$             ;GET THE CONTENTS OF THE NEXT 2 ROM ADDRESSES.
024566                              40$:
                                                ;
                                                ; AT THIS POINT WE'VE READ THE CONTENTS AND CALCULATED THE CRC FOR
                                                ; 2 ROM ROMS (ONE LOW BYTE & ONE HIGH BYTE).  ALSO WE'VE READ THE
                                                ; CRC BLASTED INTO THE LAST 2 BYTES OF THE ROM (IN LOWORD/HIWORD)
                                                ;
024566  005137  002400                          COM     LOCRC           ;COMPLEMENT THE CALCULATED CRC .
024572  023737  002400  002404                  CMP     LOCRC,LOWORD    ;IS THE CRC IN ROM THE SAME AS THE
                                                ;CALCULATED CRC?
024600  001427                                  BEQ     50$             ;IF YES - CHECK THE HIGH BYTE CRC (NEXT ROM)
024602  005737  002342                          TST     FLAG            ;HAS AN ERRDF ALREADY BEEN DECLARED (REMEMBER
                                                ;WE'RE IN A LOOP)
024606  001007                                  BNE     41$             ;IF YES, DON'T BOTHER WITH ANOTHER ERRDF.
024610  012737  000001  002342                  MOV     #1,FLAG         ;FLAG THAT ERRDF HAS BEEN DETECTED.
024616                                          ERRDF   7,EMT1          ;ROM ERROR
024616  104455                                                          TRAP    C$ERDF
024620  000007                                                          .WORD   7
024622  025434                                                          .WORD   EMT1
024624  000000                                                          .WORD   0
024626                              41$:
024626                                          PRINTB  #FMT3,R4,LOCRC,LOWORD
024626  013746  002404                                                  MOV     LOWORD,-(SP)
024632  013746  002400                                                  MOV     LOCRC,-(SP)
024636  010446                                                          MOV     R4,-(SP)
024640  012746  025272                                                  MOV     #FMT3,-(SP)
024644  012746  000004                                                  MOV     #4,-(SP)
```

```
        024650  010600                                                  MOV     SP,R0
        024652  104414                                                  TRAP    C$PNTB
        024654  062706  000012                                          ADD     #12,SP
    141 024660                          50$:
    142 024660  005204                          INC     R4              ;INCR ROM #
    143 024662  005137  002402                  COM     HICRC           ;COMPLEMENT THE CALCULATED CRC FOR THE HI BYTE
    144 024666  023737  002402  002406        CMP     HICRC,HIWORD    ;ROM CRC AND CALCULATED CRC THE SAME?
    145 024674  001427                        BEQ     60$             ;IF YES - CHECK THE ROM LOCATIONS.
    146 024676  005737  002342                TST     FLAG            ;HAS AN ERRDF ALREADY BEEN DECLARED (REMEMBER
    147                                                                 ;WE'RE IN A LOOP)
    148 024702  001007                        BNE     51$             ;IF YES, DON'T BOTHER WITH ANOTHER ERRDF.
    149 024704  012737  000001  002342        MOV     #1,FLAG         ;FLAG THAT ERRDF HAS BEEN DETECTED.
    150 024712                                ERRDF   7,EMT1          ;ROM ERROR
        024712  104455                                                  TRAP    C$ERDF
        024714  000007                                                  .WORD   7
        024716  025434                                                  .WORD   EMT1
        024720  000000                                                  .WORD   0
    151 024722                          51$:
    152 024722                                PRINTB  #FMT3,R4,HICRC,HIWORD
        024722  013746  002406                                          MOV     HIWORD,-(SP)
        024726  013746  002402                                          MOV     HICRC,-(SP)
        024732  010446                                                  MOV     R4,-(SP)
        024734  012746  025272                                          MOV     #FMT3,-(SP)
        024740  012746  000004                                          MOV     #4,-(SP)
        024744  010600                                                  MOV     SP,R0
        024746  104414                                                  TRAP    C$PNTB
        024750  062706  000012                                          ADD     #12,SP
    153 024754                          60$:
    154 024754  022704  000005                  CMP     #5,R4           ;IF WE'VE DONE ROMS 0-5, WE'RE DONE.
    155 024760  001403                          BEQ     70$             ;EXIT WHEN DONE
    156 024762  005204                          INC     R4              ;CHECK THE NEXT ROM.
    157 024764  000137  024364                  JMP     10$
    158 024770                        70$:
    159
    160 024770                          ENDSUB
        024770                                                                  L10027:
        024770  104403                                                                 TRAP    C$ESUB
    161
    162 024772                          BGNSUB
        024772                                                                  T2.3:
        024772  104402                                                                 TRAP    C$BSUB
    163 024774  005037  002342                  CLR     FLAG            ;CLEAR FLAG
    164 025000  005004                          CLR     R4              ;BEGIN AT ROM 0
    165 025002  012737  001775  002410        MOV     #1775,ROMADR    ;ADDRESS OF BYTE CONTAINING ROM #
    166 025010                        10$:
    167 025010                                CALL    $ROM0           ;GET ROM CONTENTS
    168 025014  117701  155220                MOVB    @BSEL6,R1       ;SAVE THE CONTENTS OF THE LOW BYTE
    169                                                                 ;FOR ROMS 0,2,4
    170 025020  000402                          BR      17$
    171 025022                        15$:
    172 025022  117701  155222                MOVB    @BSEL7,R1       ;SAVE THE CONTENTS OF THE HIGH BYTE
    173                                                                 ;FOR ROMS 1,3,5
    174 025026                        17$:
    175 025026  042701  177760                BIC     #^C17,R1        ;CONVERT THE ASCII BYTE TO AN OCTAL WORD.
    176 025032  020104                          CMP     R1,R4           ;IS THIS THE EXPECTED ROM #
    177 025034  001427                          BEQ     20$             ;IF YES - OK.
    178 025036  005737  002342                  TST     FLAG            ;HAS AN ERRDF ALREADY BEEN DECLARED (REMEMBER
```

```
                                                                ;WE'RE IN A LOOP)
025042  001007                          BNE     18$             ;IF YES, DON'T BOTHER WITH ANOTHER ERRDF.
025044  012737  000001  002342          MOV     #1,FLAG         ;FLAG THAT ERRDF HAS BEEN DETECTED.
025052                                  ERRDF   7,EMT2          ;ROM ERROR
025052  104455                                                                  TRAP    C$ERDF
025054  000007                                                                  .WORD   7
025056  025454                                                                  .WORD   EMT2
025060  000000                                                                  .WORD   0
025062                          18$:
025062                                  PRINTB  #FMT4,<B,ROMLOC(R4)>,R1,R4
025062  010446                                                                  MOV     R4,-(SP)
025064  010146                                                                  MOV     R1,-(SP)
025066  005046                                                                  CLR     -(SP)
025070  156416  025473                                                          BISB    ROMLOC(R4),(SP)
025074  012746  025356                                                          MOV     #FMT4,-(SP)
025100  012746  000004                                                          MOV     #4,-(SP)
025104  010600                                                                  MOV     SP,R0
025106  104414                                                                  TRAP    C$PNTB
025110  062706  000012                                                          ADD     #12,SP
025114                          20$:
025114  022704  000005                  CMP     #5,R4           ;DID WE FINISH THE LAST ROM?
025120  001410                          BEQ     30$             ;IF YES - SKIP TO THE END
025122  005204                          INC     R4              ;POINT TO THE NEXT ROM #
025124  032704  000001                  BIT     #BIT0,R4        ;IS THIS AN ODD #
025130  001334                          BNE     15$             ;IF YES GO BACK AND READ THE HIGH BYTE

025132  062737  002000  002410          ADD     #2000,ROMADR    ;INCR. ADDRESS POINTER TO NEXT ROM #.
025140  000723                          BR      10$
025142                          30$:
025142                            ENDSUB
025142                                                                  L10030:
025142  104403                                                                  TRAP    C$ESUB

025144                          ENDTST
025144                                                                  L10025:
025144  104401                                                                  TRAP    C$ETST
025146     045     116     045  FMT1:   .ASCIZ  /%N%AMICROCODE REVISION IN UNIT%D3%A:%N/
025151     101     115     111
025154     103     122     117
025157     103     117     104
025162     105     040     122
025165     105     126     111
025170     123     111     117
025173     116     040     111
025176     116     040     125
025201     116     111     124
025204     045     104     063
025207     045     101     072
025212     045     116     000
025215     045     101     122  FMT2:   .ASCIZ  /%AROM%D2%A - REV. %T%N%AROM%D2%A - REV. %T%N/
025220     117     115     045
025223     104     062     045
025226     101     040     055
025231     040     122     105
025234     126     056     040
025237     045     124     045
025242     116     045     101
```

```
        025245  122  117  115
        025250  045  104  062
        025253  045  101  040
        025256  055  040  122
        025261  105  126  056
        025264  040  045  124
        025267  045  116  000
    200 025272  045  101  122  FMT3:   .ASCIZ  /%AROM%D2%A: CALCUATED CRC =%06%A  CRC IN ROM =%06%N/
        025275  117  115  045
        025300  104  062  045
        025303  101  072  040
        025306  103  101  114
        025311  103  125  101
        025314  124  105  104
        025317  040  103  122
        025322  103  040  075
        025325  045  117  066
        025330  045  101  040
        025333  040  103  122
        025336  103  040  111
        025341  116  040  122
        025344  117  115  040
        025347  075  045  117
        025352  066  045  116
        025355  000
    201 025356  045  101  105  FMT4:   .ASCIZ  /%AE%D2%A IS ROM %D1%A (SHOULD BE ROM %D1%A)%N/
        025361  045  104  062
        025364  045  101  040
        025367  111  123  040
        025372  122  117  115
        025375  040  045  104
        025400  061  045  101
        025403  040  050  123
        025406  110  117  125
        025411  114  104  040
        025414  102  105  040
        025417  122  117  115
        025422  040  045  104
        025425  061  045  101
        025430  051  045  116
        025433  000
    202
    203 025434  103  122  103  EMT1:   .ASCIZ  /CRC-CCITT ERROR/
        025437  055  103  103
        025442  111  124  124
        025445  040  105  122
        025450  122  117  122
        025453  000
    204 025454  114  117  103  EMT2:   .ASCIZ  /LOCATION ERROR/
        025457  101  124  111
        025462  117  116  040
        025465  105  122  122
        025470  117  122  000
    205
    206 025473  003  002  004  ROMLOC: .BYTE 3,2,4,1,5,14.     ;ROM 0 - ROM LOCATION 3 ETC.
        025476  001  005  016
    207                       .EVEN
```

```
    208 025502  000000                REV1:   .WORD   0               ;ASCII VALUE OF THE REV. NUMBER
    209 025504  000000                REV2:   .WORD   0               ;ASCII VALUE OF THE REV. NUMBER
    210
    211
    212
```

```
                                .SBTTL          TEST 3 - MASTER CLEAR AND MICROTEST

                                ;*****************************************************************
                                ;*              TEST 3 - DMR-11
                                ;* MASTER CLEAR
                                ;* THIS TEST WILL ISSUE 2 MASTER CLEARS.  EACH CALL TO THE MASTER
                                ;* CLEAR ROUTINE WILL ENSURE THAT THE RUN BIT WILL BE SET.  ALSO
                                ;* THE MASTER CLEAR WILL CAUSE THE DIAGNOSTIC MICROTESTS TO BE
                                ;* RUN WHEN THE MICRODIAGNOSTIC BIT (BIT 13 IN SEL0) IS CORRECTLY
                                ;* SET OR CLEARED.  BECAUSE THE RUNNING OF MICROTESTS DEPENDS ON THE
                                ;* EXCLUSIVE OR OF THE  HARDWARE SWITCH 10 ON E134 OF THE M8203 AND
                                ;* THE MICRODIAGNOSTIC BIT, WE CAN'T KNOW WHETHER THE SETTING OR
                                ;* CLEARING OF BIT 13 WILL RESULT IN THE RUNNING OF MICROTESTS.
                                ;* THEREFORE THE MASTER CLEAR SUBROUTINE WILL TOGGLE (I.E. SET
                                ;* BIT 13 ONLY ON EVERY OTHER MASTER CLEAR) THE SOFTWARE BIT.
                                ;* THIS WILL ENSURE THAT REGARDLESS OF THE POSITION OF THE
                                ;* HARDWARE SWITCH, MICROTESTS WILL BE RUN EVERY OTHER MASTER CLEAR.
                                ;* WHEN RUNNING THIS TEST, WE EXPECT TO ADD THE RESULTS OF BSEL3
                                ;* AFTER EACH MASTER CLEAR.
                                ;* BSEL3 = 100           -  MICROTESTS DISABLED
                                ;* BSEL3 = 200           -  MICROTESTS RUN SUCCESFULLY
                                ;* IF THE RESULT OF THE 2 MASTER CLEARS IS NOT 300, AN ERROR IS
                                ;* REPORTED.
                                ;*
                                ;* ADDITIONALLY THIS ROUTINE WILL REPORT WHENEVER THE RESULT OF
                                ;* BSEL3 IS 0.  THIS WILL MEAN THAT THE DEVICE IS NOT A DMR
                                ;* (I.E. DMC)
                                ;*****************************************************************
025506                          BGNTST
025506                                                                          T3::
025506                                  CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
025506  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                ****

025512                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
025512  104410                                                                  TRAP    C$ESCAPE
025514  000072                                                                  .WORD   L10031-.
025516  105777  154522                  TSTB    @BSEL3          ;IS THERE A DMR RESPONSE?
025522  001011                          BNE     1$
025524                                  PRINTB  #FMG19          ;REPORT DEVICE NOT DMR.
025524  012746  017424                                                          MOV     #FMG19,-(SP)
025530  012746  000001                                                          MOV     #1,-(SP)
025534  010600                                                                  MOV     SP,R0
025536  104414                                                                  TRAP    C$PNTB
025540  062706  000004                                                          ADD     #4,SP
025544  000420                          BR      5$
025546                          1$:
025546  117701  154472                  MOVB    @BSEL3,R1       ;SAVE THE RESULT OF THE FIRST MASTER CLEAR.
025552                                  CLEAR                   ;MASTER CLEAR AGAIN.
                                                                ;**** MACRO EXPANSION ****
025552  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                ****

025556                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
025556  104410                                                                  TRAP    C$ESCAPE
025560  000026                                                                  .WORD   L10031-.
```

TEST 3 - MASTER CLEAR AND MICROTEST

```
     42 025562  117702  154456                MOVB    @BSEL3,R2       ;SAVE THE RESULTS OF THE SECOND MASTER CLEAR
     43 025566  060102                        ADD     R1,R2           ;ADD THE RESULTS OF THE 2 CLEARS
     44                                                               ;NOTE: ONE SHOULD BE 100 - MICRO TESTS NOT
     45                                                               ;ENABLED AND ONE SHOULD BE 200 - MICRO TESTS
     46                                                               ;SUCCESFULLY RUN.
     47 025570  122702  000300                CMPB    #300,R2         ;WAS THE MICROTEST COMPLETED?
     48 025574  001404                        BEQ     5$              ;IF YES - OK
     49 025576                                ERRDF   3,EMT3,ERRG3    ;MICROTEST NOT COMPLETED
        025576  104455                                                                  TRAP    C$ERDF
        025600  000003                                                                  .WORD   3
        025602  025610                                                                  .WORD   EMT3
        025604  015726                                                                  .WORD   ERRG3
     50 025606                          5$:
     51 025606                          ENDTST
        025606                                                                  L10031:
        025606  104401                                                                  TRAP    C$ETST
     52
     53 025610     115     111     103  EMT3:   .ASCIZ  /MICROTEST NOT COMPLETED/
        025613     122     117     124
        025616     105     123     124
        025621     040     116     117
        025624     124     040     103
        025627     117     115     120
        025632     114     105     124
        025635     105     104     000
     54                                 .EVEN
```

```
                                .SBTTL          TEST 4 - BASE IN COMMAND

                                ;*****************************************************************
                                ;*              TEST 4 - DMR-11
                                ;*  BASE IN COMMANDS
                                ;*
                                ;*  SUBTEST 1  - ISSUE A BASE IN  -  DMR MODE.
                                ;*               ENSURE THAT THE DMR MODE BIT (BIT 4) IS SET IN
                                ;*               THE MICROCODE SCRATCH PAD 7 AND THAT THE DDCMP
                                ;*               MESSAGE VARIABLES ARE PROPERLY INITIALIZED.
                                ;*  SUBTEST 2  - ISSUE A BASE IN  -  DMC MODE.
                                ;*               ENSURE THAT THE DMC MODE BIT (BIT 4) IS CLEAR IN
                                ;*               THE MICROCODE SCRATCH PAD 7 AND THAT THE DDCMP
                                ;*               MESSAGE VARIABLES ARE PROPERLY INITIALIZED.
                                ;*
                                ;*****************************************************************
025640                          BGNTST
                                                                                T4::
025640                             BGNSUB
                                                                                T4.1:
025640  104402                                                                    TRAP    C$BSUB
025642                                  CLEAR                   ;MACRO FOR MASTER CLEAR COMMAND
                                                                ;**** MACRO EXPANSION ****
025642  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                ****

025646                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END
025646  104410                                                                  TRAP    C$ESCAPE
025650  000244                                                                  .WORD   L10032-.

                                                                ;BASE IN COMMAND WITH NO MAINTENANCE,
025652                                  BASEIN  0,BASE,DMR      ;BASE=BASE TABLE ADDRESS, AND DMR-11 MODE
                                                                ;**** MACRO EXPANSION ****
025652  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE
025656  000000                          .WORD   0               ;MAINTENANCE MODE BITS TO SET IN BSEL1
025660  002636                          .WORD   BASE            ;BASE TABLE ADDRESS
025662  000522                          .WORD   DMR             ;MODE
                                                                ;****                ****

025664                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END
025664  104410                                                                  TRAP    C$ESCAPE
025666  000226                                                                  .WORD   L10032-.
025670                                  SHUTDN
                                                                ;**** MACRO EXPANSION ****
025670  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                ;****                ****
025674  132737  000020  002730          BITB    #BIT4,BASE+ISP7 ;SEE IF THE DMR MODE BIT IS SET IN THE
                                                                ;DMR SCRATCH PAD REGISTER 7 (BASE TABLE
                                                                ;LOCATION CONTAINS AN IMAGE OF SP7)
025702  001004                          BNE     10$             ;OK IF SET - BR
025704                                  ERRDF   20,EMT4
025704  104455                                                                  TRAP    C$ERDF
025706  000024                                                                  .WORD   20
025710  026336                                                                  .WORD   EMT4
025712  000000                                                                  .WORD   0
025714                          10$:
                                                                ;CHECK MESSAGE EXCHANGE VALUES
                                                                ;IN THE BASE TABLE.
```

```
     35 025714  105737  002700                  TSTB    BASE+R          ; #R (MESSAGE RECEIVED) = 0?
     36 025720  001015                          BNE     20$             ;ERROR IF NON ZERO
     37 025722  105737  002701                  TSTB    BASE+N          ; #N (MESSAGE TRANSMITTED) = 0?
     38 025726  001012                          BNE     20$             ;ERROR IF NON ZERO
     39 025730  105737  002702                  TSTB    BASE+A          ; #A (MESSAGE ACKNOWLEDGED) = 0?
     40 025734  001007                          BNE     20$             ;ERROR IF NON ZERO
     41 025736  122737  000001  002703          CMPB    #1,BASE+T       ; #T (NEXT MESSAGE # TRANSMITTED) = 1?
     42 025744  001003                          BNE     20$             ;ERROR IF NOT EQUAL TO 1.
     43 025746  105737  002704                  TSTB    BASE+X          ; #X (LAST MESSAGE TRANSMITTED) = 0?
     44 025752  001404                          BEQ     30$
     45 025754                          20$:
     46 025754                                  ERRDF   20,EMT5,ERRT1
        025754  104455                                                                 TRAP    C$ERDF
        025756  000024                                                                 .WORD   20
        025760  026363                                                                 .WORD   EMT5
        025762  026116                                                                 .WORD   ERRT1
     47 025764                          30$:
     48 025764                             ENDSUB
        025764                                                                  L10033:
        025764  104403                                                                 TRAP    C$ESUB
     49
     50 025766                             BGNSUB
        025766                                                                  T4.2:
        025766  104402                                                                 TRAP    C$BSUB
     51 025770                                  CLEAR                   ;MACRO FOR MASTER CLEAR COMMAND
                                                                        ;**** MACRO EXPANSION ****
        025770  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                 ****
     52
     53 025774                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END
        025774  104410                                                                 TRAP    C$ESCAPE
        025776  000116                                                                 .WORD   L10032-.
     54
     55                                                                 ;BASE IN COMMAND WITH NO MAINTENANCE
     56 026000                                  BASEIN  0,BASE,0        ;AND DMC MODE.
                                                                        ;**** MACRO EXPANSION ****
        026000  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE
        026004  000000                          .WORD   0               ;MAINTENANCE MODE BITS TO SET IN BSEL1
        026006  002636                          .WORD   BASE            ;BASE TABLE ADDRESS
        026010  000000                          .WORD   0               ;MODE
                                                                        ;****                 ****
     57
     58 026012                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END
        026012  104410                                                                 TRAP    C$ESCAPE
        026014  000100                                                                 .WORD   L10032-.
     59 026016                                  SHUTDN
                                                                        ;**** MACRO EXPANSION ****
        026016  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                 ****
     60 026022  132737  000020  002730          BITB    #BIT4,BASE+ISP7 ;SEE IF THE DMR MODE BIT IS CLEAR IN THE
     61                                                                 ;DMR SCRATCH PAD REGISTER 7 (BASETABLE
     62                                                                 ;LOCATION CONTAINS AN IMAGE OF SP7)
     63 026030  001404                          BEQ     10$             ;OK IF CLEAR - BR
     64 026032                                  ERRDF   20,EMT6
        026032  104455                                                                 TRAP    C$ERDF
        026034  000024                                                                 .WORD   20
        026036  026431                                                                 .WORD   EMT6
```

```
                026040  000000                                                                          .WORD   0
     65         026042                          10$:
     66                                                                  ;CHECK MESSAGE EXCHANGE VALUES
     67                                                                  ;IN THE BASE TABLE.
     68         026042  105737  002700                  TSTB    BASE+R           ; #R (MESSAGE RECEIVED) = 0?
     69         026046  001015                          BNE     20$              ;ERROR IF NON ZERO
     70         026050  105737  002701                  TSTB    BASE+N           ; #N (MESSAGE TRANSMITTED) = 0?
     71         026054  001012                          BNE     20$              ;ERROR IF NON ZERO
     72         026056  105737  002702                  TSTB    BASE+A           ; #A (MESSAGE ACKNOWLEDGED) = 0?
     73         026062  001007                          BNE     20$              ;ERROR IF NON ZERO
     74         026064  122737  000001  002703          CMPB    #1,BASE+T        ; #T (NEXT MESSAGE # TRANSMITTED) = 1?
     75         026072  001003                          BNE     20$              ;ERROR IF NOT EQUAL TO 1.
     76         026074  105737  002704                  TSTB    BASE+X           ; #X (LAST MESSAGE TRANSMITTED) = 0?
     77         026100  001404                          BEQ     30$
     78         026102                          20$:
     79         026102                                  ERRDF   20,EMT5,ERRT1
                026102  104455                                                                          TRAP    C$ERDF
                026104  000024                                                                          .WORD   20
                026106  026363                                                                          .WORD   EMT5
                026110  026116                                                                          .WORD   ERRT1
     80         026112                          30$:
     81         026112                             ENDSUB
                026112                                                                          L10034:
                026112  104403                                                                          TRAP    C$ESUB
     82
     83         026114                          ENDTST
                026114                                                                          L10032:
                026114  104401                                                                          TRAP    C$ETST
     84
     85         026116                          BGNMSG  ERRT1
                026116                                                                          ERRT1::
     86         026116  105737  002700                  TSTB    BASE+R           ;IS #R = 0?
     87         026122  001413                          BEQ     1$               ;OK - IF ZERO
     88         026124                                  PRINTB  #FMT5,<B,BASE+R> ;PRINT #R
                026124  005046                                                                          CLR     -(SP)
                026126  153716  002700                                                                  BISB    BASE+R,(SP)
                026132  012746  026470                                                                  MOV     #FMT5,-(SP)
                026136  012746  000002                                                                  MOV     #2,-(SP)
                026142  010600                                                                          MOV     SP,R0
                026144  104414                                                                          TRAP    C$PNTB
                026146  062706  000006                                                                  ADD     #6,SP
     89         026152                          1$:
     90         026152  105737  002701                  TSTB    BASE+N           ;IS #N = 0?
     91         026156  001413                          BEQ     2$               ;OK - IF ZERO
     92         026160                                  PRINTB  #FMT6,<B,BASE+N> ;PRINT #N
                026160  005046                                                                          CLR     -(SP)
                026162  153716  002640                                                                  BISB    BASE+2,(SP)
                026166  012746  026521                                                                  MOV     #FMT6,-(SP)
                026172  012746  000002                                                                  MOV     #2,-(SP)
                026176  010600                                                                          MOV     SP,R0
                026200  104414                                                                          TRAP    C$PNTB
                026202  062706  000006                                                                  ADD     #6,SP
     93         026206                          2$.
     94
     95         026206  105737  002702                  TSTB    BASE+A           ;IS #A = 0?
     96         026212  001413                          BEQ     3$               ;OK - IF ZERO
     97         026214                                  PRINTB  #FMT7,<B,BASE+A> ;PRINT #A
```

```
                                                                                                    CLR     -(SP)
        026214  005046                                                                              BISB    BASE+A,(SP)
        026216  153716  002702                                                                      MOV     #FMT7,-(SP)
        026222  012746  026552                                                                      MOV     #2,-(SP)
        026226  012746  000002                                                                      MOV     SP,R0
        026232  010600                                                                              TRAP    C$PNTB
        026234  104414                                                                              ADD     #6,SP
        026236  062706  000006
    98  026242                          3$:
    99  026242  122737  000001  002703          CMPB    #1,BASE+T       ;IS #T = 1?
   100  026250  001413                          BEQ     4$              ;OK - IF ONE
   101  026252                          PRINTB  #FMT8,<B,BASE+T>  ;PRINT #T
        026252  005046                                                                              CLR     -(SP)
        026254  153716  002703                                                                      BISB    BASE+T,(SP)
        026260  012746  026603                                                                      MOV     #FMT8,-(SP)
        026264  012746  000002                                                                      MOV     #2,-(SP)
        026270  010600                                                                              MOV     SP,R0
        026272  104414                                                                              TRAP    C$PNTB
        026274  062706  000006                                                                      ADD     #6,SP
   102  026300                          4$:
   103  026300  105737  002704          TSTB    BASE+X          ;IS #X = 0?
   104  026304  001413                  BEQ     5$              ;OK - IF ZERO
   105  026306                          PRINTB  #FMT9,<B,BASE+X>  ;PRINT #X
        026306  005046                                                                              CLR     -(SP)
        026310  153716  002704                                                                      BISB    BASE+X,(SP)
        026314  012746  026634                                                                      MOV     #FMT9,-(SP)
        026320  012746  000002                                                                      MOV     #2,-(SP)
        026324  010600                                                                              MOV     SP,R0
        026326  104414                                                                              TRAP    C$PNTB
        026330  062706  000006                                                                      ADD     #6,SP
   106  026334                          5$:
   107  026334                          ENDMSG
        026334                                                                          L10035:
        026334  104423                                                                             TRAP    C$MSG
   108
   109  026336     104     115     122  EMT4:   .ASCIZ  /DMR MODE BIT NOT SET/
        026341     040     115     117
        026344     104     105     040
        026347     102     111     124
        026352     040     116     117
        026355     124     040     123
        026360     105     124     000
   110  026363     104     104     103  EMT5:   .ASCIZ  /DDCMP MESSAGE VARIABLE(S) NOT CURRECT/
        026366     115     120     040
        026371     115     105     123
        026374     123     101     107
        026377     105     040     126
        026402     101     122     111
        026405     101     102     114
        026410     105     050     123
        026413     051     040     116
        026416     117     124     040
        026421     103     117     122
        026424     122     105     103
        026427     124     000
   111  026431     104     115     103  EMT6:   .ASCIZ  /DMC MODE - DMR BIT NOT CLEARED/
        026434     040     115     117
        026437     104     105     040
```

```
                026442  055     040     104
                026445  115     122     040
                026450  102     111     124
                026453  040     116     117
                026456  124     040     103
                026461  114     105     101
                026464  122     105     104
                026467  000
    112
    113         026470  045     101     043     FMT5:   .ASCIZ  /%A#R (MSG. RCVD) = %D3%N/
                026473  122     040     050
                026476  115     123     107
                026501  056     040     122
                026504  103     126     104
                026507  051     040     075
                026512  040     045     104
                026515  063     045     116
                026520  000
    114         026521  045     101     043     FMT6:   .ASCIZ  /%A#N (MSG. XMIT) = %D3%N/
                026524  116     040     050
                026527  115     123     107
                026532  056     040     130
                026535  115     111     124
                026540  051     040     075
                026543  040     045     104
                026546  063     045     116
                026551  000
    115         026552  045     101     043     FMT7:   .ASCIZ  /%A#A (MSG. ACK)  = %D3%N/
                026555  101     040     050
                026560  115     123     107
                026563  056     040     101
                026566  103     113     051
                026571  040     040     075
                026574  040     045     104
                026577  063     045     116
                026602  000
    116         026603  045     101     043     FMT8:   .ASCIZ  /%A#T (NEXT XMIT) = %D3%N/
                026606  124     040     050
                026611  116     105     130
                026614  124     040     130
                026617  115     111     124
                026622  051     040     075
                026625  040     045     104
                026630  063     045     116
                026633  000
    117         026634  045     101     043     FMT9:   .ASCIZ  /%A#X (LAST XMIT) = %D3%N/
                026637  130     040     050
                026642  114     101     123
                026645  124     040     130
                026650  115     111     124
                026653  051     040     075
                026656  040     045     104
                026661  063     045     116
                026664  000
    118                                             .EVEN
```

```
                        .SBTTL          TEST 5 - DMR COMMANDS

                        ;*******************************************************************
                        ;*              TEST 5 - DMR-11
                        ;* DMR COMMANDS
                        ;*  SUBTEST 1  - ISSUE AN ENABLE EXTENDED ERROR COMMAND AND CHECK THAT
                        ;*               THE EXT. ENABLE BIT IS SET IS SCRATCH PAD 13.  THEN
                        ;*               DISABLE EXTENDED ERROR AND CHECK THAT THE ENABLE BIT
                        ;*               IS CLEAR.
                        ;*  SUBTEST 2  - SET REP/SEL TIMER VALUE AND SET THE DMR THRESHOLD
                        ;*               VALUES.  CHECK THAT THE VALUES ARE CORRECT IN
                        ;*               THE BASE TABLE AFTER HALTING THE DMR.
                        ;*
                        ;*
                        ;*******************************************************************
                        BGNTST
                                                                        T5::
                          BGNSUB
                                                                        T5.1:
                                                                          TRAP    C$BSUB
                                CLEAR                   ;MACRO FOR MASTER CLEAR COMMAND
                                                        ;**** MACRO EXPANSION ****
                                JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                        ;****                ****

                                ESCAPE  TST             ;IF ERROR, BR TO TEST END
                                                                          TRAP    C$ESCAPE
                                                                          .WORD   L10036-.

                        BASEIN                          ;BASE IN COMMAND WITH  LINE UNIT LOOP,
                                                        ;**** MACRO EXPANSION ****
                                JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
                                        .WORD   LPLU    ;SET LINE UNIT LOOP
                                        .WORD   BASE    ;BASE TABLE ADDRESS
                                        .WORD   DMR     ;DMR-11 MODE
                                                        ;****                ****

                        ESCAPE  TST             ;IF ERROR, BR TO TEST END
                                                                          TRAP    C$ESCAPE
                                                                          .WORD   L10036-.
                        DMRIN   EXERR           ;ENABLE EXTENDED ERROR NOTIFICATION
                                                ;**** MACRO EXPANSION ****
                                JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
                                        .WORD   EXERR   ;INPUT COMMAND
                                        .WORD   0       ;NO SEL4
                                        .WORD   0       ;NO SEL6
                                                        ;****                ****

                        ESCAPE  TST             ;IF ERROR, BR TO TEST END
                                                                          TRAP    C$ESCAPE
                                                                          .WORD   L10036-.
                        SHUTDN                  ;HALT THE DMR
                                                ;**** MACRO EXPANSION ****
                                JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                        ;****                ****

                        ESCAPE  TST             ;IF ERROR, BR TO TEST END
                                                                          TRAP    C$ESCAPE
```

```
                                                                                .WORD   L10036-.
    30 026744  132737  000001  002734          BITB    #BIT0,BASE+ISP13 ;CHECK EXT ENABLE BIT IN THE BASE TABLE.
    31                                                                  ;IMAGE OF SCRATCH PAD 13.
    32 026752  001005                          BNE     10$              ;BIT SET - OK.
    33 026754                                  ERRDF   24,EMT7          ;ERROR EXT ENABLE CLEAR
       026754  104455                                                                TRAP    C$ERDF
       026756  000030                                                                .WORD   24
       026760  027536                                                                .WORD   EMT7
       026762  000000                                                                .WORD   0
    34 026764  000430                          BR      20$
    35 026766                            10$:
    36 026766                                  BASEIN  LPLU,BASE,RES!DMR ;BASE IN COMMAND WITH RESUME SET.
                                                                        ;**** MACRO EXPANSION ****
       026766  004737  011264                  JSR     PC, $BASEI       ;CALL BASE IN ROUTINE
       026772  004000                                  .WORD   LPLU     ;MAINTENANCE MODE BITS TO SET IN BSEL1
       026774  002636                                  .WORD   BASE     ;BASE TABLE ADDRESS
       026776  010522                                  .WORD   RES.DMR  ;MODE
                                                                        ;****                   ****
    37
    38 027000                                  DMRIN   DXERR            ;DISABLE EXTENDED ERROR NOTIFICATION.
                                                                        ;**** MACRO EXPANSION ****
       027000  004737  012060                  JSR     PC, $DMRIN       ;CALL DMR MODE INPUT ROUTINE
       027004  000007                                  .WORD   DXERR    ;INPUT COMMAND
       027006  000000                                  .WORD   0        ;NO SEL4
       027010  000000                                  .WORD   0        ;NO SEL6
                                                                        ;****                   ****
    39
    40 027012                                  ESCAPE  TST              ;IF ERROR, BR TO TEST END
       027012  104410                                                                TRAP    C$ESCAPE
       027014  000212                                                                .WORD   L10036-.
    41 027016                                  SHUTDN                   ;HALT THE DMR
                                                                        ;**** MACRO EXPANSION ****
       027016  004737  012550                  JSR     PC, $HALT        ;DMR HALT ROUTINE.
                                                                        ;****                   ****
    42 027022                                  ESCAPE  TST              ;IF ERROR, BR TO TEST END.
       027022  104410                                                                TRAP    C$ESCAPE
       027024  000202                                                                .WORD   L10036-.
    43 027026  132737  000001  002734          B!TB    #BIT0,BASE+ISP13 ;CHECK EXT ENABLE BIT IN THE BASE TABLE.
    44                                                                  ;IMAGE OF SCRATCH PAD 13.
    45 027034  001404                          BEQ     20$              ;IF CLEAR OK
    46 027036                                  ERRDF   24,EMT7          ;ERROR EXT ENABLE SET
       027036  104455                                                                TRAP    C$ERDF
       027040  000030                                                                .WORD   24
       027042  027536                                                                .WORD   EMT7
       027044  000000                                                                .WORD   0
    47 027046                            20$:
    48 027046                              ENDSUB
       027046                                                                L10037:
       027046  104403                                                                TRAP    C$FSUB
    49
    50 027050                              BGNSUB
       027050                                                                T5.2:
       027050  104402                                                                TRAP    C$BSUB
    51 027052                                  CLEAR                    ;MACRO FOR MASTER CLEAR COMMAND
                                                                        ;**** MACRO EXPANSION ****
       027052  004737  011066                  JSR     PC, $MSCLR       ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                   ****
```

```
     52
     53 027056                          ESCAPE  TST             ;IF ERROR, BR TO TEST END
        027056  104410                                                      TRAP    C$ESCAPE
        027060  000146                                                      .WORD   L10036-.
     54
     55 027062                          BASEIN                  ;BASE IN COMMAND WITH  LINE UNIT LOOP,
                                                                ;**** MACRO EXPANSION ****
        027062  004737  011264          JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
        027066  004000                          .WORD   LPLU    ;SET LINE UNIT LOOP
        027070  002636                          .WORD   BASE    ;BASE TABLE ADDRESS
        027072  000522                          .WORD   DMR     ;DMR-11 MODE
                                                                ;****                   ****
     56
     57 027074                          ESCAPE  TST             ;IF ERROR, BR TO TEST END
        027074  104410                                                      TRAP    C$ESCAPE
        027076  000130                                                      .WORD   L10036-.
     58 027100                          DMRIN   TIMER,0,54      ;SET REP/SELECT TIMER VALUE
                                                                ;**** MACRO EXPANSION ****
        027100  004737  012060          JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
        027104  000012                          .WORD   TIMER   ;INPUT COMMAND
        027106  000000                          .WORD   0       ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
        027110  000054                          .WORD   54      ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                   ****
     59
     60 027112                          ESCAPE  TST             ;IF ERROR, BR TO TEST END
        027112  104410                                                      TRAP    C$ESCAPE
        027114  000112                                                      .WORD   L10036-.
     61
     62                                                         ;SET THRESHOLD VALUES AS FOLLOWS:
     63                                                         ;BSEL4 = NAKS RECEIVED (3)
     64                                                         ;BSEL5 = NAKS TRANSMITTED (13)
     65                                                         ;BSEL6 = REP/SEL SENT (15)
     66                                                         ;BSEL7 = NO BUFFFER (4)
     67 027116                          DMRIN   THRESH,5403,2015
                                                                ;**** MACRO EXPANSION ****
        027116  004737  012060          JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
        027122  000013                          .WORD   THRESH  ;INPUT COMMAND
        027124  005403                          .WORD   5403    ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
        027126  002015                          .WORD   2015    ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                   ****
     68
     69 027130                          ESCAPE  TST             ;IF ERROR, BR TO TEST END
        027130  104410                                                      TRAP    C$ESCAPE
        027132  000074                                                      .WORD   L10036-.
     70 027134                          SHUTDN                  ;HALT THE DMR.
                                                                ;**** MACRO EXPANSION ****
        027134  004737  012550          JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                ;****                   ****
     71 027140                          ESCAPE  TST             ;IF ERROR, BR TO TEST END
        027140  104410                                                      TRAP    C$ESCAPE
        027142  000064                                                      .WORD   L10036-.
     72 027144  122737  000054  002713  CMPB    #54,BASE+PRETIM ;CHECK REP/SEL TIME IN BASE TABLE.
     73 027152  001020                  BNE     10$             ;IF NOT 54, BR TO ERROR.
     74 027154  122737  000015  002722  CMPB    #15,BASE+TH3L   ;CHECK REP. THRESH. IN BASE TABLE.
     75 027162  001014                  BNE     10$             ;IF NOT 15, BR TO ERROR.
     76 027164  122737  000003  002716  CMPB    #3,BASE+TH1L    ;CHECK NAK RCVD. THRESH. IN BASE TABLE.
     77 027172  001010                  BNE     10$             ;IF NOT 3, BR TO ERROR.
```

```
     78 027174  122737  000013  002720          CMPB    #13,BASE+TH2L   ;CHECK NAK SENT THRESH. IN BASE TABLE.
     79 027202  001004                          BNE     10$             ;IF NOT 13, BR TO ERROR
     80 027204  122737  000004  002724          CMPB    #4,BASE+TH4L    ;CHECK NO BUF. THRESH. IN BASE TABLE.
     81 027212  001404                          BEQ     20$             ;IF 4, ALL CHECKS OK - EXIT
     82 027214                          10$:
     83 027214                                  ERRDF   24,EMT8,ERRT3
        027214  104455                                                                  TRAP    C$ERDF
        027216  000030                                                                  .WORD   24
        027220  027567                                                                  .WORD   EMT8
        027222  027230                                                                  .WORD   ERRT3
     84 027224                          20$:
     85 027224                            ENDSUB
        027224                                                                  L10040:
        027224  104403                                                                  TRAP    C$ESUB
     86 027226                          ENDTST
        027226                                                                  L10036:
        027226  104401                                                                  TRAP    C$ETST
     87
     88 027230                          BGNMSG  ERRT3
        027230                                                                  ERRT3::
     89 027230                                  PRINTB  #FMG1,@SEL0,@SEL2 ;PRINT SEL0 AND SEL2
        027230  017746  153000                                                         MOV     @SEL2,-(SP)
        027234  017746  152772                                                         MOV     @SEL0,-(SP)
        027240  012746  016270                                                         MOV     #FMG1,-(SP)
        027244  012746  000003                                                         MOV     #3,-(SP)
        027250  010600                                                                 MOV     SP,R0
        027252  104414                                                                 TRAP    C$PNTB
        027254  062706  000010                                                         ADD     #10,SP
     90 027260                                  PRINTB  #FMT11,<B,BASE+ISP13> ;PRINT OUT THE IMAGE OF SCRATCH PAD 13.
        027260  005046                                                                 CLR     -(SP)
        027262  153716  002734                                                       BISB    BASE+ISP13,(SP)
        027266  012746  027624                                                         MOV     #FMT11,-(SP)
        027272  012746  000002                                                         MOV     #2,-(SP)
        027276  010600                                                                 MOV     SP,R0
        027300  104414                                                                 TRAP    C$PNTB
        027302  062706  000006                                                         ADD     #6,SP
     91 027306  122737  000054  002713          CMPB    #54,BASE+PRETIM ;IS REP/SEL TIME OK?
     92 027314  001413                          BEQ     1$              ;BR IF OK
     93 027316                                  PRINTB  #FMT12,<B,BASE+PRETIM> ;PRINT IT OUT.
        027316  005046                                                                 CLR     -(SP)
        027320  153716  002713                                                       BISB    BASE+PRETIM,(SP)
        027324  012746  027655                                                         MOV     #FMT12,-(SP)
        027330  012746  000002                                                         MOV     #2,-(SP)
        027334  010600                                                                 MOV     SP,R0
        027336  104414                                                                 TRAP    C$PNTB
        027340  062706  000006                                                         ADD     #6,SP
     94 027344                          1$:
     95 027344  122737  000003  002716          CMPB    #3,BASE+TH1L    ;IS NAK RCVD OK?
     96 027352  001413                          BEQ     2$              ;BR IF OK.
     97 027354                                  PRINTB  #FMT13,<B,BASE+TH1L> ;PRINT IT OUT
        027354  005046                                                                 CLR     -(SP)
        027356  153716  002716                                                       BISB    BASE+TH1L,(SP)
        027362  012746  027712                                                         MOV     #FMT13,-(SP)
        027366  012746  000002                                                         MOV     #2,-(SP)
        027372  010600                                                                 MOV     SP,R0
        027374  104414                                                                 TRAP    C$PNTB
        027376  062706  000006                                                         ADD     #6,SP
```

```
     98 027402                                2$:
     99 027402  122737  000013  002720            CMPB    #13,BASE+TH2L   ;IS NAK SENT OK?
    100 027410  001413                            BEQ     3$              ;BR IF OK.
    101 027412                                    PRINTB  #FMT14,<B,BASE+TH2L> ;PRINT IT OUT
        027412  005046                                                            CLR     -(SP)
        027414  153716  002720                                                    BISB    BASE+TH2L,(SP)
        027420  012746  027747                                                    MOV     #FMT14,-(SP)
        027424  012746  000002                                                    MOV     #2,-(SP)
        027430  010600                                                            MOV     SP,R0
        027432  104414                                                            TRAP    C$PNTB
        027434  062706  000006                                                    ADD     #6,SP
    102 027440                                3$:
    103 027440  122737  000015  002722            CMPB    #15,BASE+TH3L   ;IS REP LEVEL OK?
    104 027446  001413                            BEQ     4$              ;BR IF OK.
    105 027450                                    PRINTB  #FMT15,<B,BASE+TH3L> ;PRINT IT OUT
        027450  005046                                                            CLR     -(SP)
        027452  153716  002722                                                    BISB    BASE+TH3L,(SP)
        027456  012746  030004                                                    MOV     #FMT15,-(SP)
        027462  012746  000002                                                    MOV     #2,-(SP)
        027466  010600                                                            MOV     SP,R0
        027470  104414                                                            TRAP    C$PNTB
        027472  062706  000006                                                    ADD     #6,SP
    106 027476                                4$:
    107 027476  122737  000004  002724            CMPB    #4,BASE+TH4L    ;IS NO BUFFER LEVEL OK?
    108 027504  001413                            BEQ     5$              ;BR IF OK.
    109 027506                                    PRINTB  #FMT16,<B,BASE+TH4L> ;PRINT IT OUT
        027506  005046                                                            CLR     -(SP)
        027510  153716  002724                                                    BISB    BASE+TH4L,(SP)
        027514  012746  030041                                                    MOV     #FMT16,-(SP)
        027520  012746  000002                                                    MOV     #2,-(SP)
        027524  010600                                                            MOV     SP,R0
        027526  104414                                                            TRAP    C$PNTB
        027530  062706  000006                                                    ADD     #6,SP
    110 027534                                5$:
    111 027534                                    ENDMSG
        027534                                                          L10041:
        027534  104423                                                            TRAP    C$MSG
    112
    113
    114 027536     105     130     124  EMT7:    .ASCIZ  /EXT. ERROR BIT INCORRECT/
        027541     056     040     105
        027544     122     122     117
        027547     122     040     102
        027552     111     124     040
        027555     111     116     103
        027560     117     122     122
        027563     105     103     124
        027566     000
    115 027567     104     115     122  EMT8:    .ASCIZ  /DMR MODE INPUT COMMAND ERROR/
        027572     040     115     117
        027575     104     105     040
        027600     111     116     120
        027603     125     124     040
        027606     103     117     115
        027611     115     101     116
        027614     104     040     105
        027617     122     122     117
```

```
        027622      122     000
    116
    117 027624      045     101     111  FMT11:  .ASCIZ  /%AIMAGE OF SP 13 = %D3%N/
        027627      115     101     107
        027632      105     040     117
        027635      106     040     123
        027640      120     040     061
        027643      063     040     075
        027646      040     045     104
        027651      063     045     116
        027654      000
    118 027655      045     101     122  FMT12:  .ASCIZ  /%AREP-SEL TIME VALUE = %D3%N/
        027660      105     120     055
        027663      123     105     114
        027666      040     124     111
        027671      115     105     040
        027674      126     101     114
        027677      125     105     040
        027702      075     040     045
        027705      104     063     045
        027710      116     000
    119 027712      045     101     116  FMT13:  .ASCIZ  /%ANAK RCVD THRESHOLD = %D3%N/
        027715      101     113     040
        027720      122     103     126
        027723      104     040     124
        027726      110     122     105
        027731      123     110     117
        027734      114     104     040
        027737      075     040     045
        027742      104     063     045
        027745      116     000
    120 027747      045     101     116  FMT14:  .ASCIZ  /%ANAK SENT THRESHOLD = %D3%N/
        027752      101     113     040
        027755      123     105     116
        027760      124     040     124
        027763      110     122     105
        027766      123     110     117
        027771      114     104     040
        027774      075     040     045
        027777      104     063     045
        030002      116     000
    121 030004      045     101     122  FMT15:  .ASCIZ  /%AREP SENT THRESHOLD = %D3%N/
        030007      105     120     040
        030012      123     105     116
        030015      124     040     124
        030020      110     122     105
        030023      123     110     117
        030026      114     104     040
        030031      075     040     045
        030034      104     063     045
        030037      116     000
    122 030041      045     101     116  FMT16:  .ASCIZ  /%ANO BUFFER THRESHOLD = %D3%N/
        030044      117     040     102
        030047      125     106     106
        030052      105     122     040
        030055      124     110     122
        030060      105     123     110
```

```
        030063      117      114      104
        030066      040      075      040
        030071      045      104      063
        030074      045      116      000
    123                                          .EVEN
    124
    125
```

```
                                .SBTTL          TEST 6 - CONTROL IN COMMAND

                                ;*****************************************************************************
                                ;*              TEST 6 - DMR-11
                                ;*  CONTROL IN COMMAND TEST -
                                ;*  SUBTEST 1  - CONTROL IN, FULL DUPLEX, DDCMP MODE.  ENSURE THAT
                                ;*               THE HALF-DUPLEX BIT IS CLEAR IN THE MODEM STATUS WORD,
                                ;*               ALSO ENSURE THAT DDCMP MODE BIT IS SET IN SCRATCH PAD 7.
                                ;*  SUBTEST 2  - CONTROL IN, HALF DUPLEX.  ENSURE THAT THE HALF DUPLEX
                                ;*               BIT IS SET.
                                ;*  SUBTEST 3  - CONTROL IN, MAINTENANCE MODE.  ENSURE THAT MAINT. MODE
                                ;*               BIT IS SET IN SCRATCH PAD 7.
                                ;*  SUBTEST 4  - CONTROL IN USING SELECTED LOOPBACK.  ISSUE A CONTROL IN
                                ;*               USING THE USER SELECTED LOOPBACK.  IF THE LOOPBACK IS
                                ;*               NOT CORRECT, DMR RUN MODE ACKNOWLEDGE WILL NOT BE
                                ;*               RECEIVED.
                                ;*
                                ;*
                                ;*****************************************************************************
 030100                         BGNTST
 030100                                                                  T6::
 030100                           BGNSUB
 030100                                                                  T6.1:
 030100  104402                                                                  TRAP    C$BSUB
 030102                                 CLEAR                    ;MACRO FOR MASTER CLEAR
                                                                 ;**** MACRO EXPANSION ****
 030102  004737  011066                 JSR     PC, $MSCLR       ;ISSUE A DMR MASTER CLEAR
                                                                 ;****                ****

 030106                                 ESCAPE  TST              ;IF ERROR, BR TO TEST END.
 030106  104410                                                                  TRAP    C$ESCAPE
 030110  000404                                                                  .WORD   L10042-.
 030112                                 BASEIN                   ;MACRO FOR BASE IN COMMAND
                                                                 ;**** MACRO EXPANSION ****
 030112  004737  011264                 JSR     PC, $BASEI       ;CALL BASE IN ROUTINE WITH DEFAULTS
 030116  004000                                 .WORD   LPLU     ;SET LINE UNIT LOOP
 030120  002636                                 .WORD   BASE     ;BASE TABLE ADDRESS
 030122  000522                                 .WORD   DMR      ;DMR-11 MODE
                                                                 ;****                ****

 030124                                 ESCAPE  TST              ;IF ERROR, BR TO TEST END.
 030124  104410                                                                  TRAP    C$ESCAPE
 030126  000366                                                                  .WORD   L10042-.
 030130                                 CNTRIN                   ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                 ;**** MACRO EXPANSION ****
 030130  004737  011520                 JSR     PC, $CNTIN       ;CALL CONTROL IN ROUTINE WITH DEFAULT
 030134  000000                                 .WORD   0        ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                 ;****                ****

 030136                                 ESCAPE  TST              ;IF ERROR, BR TO TEST END.
 030136  104410                                                                  TRAP    C$ESCAPE
 030140  000354                                                                  .WORD   L10042-.

 030142  052777  000057  152062         BIS     #RQI!RMODEM,@SEL0 ;SET RQI AND READ MODEM COMMAND
 030150                                 WAIT    RDI              ;WAIT FOR RDI TO BE SET
                                                                 ;**** MACRO EXPANSION ****
 030150  004737  010274                 JSR     PC, $WAIT        ;CALL WAIT ROUTINE
```

TEST 6 - CONTROL IN COMMAND

```
        030154  000000                          .WORD   0       ;FLAG THAT WE'RE WAITING FOR RDI
                                                                ;****                   ****
     34 030156  032777  000020  152052          BIT     #BIT4,@SEL4     ;IS THE HDX BIT SET IN MODEM STATUS REG?
     35 030164  001404                          BEQ     10$             ;OK - IF BIT CLEAR
     36 030166                                  ERRDF   21,EMT9         ;ERROR HDX BIT SET
        030166  104455                                                          TRAP    C$ERDF
        030170  000025                                                          .WORD   21
        030172  030516                                                          .WORD   EMT9
        030174  000000                                                          .WORD   0
     37 030176                          10$:
     38 030176                                  WAIT    RQI             ;CLEAR RQI AND WAIT FOR RDI TO CLEAR.
                                                                        ;**** MACRO EXPANSION ****
        030176  004737  010704                   JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                                                        ;****                   ****
     39 030202                                  SHUTDN                  ;HALT DMR
                                                                        ;**** MACRO EXPANSION ****
        030202  004737  012550                   JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                   ****
     40 030206                                  ESCAPE  TST             ;IF ERROR, EXIT.
        030206  104410                                                          TRAP    C$ESCAPE
        030210  000304                                                          .WORD   L10042-.
     41 030212  132737  000020  002730          BITB    #BIT4,BASE+ISP7 ;IS THE DDCMP RUN BI: SET IN IMAGE OF SP 7.
     42 030220  001004                          BNE     20$
     43 030222                                  ERRDF   21,EMT10                ;ERROR DDCMP RUN BIT NOT SET
        030222  104455                                                          TRAP    C$ERDF
        030224  000025                                                          .WORD   21
        030226  030546                                                          .WORD   EMT10
        030230  000000                                                          .WORD   0
     44 030232                          20$:
     45 030232                            ENDSUB
        030232                                                                  L10043:
        030232  104403                                                          TRAP    C$ESUB
     46
     47 030234                            BGNSUB
        030234                                                                  T6.2:
        030234  104402                                                          TRAP    C$BSUB
     48 030236                                  BASEIN  LPLU,BASE,RES!DMR ;BASE IN WITH RESUME.
                                                                        ;**** MACRO EXPANSION ****
        030236  004737  011264                   JSR     PC, $BASEI      ;CALL BASE IN ROUTINE
        030242  004000                                     .WORD   LPLU    ;MAINTENANCE MODE BITS TO SET IN BSEL1
        030244  002636                                     .WORD   BASE    ;BASE TABLE ADDRESS
        030246  010522                                     .WORD   RES!DMR ;MODE
                                                                        ;****                   ****
     49
     50 030250                                  CNTRIN  HDX             ;CONTROL IN COMMAND WITH HDX.
                                                                        ;**** MACRO EXPANSION ****
        030250  004737  011520                   JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE
        030254  002000                                     .WORD   HDX     ;SEL6 - (DUPLEX, MODE)
                                                                        ;****                   ****
     51
     52 030256                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030256  104410                                                          TRAP    C$ESCAPE
        030260  000234                                                          .WORD   L10042-.
     53 030262  052777  000057  151742          BIS     #RQI!RMODEM,@SEL0 ;SET RQI AND READ MODEM COMMAND
     54 030270                                  WAIT    RDI             ;WAIT FOR RDI TO BE SET
                                                                        ;**** MACRO EXPANSI N ****
        030270  004737  010274                   JSR     PC, $WAIT       ;CALL WAIT ROUTINE
```

```
        030274  000000                                  .WORD   0       ;FLAG THAT WE'RE WAITING FOR RDI
                                                                        ;****                   ****
     55 030276  032777  000020  151732          BIT     #BIT4,@SEL4     ;IS THE HDX BIT SET IN MODEM STATUS REG?
     56 030304  001004                          BNE     10$             ;OK - IF BIT SET
     57 030306                                  ERRDF   21,EMT11                ;ERROR HDX BIT CLEAR.
        030306  104455                                                                  TRAP    C$ERDF
        030310  000025                                                                  .WORD   21
        030312  030574                                                                  .WORD   EMT11
        030314  000000                                                                  .WORD   0
     58 030316                          10$:
     59 030316                                  SHUTDN                  ;HALT THE DMR.
                                                                        ;**** MACRO EXPANSION ****
        030316  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                   ****
     60
     61 030322                          ENDSUB
        030322                                                                  L10044:
        030322  104403                                                                 TRAP    C$ESUB
     62
     63 030324                          BGNSUB
        030324                                                                  T6.3:
        030324  104402                                                                 TRAP    C$BSUB
     64 030326                                  CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                        ;**** MACRO EXPANSION ****
        030326  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                   ****
     65
     66 030332                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030332  104410                                                                  TRAP    C$ESCAPE
        030334  000160                                                                  .WORD   L10042-.
     67 030336                                  BASEIN                  ;MACRO FOR BASE IN COMMAND
                                                                        ;**** MACRO EXPANSION ****
        030336  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
        030342  004000                                  .WORD   LPLU    ;SET LINE UNIT LOOP
        030344  002636                                  .WORD   BASE    ;BASE TABLE ADDRESS
        030346  000522                                  .WORD   DMR     ;DMR-11 MODE
                                                                        ;****                   ****
     68
     69 030350                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030350  104410                                                                  TRAP    C$ESCAPE
        030352  000142                                                                  .WORD   L10042-.
     70 030354                                  CNTRIN  MAINT           ;MACRO FOR CONTROL IN (MAINT. MODE)
                                                                        ;**** MACRO EXPANSION ****
        030354  004737  011520                  JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE
        030360  000400                                  .WORD   MAINT   ;SEL6 - (DUPLEX, MODE)
                                                                        ;****                   ****
     71
     72 030362                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030362  104410                                                                  TRAP    C$ESCAPE
        030364  000130                                                                  .WORD   L10042-.
     73 030366                                  SHUTDN                  ;HALT
                                                                        ;**** MACRO EXPANSION ****
        030366  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                   ****
     74 030372                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030372  104410                                                                  TRAP    C$ESCAPE
        030374  000120                                                                  .WORD   L10042-.
```

```
     75 030376  132737  000002  002730          BITB    #BIT1,BASE+ISP7 ;IS THE MAINTENANCE BIT SET IN IMAGE OF SP 7.
     76 030404  001004                          BNE     10$
     77 030406                                  ERRDF   21,EMT12        ;ERROR - MAINT. BIT NOT SET.
        030406  104455                                                                  TRAP    C$ERDF
        030410  000025                                                                  .WORD   21
        030412  030630                                                                  .WORD   EMT12
        030414  000000                                                                  .WORD   0
     78 030416                          10$:
     79 030416                            ENDSUB
        030416                                                              L10045:
        030416  104403                                                              TRAP    C$ESUB
     80
     81 030420                            BGNSUB
        030420                                                              T6.4:
        030420  104402                                                              TRAP    C$BSUB
     82
     83 030422                                  CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                        ;**** MACRO EXPANSION ****
        030422  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                 ****
     84
     85 030426                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030426  104410                                                                  TRAP    C$ESCAPE
        030430  000064                                                                  .WORD   L10042-.
     86 030432  005737  002254                  TST     DMTURN          ;IS INTERNAL LOOPBACK REQUESTED?
     87 030436  001004                          BNE     1$              ;IF NOT, BR
     88 030440  052737  004000  030462          BIS     #LPLU,100$      ;SET LINE UNIT LOOPBACK.
     89 030446  000403                          BR      2$
     90 030450                          1$:
     91 030450  042737  004000  030462          BIC     #LPLU,100$      ;CLEAR LINE UNIT LOOPBACK.
     92 030456                          2$:
     93 030456                                  CALL    $BASEI          ;BASE IN COMMAND.
     94 030462  000000                  100$:           .WORD   0       ;MAINTENANCE BITS (L. U. LOOPBACK?)
     95 030464  002636                          .WORD   BASE    ;BASE TABLE ADDRESS.
     96 030466  000522                          .WORD   DMR     ;DMR MODE.
     97 030470                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030470  104410                                                                  TRAP    C$ESCAPE
        030472  000022                                                                  .WORD   L10042-.
     98 030474                                  CALL    $LOOP           ;EXTENDED DMR COMMAND TO SET MAINT. BITS
     99                                                                 ;IF NEEDED. THIS WILL ALLOW MODEM LOOPBACK
    100                                                                 ;IF THE USER REQUESTED IT.
    101 030500                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        030500  104410                                                                  TRAP    C$ESCAPE
        030502  000012                                                                  .WORD   L10042-.
    102 030504                                  CNTRIN                  ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                        ;**** MACRO EXPANSION ****
        030504  004737  011520                  JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
        030510  000000                          .WORD   0               ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                        ;****                 ****
    103 030512                            ENDSUB
        030512                                                              L10046:
        030512  104403                                                              TRAP    C$ESUB
    104
    105
    106
    107 030514                          ENDTST
        030514                                                              L10042:
```

```
        030514  104401                                                          TRAP    CSETST
    108
    109 030516      110     104     130  EMT9:   .ASCIZ  /HDX BIT SET WHEN IN FDX/
        030521      040     102     111
        030524      124     040     123
        030527      105     124     040
        030532      127     110     105
        030535      116     040     111
        030540      116     040     106
        030543      104     130     000
    110 030546      104     104     103  EMT10:  .ASCIZ  /DDCMP RUN BIT NOT SET/
        030551      115     120     040
        030554      122     125     116
        030557      040     102     111
        030562      124     040     116
        030565      117     124     040
        030570      123     105     124
        030573      000
    111 030574      110     104     130  EMT11:  .ASCIZ  /HDX BIT NOT SET WHEN IN HDX/
        030577      040     102     111
        030602      124     040     116
        030605      117     124     040
        030610      123     105     124
        030613      040     127     110
        030616      105     116     040
        030621      111     116     040
        030624      110     104     130
        030627      000
    112 030630      115     101     111  EMT12:  .ASCIZ  /MAINT. MODE BIT NOT SET/
        030633      116     124     056
        030636      040     115     117
        030641      104     105     040
        030644      102     111     124
        030647      040     116     117
        030652      124     040     123
        030655      105     124     000
    113                                          .EVEN
    114
    115
    116
```

TEST 7 - MODEM WRITE COMMAND

```
                                .SBTTL          TEST 7 - MODEM WRITE COMMAND

                                ;*****************************************************************
                                ;*              TEST 7 - DMR-11
                                ;* MODEM WRITE COMMAND
                                ;*  SUBTEST 1  - WRITE DATA PATTERNS INTO THE MODEM WRITE REGISTER.
                                ;*               ENSURE THAT ON THE NEXT MODEM READ THAT THE
                                ;*               MICROCODE RETURNS THE PATTERN WRITTEN INTO BSEL6.
                                ;*  SUBTEST 2  - ATTEMPT TO WRITE BOTH THE HALF-DUPLEX BIT AND THE
                                ;*               RTS HOLD BIT.  THE MICROCODE SHOULD NOT ALLOW THIS
                                ;*               TO HAPPEN.  WHEN READING THE MODEM STATUS, ONLY
                                ;*               THE HALF-DUPLEX SHOULD BE SET.
                                ;*
                                ;*****************************************************************
030660                          BGNTST
030660                                                                          T7::

                                  BGNSUB
030660                                                                          T7.1:
030660  104402                                                                  TRAP    C$BSUB
030662                                  CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
030662  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                ****

030666                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
030666  104410                                                                  TRAP    C$ESCAPE
030670  000232                                                                  .WORD   L10047-.
030672                                  BASEIN                  ;BASE IN COMMAND.
                                                                ;**** MACRO EXPANSION ****
030672  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
030676  004000                          .WORD   LPLU            ;SET LINE UNIT LOOP
030700  002636                          .WORD   BASE            ;BASE TABLE ADDRESS
030702  000522                          .WORD   DMR             ;DMR-11 MODE
                                                                ;****                ****

030704                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
030704  104410                                                                  TRAP    C$ESCAPE
030706  000214                                                                  .WORD   L10047-.

030710  012701  000005                  MOV     #5,R1           ;COUNTER
030714  012702  031124                  MOV     #MODEM,R2       ;PATTERN TO WRITE INTO MODEM
030720                          10$:
030720  012237  030734                  MOV     (R2)+,15$       ;WRITE PATTERN
030724  004737  012060                  JSR     PC,$DMRIN       ;ISSUE DMR MODE COMMAND
030730  000005                          .WORD   WMODEM          ;WRITE MODEM COMMNAD
030732  000377                          .WORD   377             ;CLEAR ALL BITS IN BSEL6
030734  000000                  15$:    .WORD   0               ;SET THE BITS IN BSEL6 (FROM PATTERN)
030736                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
030736  104410                                                                  TRAP    C$ESCAPE
030740  000162                                                                  .WORD   L10047-.

030742  052777  000057  151262          BIS     #RQI!RMODEM,@SEL0 ;SET RQI AND READ  MODEM COMMAND
030750                                  WAIT    RDI             ;WAIT FOR RDI TO BE SET.
                                                                ;**** MACRO EXPANSION ****
030750  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
030754  000000                          .WORD   0               ;FLAG THAT WE'RE WAITING FOR RDI
```

```
                                                        ;****                   ****
 37 030756                              ESCAPE  TST     ;IF ERROR, EXIT TEST.
    030756  104410                                                              TRAP    C$ESCAPE
    030760  000142                                                              .WORD   L10047-.
 38 030762                      20$:
 39 030762  127737  151252  030734      CMPB    @BSEL6,15$      ;DID THE MICROCODE COPY THE BITS?
 40 030770  001406                      BEQ     25$             ;IF YES CONTINUE
 41 030772  013703  030734              MOV     15$,R3          ;SAVE THE PATTERN FOR THE ERROR MESSAGE.
 42 030776                              ERRDF   22,EMT13,ERRT2  ;WRITE MODEM ERROR
    030776  104455                                                              TRAP    C$ERDF
    031000  000026                                                             .WORD   22
    031002  031170                                                             .WORD   EMT13
    031004  031136                                                             .WORD   ERRT2
 43 031006                      25$:
 44 031006                              WAIT    RQI             ;CLEAR RQI AND WAIT FOR RDI TO CLEAR.
                                                                ;**** MACRO EXPANSION ****
    031006  004737  010704              JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED
                                                                ;****                   ****
 45 031012                              ESCAPE  TST             ;IF ERROR, EXIT TEST.
    031012  104410                                                              TRAP    C$ESCAPE
    031014  000106                                                              .WORD   L10047-.
 46 031016  005301                      DEC     R1              ;DECREMENT COUNTER
 47 031020  001337                      BNE     10$             ;CONTINUE UNTIL ALL 5 PATTERNS TRIED.
 48 031022                      30$:
 49
 50 031022                        ENDSUB
    031022                                                                  L10050:
    031022  104403                                                              TRAP    C$ESUB
 51
 52 031024                        BGNSUB
    031024                                                                      T7.2:
    031024  104402                                                              TRAP    C$BSUB
 53
 54 031026                              DMRIN   WMODEM,377,21   ;ATTEMPT TO WRITE MODEM HDX AND RTS.
                                                                ;**** MACRO EXPANSION ****
    031026  004737  012060              JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
    031032  000005                              .WORD   WMODEM  ;INPUT COMMAND
    031034  000377                              .WORD   377     ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
    031036  000021                              .WORD   21      ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                   ****
 55
 56 031040                              ESCAPE  TST             ;IF ERROR, BR TO END.
    031040  104410                                                              TRAP    C$ESCAPE
    031042  000060                                                              .WORD   L10047-.
 57 031044  052777  000057  151160      BIS     #RQI!RMODEM,@SEL0 ;SET RQI AND READ MODEM COMMAND.
 58 031052                              WAIT    RDI             ;WAIT FOR RDI TO BE SET
                                                                ;**** MACRO EXPANSION ****
    031052  004737  010274              JSR     PC, $WAIT       ;CALL WAIT ROUTINE
    031056  000000                              .WORD   0       ;FLAG THAT WE'RE WAITING FOR RDI
                                                                ;****                   ****
 59 031060                              ESCAPE  TST             ;IF ERROR, EXIT TEST.
    031060  104410                                                              TRAP    C$ESCAPE
    031062  000040                                                              .WORD   L10047-.
 60
 61 031064  122777  000020  151146      CMPB    #20,@BSEL6      ;IS ONLY HDX SET?
 62 031072  001406                      BEQ     10$             ;IF YES - OK
 63 031074  012703  000021              MOV     #21,R3          ;SAVE THE PATTERN FOR THE ERROR MESSAGE.
```

```
     64 031100                                  ERRDF   22,EMT13,ERRT2
        031100  104455                                                      TRAP    C$ERDF
        031102  000026                                                      .WORD   22
        031104  031170                                                      .WORD   EMT13
        031106  031136                                                      .WORD   ERRT2
     65 031110                          10$:
     66 031110                                  WAIT    RQI             ;CLEAR RQI AND WAIT FOR RDI TO CLEAR.
                                                                        ;**** MACRO EXPANSION ****
        031110  004737  010704                    JSR     PC, $CLRQI      ;CLEAR RQI AND WAIT FOR IT TO BE CLEARED.
                                                                        ;****                   ****
     67 031114                                  SHUTDN
                                                                        ;**** MACRO EXPANSION ****
        031114  004737  012550                    JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                   ****
     68
     69 031120                            ENDSUB
        031120                                                                  L10051:
        031120  104403                                                          TRAP    C$ESUB
     70
     71 031122                          ENDTST
        031122                                                                  L10047:
        031122  104401                                                          TRAP    C$ETST
     72
     73 031124  000000  000376  000001  MODEM:  .WORD   0,376,1,252,357 ;PATTERN TO WRITE INTO MODEM
        031132  000252  000357
     74
     75 031136                          BGNMSG  ERRT2
        031136                                                                  ERRT2::
     76 031136                                  PRINTB  #FMT19,R3,<B,@BSEL6>
        031136  005046                                                         CLR     -(SP)
        031140  157716  151074                                                 BISB    @BSEL6,(SP)
        031144  010346                                                         MOV     R3,-(SP)
        031146  012746  031214                                                 MOV     #FMT19,-(SP)
        031152  012746  000003                                                 MOV     #3,-(SP)
        031156  010600                                                         MOV     SP,R0
        031160  104414                                                         TRAP    C$PNTB
        031162  062706  000010                                                 ADD     #10,SP
     77 031166                              ENDMSG
        031166                                                          L10052:
        031166  104423                                                         TRAP    C$MSG
     78
     79
     80 031170     127     122     111  EMT13:  .ASCIZ  /WRITE MODEM ERROR /
        031173     124     105     040
        031176     115     117     104
        031201     105     115     040
        031204     105     122     122
        031207     117     122     040
        031212     000
     81                                         .EVEN
     82
     83 031214     045     101     127  FMT19:  .ASCIZ  /%AWROTE IN BSEL6: %03%A  MODEM FORMAT IN BSEL6: %03%N/
        031217     122     117     124
        031222     105     040     111
        031225     116     040     102
        031230     123     105     114
        031233     066     072     040
```

```
        031236      045      117      063
        031241      045      101      040
        031244      040      115      117
        031247      104      105      115
        031252      040      106      117
        031255      122      115      101
        031260      124      040      111
        031263      116      040      102
        031266      123      105      114
        031271      066      072      040
        031274      045      117      063
        031277      045      116      000
     84                                          .EVEN
     85
     86
     87
```

```
                                .SBTTL          TEST 8 - NO BUFFER ERROR

                                ;*****************************************************************
                                ;*              TEST 8 - DMR-11
                                ;*  SUBTEST 1  - TRANSMIT A BUFFER THREE TIMES WIHOUT ASSIGNING A
                                ;*               RECEIVE BUFFER.  BY ASSIGNING A NO BUFFER THRESHOLD
                                ;*               OF THREE, ENSURE THAT A NO BUFFER ERROR IS RECEIVED
                                ;*               AFTER THE THIRD THRANSMISSION.
                                ;*  SUBTEST 2  - TRANSMIT A BUFFER WITHOUT A RECEIVE BUFFER.
                                ;*               ASSIGN THE NAKS THRESHOLD OF 3 AND A NO BUFFER
                                ;*               THRESHOLD OF 7.  CHECK THAT THE NAKS ERROR COUNT IS
                                ;*               THREE AFTER SHUTDOWN.
                                ;*****************************************************************
14 031302                       BGNTST
   031302                                                                       T8::
15 031302                         BGNSUB
   031302                                                                       T8.1:
   031302  104402                                                                      TRAP    C$BSUB
16 031304                               CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
   031304  004737  011066               JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****
17
18 031310                               ESCAPE  TST             ;IF ERROR, BR TO TEST END.
   031310  104410                                                                   TRAP    C$ESCAPE
   031312  000416                                                                   .WORD   L10053-.
19 031314                               BASEIN                  ;MACRO FOR BASE IN COMMAND
                                                                ;**** MACRO EXPANSION ****
   031314  004737  011264               JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
   031320  004000                               .WORD   LPLU    ;SET LINE UNIT LOOP
   031322  002636                               .WORD   BASE    ;BASE TABLE ADDRESS
   031324  000522                               .WORD   DMR     ;DMR-11 MODE
                                                                ;****                 ****
20
21 031326                               ESCAPE  TST             ;IF ERROR, BR TO TEST END.
   031326  104410                                                                   TRAP    C$ESCAPE
   031330  000400                                                                   .WORD   L10053-.
22 031332                               CNTRIN  MAINT           ;MACRO FOR CONTROL IN (FULL DUPLEX AND MAINT)
                                                                ;**** MACRO EXPANSION ****
   031332  004737  011520               JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE
   031336  000400                               .WORD   MAINT   ;SEL6 - (DUPLEX, MODE)
                                                                ;****                 ****
23
24 031340                               ESCAPE  TST             ;IF ERROR, BR TO TEST END.
   031340  104410                                                                   TRAP    C$ESCAPE
   031342  000366                                                                   .WORD   L10053-.
25
26                                                              ;SET THRESHOLDS:
27                                                              ;NAKS RCVD = 377
28                                                              ;NAKS SENT = 377
29                                                              ;REP SENT = 377
30                                                              ;NO BUFFER = 3
31 031344                               DMRIN   THRESH,177777,1777
                                                                ;**** MACRO EXPANSION ****
   031344  004737  012060               JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
   031350  000013                               .WORD   THRESH  ;INPUT COMMAND
   031352  177777                               .WORD   177777  ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
```

TEST 8 - NO BUFFER ERROR

```
        031354  001777                          .WORD   1777    ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                   ****
     32
     33 031356                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        031356  104410                                                          TRAP    C$ESCAPE
        031360  000350                                                          .WORD   L10053-.
     34 031362  012700  000003          MOV     #3,R0           ;SET UP A COUNTER
     35 031366                  1$:
     36 031366                          BACCIT                  ;BA/CC IN COMMAND FOR TRANSMIT
                                                                ;**** MACRO EXPANSION ****
        031366  004737  012270          JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
        031372  000040                  .WORD   RQI!BACCT       ;BA/CC IN TRANSMIT COMMAND
        031374  002520                  .WORD   TBUF    ;TRANSMIT BUFFER ADDRESS
        031376  000044                  .WORD   TCOUNT  ;TRANSMIT CHARACTER COUNT
                                                                ;****                   ****
     37
     38 031400                          WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                ;**** MACRO EXPANSION ****
        031400  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        031404  000001                  .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                ;****                   ****
     39 031406                          ESCAPE  TST             ;IF RDO NOT SET, BR TO TEST END.
        031406  104410                                                          TRAP    C$ESCAPE
        031410  000320                                                          .WORD   L10053-
     40 031412  005300                  DEC     R0              ;DEC COUNTER
     41 031414  001404                  BEQ     10$             ;TRANSMIT FOR 3 TIMES.
     42 031416  042777  000207  150610  BIC     #RDO.CMD,@SEL2  ;CLEAR BACC OUT TRANSMIT.
     43 031424  000760                  BR      1$              ;TRANSMIT AGAIN
     44 031426                  10$:
     45 031426  032777  000001  150600  BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
     46 031434  001005                  BNE     20$             ;IF YES, PROCEED.
     47 031436                          ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT NOT RECEIVED.
        031436  104455                                                          TRAP    C$ERDF
        031440  000010                                                          .WORD   8
        031442  017762                                                          .WORD   EMG8
        031444  015112                                                          .WORD   ERRG2
     48 031446  000410                  BR      30$             ;EXIT
     49 031450                  20$:
     50 031450  032777  000004  150562  BIT     #NOBFR,@SEL6    ;IS THE NO BUFFER FLAG SET?
     51 031456  001004                  BNE     30$             ;IF YES - OK, PROCEED.
     52 031460                          ERRDF   9,EMG9,ERRG2    ;WE'RE NOT GETTING EXPECTED RESULT
        031460  104455                                                          TRAP    C$ERDF
        031462  000011                                                          .WORD   9
        031464  020026                                                          .WORD   EMG9
        031466  015112                                                          .WORD   ERRG2
     53                                                         ;(EITHER CONTROL OUT OR NOBUF/NAKS)
     54 031470                  30$:
     55 031470  042777  000207  150536  BIC     #RDO!CMD,@SEL2  ;CLEAR CONTROL OUT
     56 031476                          WAIT    RDO             ;EXPECT ANOTHER BACC OUT.
                                                                ;**** MACRO EXPANSION ****
        031476  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        031502  000001                  .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                ;****                   ****
     57 031504                          ESCAPE  TST             ;IF ERROR, BR TO END.
        031504  104410                                                          TRAP    C$ESCAPE
        031506  000222                                                          .WORD   L10053-.
     58 031510  042777  000207  150516  BIC     #RDO CMD,@SEL2  ;CLEAR BACC OUT.
```

```
     59 031516                          SHUTDN                  ;HALT DMR
                                                                ;**** MACRO EXPANSION ****
        031516  004737  012550           JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                ;****                 ****
     60 031522                    50$:
     61 031522                      ENDSUB
        031522                                                                  L10054:
        031522  104403                                                          TRAP    C$ESUB
     62
     63 031524                      BGNSUB
        031524                                                                  T8.2:
        031524  104402                                                          TRAP    C$BSUB
     64 031526                          CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
        031526  004737  011066           JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****
     65
     66 031532                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        031532  104410                                                          TRAP    C$ESCAPE
        031534  000174                                                          .WORD   L10053-.
     67 031536                          BASEIN                  ;MACRO FOR BASE IN COMMAND
                                                                ;**** MACRO EXPANSION ****
        031536  004737  011264           JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
        031542  004000                             .WORD   LPLU    ;SET LINE UNIT LOOP
        031544  002636                             .WORD   BASE    ;BASE TABLE ADDRESS
        031546  000522                             .WORD   DMR     ;DMR-11 MODE
                                                                ;****                 ****
     68
     69 031550                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        031550  104410                                                          TRAP    C$ESCAPE
        031552  000156                                                          .WORD   L10053-.
     70 031554                          CNTRIN                  ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                ;**** MACRO EXPANSION ****
        031554  004737  011520           JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
        031560  000000                             .WORD   0       ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                ;****                 ****
     71
     72 031562                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        031562  104410                                                          TRAP    C$ESCAPE
        031564  000144                                                          .WORD   L10053-.
     73
     74                                                         ;SET THRESHOLDS:
     75                                                         ;NAKS RCVD = 3
     76                                                         ;NAKS SENT = 3
     77                                                         ;REP SENT = 377
     78                                                         ;NO BUFFER = 7
     79 031566                          DMRIN   THRESH,1403,3777
                                                                ;**** MACRO EXPANSION ****
        031566  004737  012060           JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
        031572  000013                             .WORD   THRESH  ;INPUT COMMAND
        031574  001403                             .WORD   1403    ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
        031576  003777                             .WORD   3777    ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                 ****
     80
     81 031600                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        031600  104410                                                          TRAP    C$ESCAPE
        031602  000126                                                          .WORD   L10053-.
```

```
     82 031604                                  BACCIT                  ;BA/CC IN COMMAND FOR TRANSMIT
                                                                        ;**** MACRO EXPANSION ****
        031604  004737  012270                  JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
        031610  000040                            .WORD   RQI!BACCT       ;BA/CC IN TRANSMIT COMMAND
        031612  002520                            .WORD   TBUF    ;TRANSMIT BUFFER ADDRESS
        031614  000044                            .WORD   TCOUNT  ;TRANSMIT CHARACTER COUNT
                                                                        ;****                   ****
     83 031616                              10$:
     84 031616                                  WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                        ;**** MACRO EXPANSION ****
        031616  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        031622  000001                            .WORD   1       ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                   ****
     85 031624                                  ESCAPE  TST             ;IF RDO NOT SET, BR TO TEST END.
        031624  104410                                                                  TRAP    C$ESCAPE
        031626  000102                                                                  .WORD   L10053-.
     86 031630  032777  000001  150376          BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
     87 031636  001005                          BNE     20$             ;IF YES, PROCEED.
     88 031640                                  ERRDF   8,EMG8,E RG2    ;EXPECTED CONTROL OUT NOT RECEIVED.
        031640  104455                                                                  TRAP    C$ERDF
        031642  000010                                                                  .WORD   8
        031644  017762                                                                  .WORD   EMG8
        031646  015112                                                                  .WORD   ERRG2
     89 031650  000410                          BR      30$             ;EXIT
     90 031652                              20$:
     91 031652  032777  000004  150360          BIT     #NOBFR,@SEL6    ;IS THE NO BUFFER FLAG SET?
     92 031660  001004                          BNE     30$             ;IF YES - OK, PROCEED.
     93 031662                                  ERRDF   9,EMG9,ERRG2    ;WE'RE NOT GETTING EXPECTED RESULT
        031662  104455                                                                  TRAP    C$ERDF
        031664  000011                                                                  .WORD   9
        031666  020026                                                                  .WORD   EMG9
        031670  015112                                                                  .WORD   ERRG2
     94                                                                 ;(EITHER CONTROL OUT OR NOBUF/NAKS)
     95 031672                              30$:
     96 031672                                  SHUTDN
                                                                        ;**** MACRO EXPANSION ****
        031672  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                   ****
     97 031676  123727  002641  000003          CMPB    BASE+3,#3       ;NAKS REC. - NO BUFFER = 3?
     98 031704  001004                          BNE     35$             ;IF NOT ERROR
     99 031706  123727  002644  000003          CMPB    BASE+6,#3       ;NAKS SENT - NO BUFFER = 3?
    100 031714  001404                          BEQ     40$             ;IF OK - SKIP.
    101 031716                              35$:
    102 031716                                  ERRDF   23,EMT20,ERRT4
        031716  104455                                                                  TRAP    C$ERDF
        031720  000027                                                                  .WORD   23
        031722  031770                                                                  .WORD   EMT20
        031724  031732                                                                  .WORD   ERRT4
    103
    104 031726                              40$:
    105 031726                                ENDSUB
        031726                                                                  L10055:
        031726  104403                                                                 TRAP    C$ESUB
    106 031730                              ENDTST
        031730                                                                  L10053:
        031730  104401                                                                 TRAP    C$ETST
    107
```

```
    108
    109 031732                          BGNMSG  ERRT4
         031732                                                          ERRT4::
    110 031732                                  PRINTB  #FMG7,<B,BASE+3>,<B,BASE+6>
         031732  005046                                                          CLR     -(SP)
         031734  153716  002644                                                  BISB    BASE+6,(SP)
         031740  005046                                                          CLR     -(SP)
         031742  153716  002641                                                  BISB    BASE+3,(SP)
         031746  012746  016510                                                  MOV     #FMG7,-(SP)
         031752  012746  000003                                                  MOV     #3,-(SP)
         031756  010600                                                          MOV     SP,R0
         031760  104414                                                          TRAP    C$PNTB
         031762  062706  000010                                                  ADD     #10,SP
    111 031766                          ENDMSG
         031766                                                         L10056:
         031766  104423                                                          TRAP    C$MSG
    112
    113 031770     116     101     113  EMT20:  .ASCIZ  /NAKS ERROR/
         031773     123     040     105
         031776     122     122     117
         032001     122     000
    114                                 .EVEN
    115
```

```
                                .SBTTL          TEST 9 - NON-EXISTENT MEMORY ERROR

                                ;*****************************************************************************
                                ;*                      TEST 9 - DMR-11
                                ;* NON-EXISTENT MEMORY (NXM) ERROR CHECK
                                ;* PERFORM DMR COMMANDS USING NXM ADDRESSES; VERIFY THAT NXM ERROR IS
                                ;* REPORTED IN EACH OF THE FOLLOWING SUBTESTS:
                                ;*  SUBTEST 1  -  BASE IN RESUME COMMAND - BASE TABLE ADDRESS IS NXM
                                ;*  SUBTEST 2  -  BA/CC IN RECEIVE COMMAND - BA/CC IN ADDRESS IS NXM
                                ;*  SUBTEST 3  -  BA/CC IN TRANSMIT COMMAND - BA/CC IN ADDRESS IS NXM
                                ;*
                                ;*****************************************************************************
013 032004                      BGNTST
    032004                                                                      T9::
014 032004                        BGNSUB
    032004                                                                      T9.1:
    032004  104402                                                                      TRAP    C$BSUB
015 032006                              CLEAR                   ;MASTER CLEAR MACRO
                                                                ;**** MACRO EXPANSION ****
    032006  004737  011066              JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****
016
017 032012                              ESCAPE  TST             ;IF ERROR, BR TO TEST END
    032012  104410                                                                      TRAP    C$ESCAPE
    032014  000500                                                                      .WORD   L10057-.
018 032016                              BASEIN                  ;BASE IN COMMAND - DMR MODE
                                                                ;**** MACRO EXPANSION ****
    032016  004737  011264              JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
    032022  004000                              .WORD   LPLU    ;SET LINE UNIT LOOP
    032024  002636                              .WORD   BASE    ;BASE TABLE ADDRESS
    032026  000522                              .WORD   DMR     ;DMR-11 MODE
                                                                ;****                 ****
019
020 032030                              ESCAPE  TST             ;IF ERROR, BR TO TEST END
    032030  104410                                                                      TRAP    C$ESCAPE
    032032  000462                                                                      .WORD   L10057-.
021 032034                              SHUTDN                  ;HALT
                                                                ;**** MACRO EXPANSION ****
    032034  004737  012550              JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                ;****                 ****
022 032040                              ESCAPE  TST             ;IF ERROR, BR TO TEST END.
    032040  104410                                                                      TRAP    C$ESCAPE
    032042  000452                                                                      .WORD   L10057-.
023 032044  012737  000001  002364      MOV     #CNTRL,ERROR    ;THIS FLAG WILL INHIBIT CONTROL OUT
024                                                             ;ERROR REPORTING - BECAUSE WE EXPECT ONE.
025
026                                                             ;BASE IN RESUME COMMAND WITH NXM BASE TABLE.
027 032052                              BASEIN  0,160000,BIT15!BIT14!RES!DMR
                                                                ;**** MACRO EXPANSION ****
    032052  004737  011264              JSR     PC, $BASEI      ;CALL BASE IN ROUTINE
    032056  000000                              .WORD   0       ;MAINTENANCE MODE BITS TO SET IN BSEL1
    032060  160000                              .WORD   160000  ;BASE TABLE ADDRESS
    032062  150522                              .WORD   BIT15!BIT14!RES!DMR     ;MODE
                                                                ;****                 ****
028
029 032064                              WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                ;**** MACRO EXPANSION ****
```

```
        032064  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        032070  000001                           .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                         ;****                   ****
     30 032072  032777  000001  150134           BIT     #CNTRL,@SEL2    ;IS THERE A CONTROL OUT REPORTED ?
     31 032100  001005                           BNE     10$             ;IF YES, PROCEED.
     32 032102                                   ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT
        032102  104455                                                                   TRAP    C$ERDF
        032104  000010                                                                   .WORD   8
        032106  017762                                                                   .WORD   EMG8
        032110  015112                                                                   .WORD   ERRG2
     33 032112  000410                           BR      20$             ;EXIT
     34 032114                          10$:
     35 032114  032777  000400  150116           BIT     #NXM,@SEL6      ;IS THE NXM FLAG SET?
     36 032122  001004                           BNE     20$             ;IF YES - ERROR REPORTED CORRECTLY
     37 032124                                   ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        032124  104455                                                                   TRAP    C$ERDF
        032126  000011                                                                   .WORD   9
        032130  020026                                                                   .WORD   EMG9
        032132  015112                                                                   .WORD   ERRG2
     38 032134                          20$:
     39 032134  042777  000207  150072           BIC     #RDO!CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS
     40 032142  005037  002364                   CLR     ERROR           ;ALLOW ERROR REPORTING
     41 032146                        ENDSUB
        032146                                                                 L10060:
        032146  104403                                                                  TRAP    C$ESUB
     42
     43 032150                        BGNSUB
        032150                                                                 T9.2:
        032150  104402                                                                  TRAP    C$BSUB
     44 032152                        CLEAR                              ;MACRO FOR MASTER CLEAR
                                                                         ;**** MACRO EXPANSION ****
        032152  004737  011066           JSR     PC, $MSCLR            ;ISSUE A DMR MASTER CLEAR
                                                                         ;****                   ****
     45
     46 032156                          ESCAPE  1ST                    ;IF ERROR, BR TO TEST END.
        032156  104410                                                                   TRAP    C$ESCAPE
        032160  000334                                                                   .WORD   L10057-.
     47 032162                          BASEIN                         ;MACRO FOR BASE IN COMMAND
                                                                         ;**** MACRO EXPANSION ****
        032162  004737  011264           JSR     PC, $BASEI            ;CALL BASE IN ROUTINE WITH DEFAULTS
        032166  004000                            .WORD   LPLU          ;SET LINE UNIT LOOP
        032170  002636                            .WORD   BASE          ;BASE TABLE ADDRESS
        032172  000522                            .WORD   DMR           ;DMR-11 MODE
                                                                         ;****                   ****
     48
     49 032174                          ESCAPE  TST                    ;IF ERROR, BR TO TEST END.
        032174  104410                                                                   TRAP    C$ESCAPE
        032176  000316                                                                   .WORD   L10057-.
     50 032200                          CNTRIN                         ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                         ;**** MACRO EXPANSION ****
        032200  004737  011520           JSF     PC, $CNTIN            ;CALL CONTROL IN ROUTINE WITH DEFAULT
        032204  000000                            .WORD   0             ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                         ;****                   ****
     51
     52 032206                          ESCAPE  TST                    ;IF ERROR, BR TO TEST END.
        032206  104410                                                                   TRAP    C$ESCAPE
        032210  000304                                                                   .WORD   L10057-.
```

```
TEST 9 - NON-EXISTENT MEMORY ERROR

     53 032212  012737  000001  002364          MOV     #CNTRL,ERROR    ;INHIBIT CONTROL OUT ERROR REPORTING AGAIN.
     54
     55                                                                 ;BA/CC IN REC. COMMAND WITH NXM
     56                                                                 ;ADDR = 760000 AND A CHARACTER COUNT = 3.
     57 032220                                  BACCIR  160000,BIT15!BIT14!RCOUNT
                                                                        ;**** MACRO EXPANSION ****
        032220  004737  012270                  JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE
        032224  000044                                    .WORD   RQI!BACCR       ;BA/CC IN RECEIVE COMMAND
        032226  160000                                    .WORD   160000  ;BUFFER ADDRESS BITS 0-15
        032230  140044                                    .WORD   BIT15!BIT14!RCOUNT      ;BA BITS 16/17 AND CHAR. COUNT
                                                                        ;****                   ****
     58
     59 032232                                  BACCIT                  ;BA/CC IN XMIT
                                                                        ;**** MACRO EXPANSION ****
        032232  004737  012270                  JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
        032236  000040                                    .WORD   RQI!BACCT       ;BA/CC IN TRANSMIT COMMAND
        032240  002520                                    .WORD   TBUF    ;TRANSMIT BUFFER ADDRESS
        032242  000044                                    .WORD   TCOUNT  ;TRANSMIT CHARACTER COUNT
                                                                        ;****                   ****
     60
     61 032244                                  WAIT    RDO             ;WAIT FOR RDO
                                                                        ;**** MACRO EXPANSION ****
        032244  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        032250  000001                                    .WORD   1       ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                   ****
     62 032252  032777  000001  147754          BIT     #CNTRL,@SEL2    ;IS THERE A CONTROL OUT REPORTED ?
     63 032260  001005                          BNE     10$             ;IF YES, PROCEED.
     64 032262                                  ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT
        032262  104455                                                                  TRAP    C$ERDF
        032264  000010                                                                  .WORD   8
        032266  017762                                                                  .WORD   EMG8
        032270  015112                                                                  .WORD   ERRG2
     65 032272  000410                          BR      20$             ;EXIT
     66 032274                          10$:
     67 032274  032777  000400  147736          BIT     #NXM,@SEL6      ;IS THE NXM FLAG SET?
     68 032302  001004                          BNE     20$             ;IF YES - ERROR REPORTED CORRECTLY
     69 032304                                  ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        032304  104455                                                                  TRAP    C$ERDF
        032306  000011                                                                  .WORD   9
        032310  020026                                                                  .WORD   EMG9
        032312  015112                                                                  .WORD   ERRG2
     70
     71 032314                          20$:
     72 032314  042777  000207  147712          BIC     #RDO!CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS.
     73 032322  005037  002364                  CLR     ERROR           ;ENABLE ERROR REPORTING
     74 032326                            ENDSUB
        032326                                                                  L10061:
        032326  104403                                                                 TRAP    C$ESUB
     75
     76 032330                            BGNSUB
        032330                                                                  T9.3:
        032330  104402                                                                 TRAP    C$BSUB
     77 032332                                  CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                        ;**** MACRO EXPANSION ****
        032332  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                   ****
     78
```

```
     79 032336                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        032336  104410                                                                  TRAP    C$ESCAPE
        032340  000154                                                                  .WORD   L10057-.
     80 032342                                  BASEIN                  ;MACRO FOR BASE IN COMMAND
                                                                        ;**** MACRO EXPANSION ****
        032342  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
        032346  004000                                  .WORD   LPLU    ;SET LINE UNIT LOOP
        032350  002636                                  .WORD   BASE    ;BASE TABLE ADDRESS
        032352  000522                                  .WORD   DMR     ;DMR-11 MODE
                                                                        ;****                   ****
     81
     82 032354                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        032354  104410                                                                  TRAP    C$ESCAPE
        032356  000136                                                                  .WORD   L10057-.
     83 032360                                  CNTRIN                  ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                        ;**** MACRO EXPANSION ****
        032360  004737  011520                  JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
        032364  000000                                  .WORD   0       ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                        ;****                   ****
     84
     85 032366                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        032366  104410                                                                  TRAP    C$ESCAPE
        032370  000124                                                                  .WORD   L10057-.
     86 032372                                  BACCIR                  ;BA/CC IN RCV
                                                                        ;**** MACRO EXPANSION ****
        032372  004737  012270                  JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
        032376  000044                                  .WORD   RQI!BACCR       ;BA/CC IN RECEIVE COMMAND
        032400  002570                                  .WORD   RBUF    ;RECEIVE BUFFER
        032402  000044                                  .WORD   RCOUNT  ;RECEIVE CHARACTER COUNT
                                                                        ;****                   ****
     87
     88 032404                                  ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        032404  104410                                                                  TRAP    C$ESCAPE
        032406  000106                                                                  .WORD   L10057-.
     89 032410  012737  000001  002364           MOV     #CNTRL,ERROR    ;INHIBIT CONTROL OUT ERROR REPORTING AGAIN.
     90
     91                                                                 ;BA/CC IN XMIT COMMAND WITH NXM BUFFER
     92                                                                 ;ADDRESS (760000) AND A CHAR. COUNT = 1
     93 032416                                  BACCIT  160000,BIT15!BIT14!1
                                                                        ;**** MACRO EXPANSION ****
        032416  004737  012270                  JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE
        032422  000040                                  .WORD   RQI!BACCT       ;BA/CC IN TRANSMIT COMMAND
        032424  160000                                  .WORD   160000  ;BUFFER ADDRESS BITS 0-15
        032426  140001                                  .WORD   BIT15!BIT14!1   ;BA BITS 16 & 17 AND CHAR. COUNT
                                                                        ;****                   ****
     94
     95 032430                                  WAIT    RDO             ;WAIT FOR RDO TO BE SET.
                                                                        ;**** MACRO EXPANSION ****
        032430  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        032434  000001                                  .WORD   1       ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                   ****
     96 032436  032777  000001  147570           BIT     #CNTRL,@SEL2    ;IS THERE A CONTROL OUT REPORTED ?
     97 032444  001005                          BNE     10$             ;IF YES, PROCEED.
     98 032446                                  ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT
        032446  104455                                                                  TRAP    C$ERDF
        032450  000010                                                                  .WORD   8
        032452  017762                                                                  .WORD   EMG8
```

```
                                                                                                .WORD   ERRG2
     99 032456  000410                          BR      20$             ;EXIT
    100 032460                              10$:
    101 032460  032777  000400  147552        BIT     #NXM,@SEL6      ;IS THE NXM FLAG SET?
    102 032466  001004                        BNE     20$             ;IF YES - ERROR REPORTED CORRECTLY
    103 03247C                                ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        032470  104455                                                                         TRAP    C$ERDF
        032472  000011                                                                         .WORD   9
        032474  020026                                                                         .WORD   EMG9
        032476  015112                                                                         .WORD   ERRG2
    104 032500                              20$:
    105 032500  042777  000207  147526        BIC     #RDO!CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS.
    106 032506  005037  002364                CLR     ERROR           ;DON'T INHIBIT CONTROL OUT ERRORS
    107 032512                                ENDSUB
        032512                                                                          L10062:
        032512  104403                                                                          TRAP    C$ESUB
    108
    109 032514                              ENDTST
        032514                                                                          L10057:
        032514  104401                                                                          TRAP    C$ETST
    110
    111
    112
    113
    114
    115
```

```
                                .SBTTL          TEST 10 - TIME OUT ERROR
                                ;*****************************************************************
                                ;*              TEST  10 - DMR-11
                                ;* TIME OUT - FORCE A TIMEOUT AND VERIFY THAT THE ERROR IS REPORTED
                                ;* THIS TEST WILL ALSO USE AN APPROXIMATE TIMER TO DETERMINE IF THE
                                ;* M8207 1 MSEC PROGRAM TIMER IS OUT OF RANGE.
                                ;*
                                ;*****************************************************************
                                BGNTST
                                                                                        T10::
                                        CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
032516  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                ****

                                        ESCAPE  TST             ;IF ERROR, BR TO TEST END.
032522  104410                                                                  TRAP    C$ESCAPE
032524  000214                                                                  .WORD   L10063-.
                                        BASEIN                  ;MACRO FOR BASE IN COMMAND
                                                                ;**** MACRO EXPANSION ****
032526  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
032532  004000                          .WORD   LPLU            ;SET LINE UNIT LOOP
032534  002636                          .WORD   BASE            ;BASE TABLE ADDRESS
032536  000522                          .WORD   DMR             ;DMR-11 MODE
                                                                ;****                ****

                                                                ;SET THRESHOLD VALUES AS FOLLOWS:
                                                                ;BSEL4 = NAKS RECEIVED (377)
                                                                ;BSEL5 = NAKS TRANSMITTED (377)
                                                                ;BSEL6 = REP/SEL SENT (1)
                                                                ;BSEL7 = NO BUFFFER (377)
                                DMRIN   THRESH,177777,177401
                                                                ;**** MACRO EXPANSION ****
032540  004737  012060                  JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
032544  000013                          .WORD   THRESH          ;INPUT COMMAND
032546  177777                          .WORD   177777          ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
032550  177401                          .WORD   177401          ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                ****

                                ESCAPE  TST                     ;IF ERROR, BR TO TEST END
032552  104410                                                                  TRAP    C$ESCAPE
032554  000164                                                                  .WORD   L10063-.
                                DMRIN   TIMER,0,10              ;SET REP/SEL TIMER
                                                                ;**** MACRO EXPANSION ****
032556  004737  012060                  JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
032562  000012                          .WORD   TIMER           ;INPUT COMMAND
032564  000000                          .WORD   0               ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
032566  000010                          .WORD   10              ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                ****

                                ESCAPE  TST                     ;IF ERROR, BR TO TEST END.
032570  104410                                                                  TRAP    C$ESCAPE
032572  000146                                                                  .WORD   L10063-.
                                CNTRIN                          ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                ;**** MACRO EXPANSION ****
032574  004737  011520                  JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
```

```
TEST 10 - TIME OUT ERROR

        032600  000000                          .WORD   0       ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                ;****                   ****
     28
     29 032602                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
        032602  104410                                                          TRAP    C$ESCAPE
        032604  000134                                                          .WORD   L10063-.
     30
     31                                                         ;BLIND THE RECEIVER BY GOING INTO HDX.
     32 032606                          DMRIN   WMODEM,0,BIT4   ;USE . !TE MODEM COMMAND TO SET HALF DUPLEX.
                                                                ;**** MACRO EXPANSION ****
        032606  004737  012060          JSR     PC, $DMRIN      ;CALL DMR MODE INPUT ROUTINE
        032612  000005                  .WORD   WMODEM          ;INPUT COMMAND
        032614  000000                  .WORD   0               ;SEL4 VALUE (OR BITS TO CLEAR IN BSEL6)
        032616  000020                  .WORD   BIT4            ;SEL6 VALUE (OR BITS TO SET IN BSEL6)
                                                                ;****                   ****
     33
     34 032620                          BACCIT                  ;BA/CC IN XMIT BUFFER
                                                                ;**** MACRO EXPANSION ****
        032620  004737  012270          JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
        032624  000040                  .WORD   RQI!BACCT               ;BA/CC IN TRANSMIT COMMAND
        032626  002520                  .WORD   TBUF            ;TRANSMIT BUFFER ADDRESS
        032630  000044                  .WORD   TCOUNT          ;TRANSMIT CHARACTER COUNT
                                                                ;****                   ****
     35
     36 032632                          ESCAPE  TST             ;IF ERROR, EXIT
        032632  104410                                                          TRAP    C$ESCAPE
        032634  000104                                                          .WORD   L10063-.
     37 032636                          WAIT    RDO             ;WAIT FOR THE READY OUT.
                                                                ;**** MACRO EXPANSION ****
        032636  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        032642  000001                  .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                ;****                   ****
     38 032644                          ESCAPE  TST             ;IF ERROR, EXIT.
        032644  104410                                                          TRAP    C$ESCAPE
        032646  000072                                                          .WORD   L10063-.
     39 032650  023727  002414  011610  CMP     COUNT,#5000.    ;CHECK THE SOFTWARE TIMER COUNT.
     40                                                         ;THE TIMER VALUE WAS DETERMINED
     41                                                         ;EMPIRICALLY ON A 11/04, 11/34, 11/40, 11/70.
     42 032656  003005                  BGT     5$              ;IF OK - PROCEED
     43                                                         ;*****************************************
     44 032660                          ERRDF   19,EMG19        ;
        032660  104455                                                          TRAP    C$ERDF
        032662  000023                                                          .WORD   19
        032664  020370                                                          .WORD   EMG19
        032666  000000                                                          .WORD   0
     45                                                         ;1MSEC PROGRAM TIMER - OUT OF RANGE.
     46                                                         ;IF THIS ERROR OCCURS, CHECK THE M8207
     47                                                         ;MICROPROCESSOR AS FOLLOWS:
     48                                                         ;RESET THE DMR, SCOPE E-69, PIN 4 TO VERIFY
     49                                                         ;THAT THE 1MSEC TIMER IS OUT OF RANGE.
     50                                                         ;*****************************************
     51 032670  000423                  BR      25$
     52 032672                  5$:
     53 032672  032777  000001  147334  BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT
     54 032700  001005                  BNE     10$             ;IF YES, PROCEED.
     55 032702                          ERRDF   8,EMG8,ERRG2    ;EXPECTED A CONTROL OUT.
        032702  104455                                                          TRAP    C$ERDF
```

```
TEST 10 - TIME OUT ERROR

        032704  000010                                                          .WORD   8
        032706  017762                                                          .WORD   EMG8
        032710  015112                                                          .WORD   ERRG2
     56 032712  000410                          BR      20$             ;EXIT
     57 032714                          10$:
     58 032714  032777  000002  147316         BIT     #TOUT,@SEL6     ;WAS THE TIME OUT REPORTED?
     59 032722  001004                         BNE     20$             ;IF YES, EXIT
     60 032724                                  ERRDF   9,EMG9,ERRG2    ;UNEXPECTED ERROR.
        032724  104455                                                          TRAP    C$ERDF
        032726  000011                                                          .WORD   9
        032730  020026                                                          .WORD   EMG9
        032732  015112                                                          .WORD   ERRG2
     61 032734                          20$:
     62 032734                                  SHUTDN
                                                                ;**** MACRO EXPANSION ****
        032734  004737  012550                 JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                ;****                   ****
     63 032740                          25$:
     64
     65 032740                          ENDTST
        032740                                                                  L10063:
        032740  104401                                                          TRAP    C$ETST
```

```
                                .SBTTL          TEST 11 - MESSAGE TOO LONG ERROR

                                ;*****************************************************************
                                ;*              TEST 11 - DMR-11
                                ;*  MESSAGE TOO LONG - TRANSMIT A MESSAGE THAT IS TOO LONG FOR THE
                                ;*  RECEIVE BUFFER  'ID VERIFY THAT THE ''TOO LONG'' ERROR IS RECEIVED.
                                ;*
                                ;*****************************************************************
 032742                         BGNTST
 032742                                                                          T11::
 032742                                 CLEAR                    ;MACRO FOR MASTER CLEAR
                                                                 ;**** MACRO EXPANSION ****
 032742  004737  011066                 JSR     PC, $MSCLR       ;ISSUE A DMR MASTER CLEAR
                                                                 ;****                 ****

 032746                                 ESCAPE  TST              ;IF ERROR, BR TO TEST END.
 032746  104410                                                                  TRAP    C$ESCAPE
 032750  000150                                                                  .WORD   L10064-.
 032752                                 BASEIN                   ;MACRO FOR BASE IN COMMAND
                                                                 ;**** MACRO EXPANSION ****
 032752  004737  011264                 JSR     PC, $BASEI       ;CALL BASE IN ROUTINE WITH DEFAULTS
 032756  004000                                 .WORD   LPLU     ;SET LINE UNIT LOOP
 032760  002636                                 .WORD   BASE     ;BASE TABLE ADDRESS
 032762  000522                                 .WORD   DMR      ;DMR-11 MODE
                                                                 ;****                 ****

 032764                                 ESCAPE  TST              ;IF ERROR, BR TO TEST END.
 032764  104410                                                                  TRAP    C$ESCAPE
 032766  000132                                                                  .WORD   L10064-.
 032770                                 CNTRIN                   ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                 ;**** MACRO EXPANSION ****
 032770  004737  011520                 JSP     PC, $CNTIN       ;CALL CONTROL IN ROUTINE WITH DEFAULT
 032774  000000                                 .WORD   0        ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                 ;****                 ****

 032776                                 ESCAPE  TST              ;IF ERROR, BR TO TEST END.
 032776  104410                                                                  TRAP    C$ESCAPE
 033000  000120                                                                  .WORD   L10064-.
 033002                                 BACCIR  RBUF,RCOUNT/2    ;SET UP THE RECEIVE BUFFER WITH 1/2 BUF. SPACE
                                                                 ;**** MACRO EXPANSION ****
 033002  004737  012270                 JSR     PC, $BACC        ;CALL BA/CC IN ROUTINE
 033006  000044                                 .WORD   RQI!BACCR        ;BA/CC IN RECEIVE COMMAND
 033010  002570                                 .WORD   RBUF     ;BUFFER ADDRESS BITS 0-15
 033012  000022                                 .WORD   RCOUNT/2         ;BA BITS 16/17 AND CHAR. COUNT
                                                                 ;****                 ****

 033014  012737  000001  002364         MOV     #CNTRL,ERROR     ;THIS FLAG WILL DISABLE ANY CONTROL OUT ERROR
                                                                 ;REPORTING BECAUSE WE ARE INTENTIONALLY
                                                                 ;CAUSING ONE IN THIS TEST.
 033022                                 BACCIT                   ;BA/CC IN XMIT COMMAND
                                                                 ;**** MACRO EXPANSION ****
 033022  004737  012270                 JSR     PC, $BACC        ;CALL BA/CC IN ROUTINE WITH DEFAULTS
 033026  000040                                 .WORD   RQI'BACCT        ;BA/CC IN TRANSMIT COMMAND
 033030  002520                                 .WORD   TBUF     ;TRANSMIT BUFFER ADDRESS
 033032  000044                                 .WORD   TCOUNT   ;TRANSMIT CHARACTER COUNT
                                                                 ;****                 ****

 033034                         10$:
```

```
     26 033034                                  WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                        ;**** MACRO EXPANSION ****
        033034  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        033040  000001                          .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                 ****
     27 033042                                  ESCAPE  TST             ;IF RDO NOT SET, BR TO TEST END.
        033042  104410                                                                  TRAP    C$ESCAPE
        033044  000054                                                                  .WORD   L10064-.
     28 033046  032777  000001  147160          BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
     29 033054  001005                          BNE     20$             ;IF YES, PROCEED
     30 033056                                  ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT.
        033056  104455                                                                  TRAP    C$ERDF
        033060  000010                                                                  .WORD   8
        033062  017762                                                                  .WORD   EMG8
        033064  015112                                                                  .WORD   ERRG2
     31 033066  000410                          BR      40$             ;EXIT
     32 033070                          20$:
     33 033070  032777  000020  147142          BIT     #TOLONG,@SEL6   ;IS THE TOO LONG BIT SET?
     34 033076  001004                          BNE     40$             ;IF YES, TEST OK - FINISH UP.
     35 033100                          30$:
     36 033100                                  ERRDF   9,EMG9,ERRG2    ;WE'RE NOT GETTING EXPECTED RESULT
        033100  104455                                                                  TRAP    C$ERDF
        033102  000011                                                                  .WORD   9
        033104  020026                                                                  .WORD   EMG9
        033106  015112                                                                  .WORD   ERRG2
     37
     38 033110                          40$:
     39 033110  005037  002364                  CLR     ERROR           ;RESTORE ERROR FLAG TO NORMAL STATE.
     40 033114                                  SHUTDN                  ;HALT THE DMR.
                                                                        ;**** MACRO EXPANSION ****
        033114  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                 ****
     41
     42
     43
     44 033120                          ENDTST
        033120                                                          L10064:
        033120  104401                                                                  TRAP    C$ETST
     45
     46
```

```
                                .SBTTL          TEST 12 - PROCEDURE ERRORS

                                ;*****************************************************************
                                ;*              TEST 12 - DMR-11
                                ;*  PROCEDURE ERRORS -
                                ;*  THE FOLLOWING SHOULD CAUSE THE DMR-11 TO HALT AND RESPOND WITH
                                ;*  A PROCEDURE ERROR:
                                ;*  SUBTEST 1  -  A SECOND BASE IN COMMAND
                                ;*  SUBTEST 2  -  A CONTROL IN BEFORE A BASE IN
                                ;*  SUBTEST 3  -  A BA/CC IN BEFORE A BASE IN
                                ;*  SUBTEST 4  -  A BA/CC IN RCV WITH A BUFFER LENGTH OF 0
                                ;*  SUBTEST 5  -  A BA/CC IN XMIT. WITH A BUFFER LENGTH OF 0
                                ;*
                                ;*****************************************************************
033122                          BGNTST
033122                                                                  T12::
033122                            BGNSUB
033122                                                                  T12.1:
033122  104402                                                                  TRAP    C$BSUB

033124                                  CLEAR                   ;MASTER CLEAR MACRO
                                                                ;**** MACRO EXPANSION ****
033124  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****

033130                                  BASEIN
                                                                ;**** MACRO EXPANSION ****
033130  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
033134  004000                                  .WORD   LPLU    ;SET LINE UNIT LOOP
033136  002636                                  .WORD   BASE    ;BASE TABLE ADDRESS
033140  000522                                  .WORD   DMR     ;DMR-11 MODE
                                                                ;****                 ****

033142  012737  000001  002364          MOV     #CNTRL,ERROR    ;THIS FLAG WILL DISABLE ANY CONTROL OUT ERROR
                                                                ;REPORTING BECAUSE WE ARE INTENTIONALLY
                                                                ;CAUSING ONE IN THIS TEST.
033150                          BASEIN                          ;SECOND BASE IN
                                                                ;**** MACRO EXPANSION ****
033150  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
033154  004000                                  .WORD   LPLU    ;SET LINE UNIT LOOP
033156  002636                                  .WORD   BASE    ;BASE TABLE ADDRESS
033160  000522                                  .WORD   DMR     ;DMR-11 MODE
                                                                ;****                 ****

033162                          WAIT    RDO                     ;WAIT FOR RDO TO BE SET
                                                                ;**** MACRO EXPANSION ****
033162  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
033166  000001                                  .WORD   1       ;FLAG THAT WE'RE WAITING FOR RDO
                                                                ;****                 ****
033170                          ESCAPE  TST                     ;IF RDO NOT SET, BR TO TEST END.
033170  104410                                                                  TRAP    C$ESCAPE
033172  000632                                                                  .WORD   L10065-.
033174  032777  000001  147032  BIT     #CNTRL,@SEL2            ;IS THIS A CONTROL OUT?
033202  001005                  BNE     10$                     ;IF YES, PROCEED.
033204                          ERRDF   8.,EMG8,ERRG2           ;EXPECTED CONTROL OUT
033204  104455                                                                  TRAP    C$ERDF
033206  000010                                                                  .WORD   8
```

```
        033210  017762                                                          .WORD   EMG8
        033212  015112                                                          .WORD   ERRG2
     32 033214  000410                  BR      15$             ;EXIT
     33 033216                  10$:
     34 033216  032777  001000  147014  BIT     #HALTC,@SEL6    ;IS THE HALT - PROCEDURE ERROR BIT SET?
     35 033224  001004                  BNE     15$             ;IF YES - ERROR REPORTED CORRECTLY
     36 033226                          ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        033226  104455                                                          TRAP    C$ERDF
        033230  000011                                                          .WORD   9
        033232  020026                                                          .WORD   EMG9
        033234  015112                                                          .WORD   ERRG2
     37 033236                  15$:
     38 033236  042777  000207  146770  BIC     #RDO CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS
     39 033244  005037  002364          CLR     ERROR           ;RESTORE FLAG
     40 033250                  ENDSUB
        033250                                                                  L10066:
        033250  104403                                                          TRAP    C$ESUB
     41
     42 033252                  BGNSUB
        033252                                                                  T12.2:
        033252  104402                                                          TRAP    C$BSUB
     43
     44 033254                  CLEAR                           ;MASTER CLEAR MACRO
                                                                ;**** MACRO EXPANSION ****
        033254  004737  011066          JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****
     45
     46 033260  012737  000001  002364  MOV     #CNTRL,ERROR    ;THIS FLAG WILL DISABLE ANY CONTROL OUT ERROR
     47                                                         ;REPORTING BECAUSE WE ARE INTENTIONALLY
     48                                                         ;CAUSING ONE IN THIS TEST.
     49 033266  005037  002260          CLR     DMRFLG          ;CLEAR FLAG THAT IS SET IN BASEIN IN ORDER
     50                                                         ;TO FLAG THAT A CONTROL OUT-DMR RUN MODE
     51                                                         ;COMMAND IS EXPECTED (THIS FLAG WAS SET IN
     52                                                         ;THE PREVIOUS SUBTEST BASEIN)
     53 033272                  CNTRIN                          ;CONTROL IN
                                                                ;**** MACRO EXPANSION ****
        033272  004737  011520          JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
        033276  000000                  .WORD   0               ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                ;****                 ****
     54
     55 033300                  WAIT    RDO                     ;WAIT FOR RDO TO BE SET
                                                                ;**** MACRO EXPANSION ****
        033300  004737  010274          JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        033304  000001                  .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                ;****                 ****
     56 033306                  ESCAPE  TST                     ;IF RDO NOT SET, BR TO TEST END.
        033306  104410                                                          TRAP    C$ESCAPE
        033310  000514                                                          .WORD   L10065-.
     57 033312  032777  000001  146714  BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
     58 033320  001005                  BNE     10$             ;IF YES - PROCEED.
     59 033322                          ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT
        033322  104455                                                          TRAP    C$ERDF
        033324  000010                                                          .WORD   8
        033326  017762                                                          .WORD   EMG8
        033330  015112                                                          .WORD   ERRG2
     60 033332  000410                  BR      15$             ;EXIT
     61 033334                  10$:
```

```
TEST 12 - PROCEDURE ERRORS

     62 033334  032777  001000  146676          BIT     #HALTC,@SEL6    ;IS THE HALT - PROCEDURE ERROR BIT SET?
     63 033342  001004                          BNE     15$             ;IF YES - ERROR REPORTED CORRECTLY
     64 033344                                  ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        033344  104455                                                                  TRAP    C$ERDF
        033346  000011                                                                  .WORD   9
        033350  020026                                                                  .WORD   EMG9
        033352  015112                                                                  .WORD   ERRG2
     65 033354                          15$:
     66 033354  042777  000207  146652          BIC     #PDO.CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS.
     67 033362  005037  002364                  CLR     ERROR           ;RESTORE FLAG
     68 033366                          ENDSUB
        033366                                                                  L10067:
        033366  104403                                                                  TRAP    C$ESUB
     69
     70 033370                          BGNSUB
        033370                                                                  T12.3:
        033370  104402                                                                  TRAP    C$BSUB
     71
     72 033372                                  CLEAR                   ;MASTER CLEAR MACRO
                                                                        ;**** MACRO EXPANSION ****
        033372  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                 ****
     73
     74 033376  012737  000001  002364          MOV     #CNTRL,ERROR    ;THIS FLAG WILL DISABLE ANY CONTROL OUT ERROR
     75                                                                 ;REPORTING BECAUSE WE ARE INTENTIONALLY
     76                                                                 ;CAUSING ONE IN THIS TEST.
     77 033404                                  BACCIR                  ;BA/CC IN RCV. COMMAND
                                                                        ;**** MACRO EXPANSION ****
        033404  004737  012270                  JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
        033410  000044                          .WORD   RQI!BACCR       ;BA/CC IN RECEIVE COMMAND
        033412  002570                          .WORD   RBUF    ;RECEIVE BUFFER
        033414  000044                          .WORD   RCOUNT  ;RECEIVE CHARACTER COUNT
                                                                        ;****                 ****
     78
     79 033416                                  WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                        ;**** MACRO EXPANSION ****
        033416  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        033422  000001                          .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                 ****
     80 033424                                  ESCAPE  TST             ;IF RDO NOT SET, BR TO TEST END.
        033424  104410                                                                  TRAP    C$ESCAPE
        033426  000376                                                                  .WORD   L10065-.
     81 033430  032777  000001  146576          BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
     82 033436  001005                          BNE     10$             ;IF YES - PROCEED.
     83 033440                                  ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT
        033440  104455                                                                  TRAP    C$ERDF
        033442  000010                                                                  .WORD   8
        033444  017762                                                                  .WORD   EMG8
        033446  015112                                                                  .WORD   ERRG2
     84 033450  000410                          BR      15$             ;EXIT
     85 033452                          10$:
     86 033452  032777  001000  146560          BIT     #HALTC,@SEL6    ;IS THE HALT - PROCEDURE ERROR BIT SET?
     87 033460  001004                          BNE     15$             ;IF YES - ERROR REPORTED CORRECTLY
     88 033462                                  ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        033462  104455                                                                  TRAP    C$ERDF
        033464  000011                                                                  .WORD   9
        033466  020026                                                                  .WORD   EMG9
```

```
                                                                                                    .WORD   ERRG2
 89 033472                                  15$:
 90 033472  042777  000207  146534                BIC     #RDO!CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS.
 91 033500  005037  002364                        CLR     ERROR           ;RESTORE FLAG
 92 033504                              ENDSUB
    033504                                                                          L10070:
    033504  104403                                                                         TRAP    C$ESUB
 93
 94 033506                              BGNSUB
    033506                                                                          T12.4:
    033506  104402                                                                         TRAP    C$BSUB
 95 033510                                      CLEAR                   ;MASTER CLEAR
                                                                        ;**** MACRO EXPANSION ****
    033510  004737  011066                       JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                   ****
 96
 97 033514                                      ESCAPE  TST             ;IF ERROR, EXIT.
    033514  104410                                                                      TRAP    C$ESCAPE
    033516  000306                                                                      .WORD   L10065-.
 98 033520                                      BASEIN                  ;BASE IN COMMAND
                                                                        ;**** MACRO EXPANSION ****
    033520  004737  011264                       JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
    033524  004000                                       .WORD   LPLU    ;SET LINE UNIT LOOP
    033526  002636                                       .WORD   BASE    ;BASE TABLE ADDRESS
    033530  000522                                       .WORD   DMR     ;DMR-11 MODE
                                                                        ;****                   ****
 99
100 033532                                      ESCAPE  TST             ;IF ERROR, EXIT.
    033532  104410                                                                      TRAP    C$ESCAPE
    033534  000270                                                                      .WORD   L10065-.
101 033536                                      BACCIR                  ;ASSIGN A BA/CC IN RECEIVE BUFFER
                                                                        ;**** MACRO EXPANSION ****
    033536  004737  012270                       JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE WITH DEFAULTS
    033542  000044                                       .WORD   RQI!BACCR       ;BA/CC IN RECEIVE COMMAND
    033544  002570                                       .WORD   RBUF    ;RECEIVE BUFFER
    033546  000044                                       .WORD   RCOUNT  ;RECEIVE CHARACTER COUNT
                                                                        ;****                   ****
102
103 033550                                      ESCAPE  TST             ;IF ERROR, EXIT.
    033550  104410                                                                      TRAP    C$ESCAPE
    033552  000252                                                                     .WORD   L10065-.
104 033554  012737  000001  002364                MOV     #CNTRL,ERROR    ;THIS FLAG WILL DISABLE ANY CONTROL OUT
105                                                                     ;ERROR REPORTING BECAUSE WE ARE INTENTIONALLY
106                                                                     ;CAUSING ONE.
107 033562                                      BACCIT  TBUF,0          ;ASSIGN A BA/CC IN XMIT BUFFER LENGTH = 0.
                                                                        ;**** MACRO EXPANSION ****
    033562  004737  012270                       JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE
    033566  000040                                       .WORD   RQI!BACCT       ;BA/CC IN TRANSMIT COMMAND
    033570  002520                                       .WORD   TBUF    ;BUFFER ADDRESS BITS 0-15
    033572  000000                                       .WORD   0       ;BA BITS 16 & 17 AND CHAR. COUNT
                                                                        ;****                   ****
108
109 033574                                      WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                        ;**** MACRO EXPANSION ****
    033574  004737  010274                       JSR     PC, $WAIT       ;CALL WAIT ROUTINE
    033600  000001                                       .WORD   1       ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                   ****
```

```
    110 033602                                  ESCAPE  TST             ;IF RDO NOT SET, BR TO TEST END.
        033602  104410                                                                  TRAP    C$ESCAPE
        033604  000220                                                                  .WORD   L10065-.
    111 033606  032777  000001  146420          BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
    112 033614  001005                          BNE     10$             ;IF YES - PROCEED.
    113 033616                                  ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT
        033616  104455                                                                  TRAP    C$ERDF
        033620  000010                                                                  .WORD   8
        033622  017762                                                                  .WORD   EMG8
        033624  015112                                                                  .WORD   ERRG2
    114 033626  000410                          BR      15$             ;EXIT
    115 033630                              10$:
    116 033630  032777  001000  146402          BIT     #HALTC,@SEL6    ;IS THE HALT - PROCEDURE ERROR BIT SET?
    117 033636  001004                          BNE     15$             ;IF YES - ERROR REPORTED CORRECTLY
    118 033640                                  ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        033640  104455                                                                  TRAP    C$ERDF
        033642  000011                                                                  .WORD   9
        033644  020026                                                                  .WORD   EMG9
        033646  015112                                                                  .WORD   ERRG2
    119 033650                              15$:
    120 033650  042777  000207  146356          BIC     #RDO!CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS.
    121 033656  005037  002364                  CLR     ERROR           ;RESTORE FLAG
    122 033662                          ENDSUB
        033662                                                                  L10071:
        033662  104403                                                                  TRAP    C$ESUB
    123
    124 033664                          BGNSUB
        033664                                                                  T12.5:
        033664  104402                                                                  TRAP    C$BSUB
    125 033666                                  CLEAR                   ;MASTER CLEAR
                                                                        ;**** MACRO EXPANSION ****
        033666  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                ****
    126
    127 033672                                  ESCAPE  TST             ;IF ERROR, EXIT.
        033672  104410                                                                  TRAP    C$ESCAPE
        033674  000130                                                                  .WORD   L10065-.
    128 033676                                  BASEIN                  ;BASE IN COMMAND
                                                                        ;**** MACRO EXPANSION ****
        033676  004737  011264                  JSR     PC, $BASEI      ;CALL BASE IN ROUTINE WITH DEFAULTS
        033702  004000                                  .WORD   LPLU    ;SET LINE UNIT LOOP
        033704  002636                                  .WORD   BASE    ;BASE TABLE ADDRESS
        033706  000522                                  .WORD   DMR     ;DMR-11 MODE
                                                                        ;****                ****
    129
    130 033710                                  ESCAPE  TST             ;IF ERROR, EXIT.
        033710  104410                                                                  TRAP    C$ESCAPE
        033712  000112                                                                  .WORD   L10065-.
    131 033714  012737  000001  002364          MOV     #CNTRL,ERROR    ;THIS FLAG WILL DISABLE ANY CONTROL OUT
    132                                                                 ;ERROR REPORTING BECAUSE WE ARE INTENTIONALLY
    133                                                                 ;CAUSING ONE.
    134 033722                                  BACCIR  RBUF,0          ;ASSIGN A BA/CC IN REC. BUFFER LENGTH   0
                                                                        ;**** MACRO EXPANSION ****
        033722  004737  012270                  JSR     PC, $BACC       ;CALL BA/CC IN ROUTINE
        033726  000044                                  .WORD   P2: BACCR       ;BA/CC IN RECEIVE COMMAND
        033730  002570                                  .WORD   RBUF    ;BUFFER ADDRESS BITS 0-15
        033732  000000                                  .WORD   0       ;BA BITS 16/17 AND CHAR. COUNT
```

```
                                                        ;****                   ****
    135
    136 033734                                  WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                        ;**** MACRO EXPANSION ****
        033734  004737  010274                  JSR     PC, $WAIT       ;CALL WAIT ROUTINE
        033740  000001                          .WORD   1               ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                   ****
    137 033742                                  ESCAPE  TST             ;IF RDO NOT SET, BR TO TEST END.
        033742  104410                                                                  TRAP    C$ESCAPE
        033744  000060                                                                  .WORD   L10065-.
    138 033746  032777  000001  146260          BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT?
    139 033754  001005                          BNE     10$             ;IF YES - PROCEED.
    140 033756                                  ERRDF   8,EMG8,ERRG2    ;EXPECTED CONTROL OUT
        033756  104455                                                                  TRAP    C$ERDF
        033760  000010                                                                  .WORD   8
        033762  017762                                                                  .WORD   EMG8
        033764  015112                                                                  .WORD   ERRG2
    141 033766  000410                          BR      15$             ;EXIT
    142 033770                          10$:
    143 033770  032777  001000  146242          BIT     #HALTC,@SEL6    ;IS THE HALT - PROCEDURE ERROR BIT SET?
    144 033776  001004                          BNE     15$             ;IF YES - ERROR REPORTED CORRECTLY
    145 034000                                  ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
        034000  104455                                                                  TRAP    C$ERDF
        034002  000011                                                                  .WORD   9
        034004  020026                                                                  .WORD   EMG9
        034006  015112                                                                  .WORD   ERRG2
    146 034010                          15$:
    147 034010  042777  000207  146216          BIC     #RDO!CMD,@SEL2  ;CLEAR RDO AND THE COMMAND BITS.
    148 034016  005037  002364                  CLR     ERROR           ;RESTORE FLAG
    149 034022                            ENDSUB
        034022                                                                  L10072:
        034022  104403                                                                  TRAP    C$ESUB
    150
    151 034024                          ENDTST
        034024                                                                  L10065:
        034024  104401                                                                  TRAP    C$ETST
```

```
                                .SBTTL          TEST 13 - DATA TEST
                                ;*****************************************************************
                                ;*              TEST 13 - DMR-11
                                ;* FREE RUNNING FLAG MODE DATA TEST
                                ;* TRANSMIT A MESSAGE AND VERIFY THE RECEIVED DATA IS CORRECT.
                                ;* IN THIS TEST NO INTERRUPTS ARE USED AND THE LINE UNIT IS IN
                                ;* INTERNAL (TTL) LOOPBACK.  THIS TEST IS THE FIRST TEST IN WHICH
                                ;* THE DMR IS USED IN A DATA TRANSMISSION MODE.
                                ;*****************************************************************
034026                          BGNTST
034026                                                                          T13::
034026  013700  000044                MOV     RCOUNT,R0       ;BYTE COUNT FOR RECEIVE BUFFER
034032  062700  000002                ADD     #2,R0           ;2 ADDITIONAL BYTES AT END OF BUFFER ARE
                                                                ;USED FOR DELIMITOR
034036  012701  002570                MOV     #RBUF,R1        ;ADDRESS OF RECEIVE BUFFER
034042                          10$:
034042  105021                        CLRB    (R1)+           ;CLEAR A BYTE IN THE BUFFER
034044  005300                        DEC     R0              ;CONTINUE - UNTIL ENTIRE BUFFER DONE
034046  001375                        BNE     10$
                                
034050  005037  002516                CLR     TFLAG           ;CLEAR TRANSMIT FLAG
034054  005037  002566                CLR     RFLAG           ;CLEAR RECEIVER FLAG
034060                                CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
034060  004737  011066                JSR     PC, $MSCLR      ;ISSUF A DMR MASTER CLEAR
                                                                ;****                 ****
                                
034064                          ESCAPE  TST                     ;IF ERROR, BR TO TEST END.
034064  104410                                                                  TRAP    C$ESCAPE
034066  000466                                                                  .WORD   L10073-.
034070  005737  002254                TST     DMTURN          ;IS INTERNAL LOOPBACK DESIRED?
034074  001004                        BNE     11$             ;IF NOT, CLEAR INTERNAL LOOPBACK.
034076  052737  004000  034120        BIS     #LPLU,100$      ;SET LINE UNIT LOOPBACK.
034104  000403                        BR      12$
034106                          11$:
034106  042737  004000  034120        BIC     #LPLU,100$      ;CLEAR LINE UNIT LOOPBACK.
034114                          12$:
034114                                CALL    $BASEI          ;BASE IN COMMAND.
034120  000000                100$:           .WORD   0       ;MAINTENANCE BITS (LINE UNIT LOOP)
034122  002636                                .WORD   BASE    ;BASE TABLE ADDRESS
034124  000522                                .WORD   DMR     ;DMR MODE
034126                          ESCAPE  TST                     ;IF ERROR, BR TO TEST END.
034126  104410                                                                  TRAP    C$ESCAPE
034130  000424                                                                  .WORD   L10073-.
                                
034132                                CALL    $LOOP           ;DMR COMMAND TO SET MAINT. BITS
034136                          ESCAPE  TST                     ;IF ERROR, BR TO TEST END.
034136  104410                                                                  TRAP    C$ESCAPE
034140  000414                                                                  .WORD   L10073-.
                                
034142                                CNTRIN                  ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                ;**** MACRO EXPANSION ****
034142  004737  011520                JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
034146  000000                        .WORD   0               ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                ;****                 ****
034150                          ESCAPE  TST                     ;IF ERROR, BR TO TEST END.
```

```
                034150  104410                                                          TRAP    C$ESCAPE
                034152  000402                                                          .WORD   L10073-.
          44
          45    034154                          BACCIR                  ;BUFFER ADDRESS/CHARACTER COUNT REC. IN
                                                                        ;**** MACRO EXPANSION ****
                034154  004737  012270           JSR     PC, $BACC      ;CALL BA/CC IN ROUTINE WITH DEFAULTS
                034160  000044                   .WORD   RQI!BACCR      ;BA/CC IN RECEIVE COMMAND
                034162  002570                   .WORD   RBUF   ;RECEIVE BUFFER
                034164  000044                   .WORD   RCOUNT ;RECEIVE CHARACTER COUNT
                                                                        ;****                   ****
          46
          47    034166                          ESCAPE  TST             ;IF ERROR (I.E. RDI NOT SET), ESCAPE
                034166  104410                                                          TRAP    C$ESCAPE
                034170  000364                                                          .WORD   L10073-.
          48
          49    034172                          BACCIT                  ;BUFFER ADDRESS/CHARACTER COUNT XMIT. IN
                                                                        ;**** MACRO EXPANSION ****
                034172  004737  012270           JSR     PC, $BACC      ;CALL BA/CC IN ROUTINE WITH DEFAULTS
                034176  000040                   .WORD   RQI!BACCT      ;BA/CC IN TRANSMIT COMMAND
                034200  002520                   .WORD   TBUF   ;TRANSMIT BUFFER ADDRESS
                034202  000044                   .WORD   TCOUNT ;TRANSMIT CHARACTER COUNT
                                                                        ;****                   ****
          50
          51    034204                          ESCAPE  TST             ;IF ERROR (I.E. RDI NOT SET), ESCAPE
                034204  104410                                                          TRAP    C$ESCAPE
                034206  000346                                                          .WORD   L10073-.
          52
          53    034210                  20$:
          54    034210                          WAIT    RDO             ;WAIT FOR RDO
                                                                        ;**** MACRO EXPANSION ****
                034210  004737  010274           JSR     PC, $WAIT      ;CALL WAIT ROUTINE
                034214  000001                   .WORD   1              ;FLAG THAT WE'RE WAITING FOR RDO
                                                                        ;****                   ****
          55    034216                          BERROR  52$             ;IF ERROR - RDO NOT SET, END TEST
                034216  103552                                                          BCS     52$
          56    034220  032777  000001  146006   BIT     #CNTRL,@SEL2   ;IS THIS A CONTROL OUT COMMAND ?
          57    034226  001405                   BEQ     25$            ;IF NOT - PROCEED
          58    034230                          ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT RECEIVED
                034230  104455                                                          TRAP    C$ERDF
                034232  000011                                                          .WORD   9
                034234  020026                                                          .WORD   EMG9
                034236  015112                                                          .WORD   ERRG2
          59    034240  000541                   BR      52$
          60    034242                  25$:
          61    034242  032777  000004  145764   BIT     #RCV,@SEL2     ;TRANSMIT OR RECEIVE ?
          62    034250  001035                   BNE     40$            ;BR FOR RECEIVE
          63
          64                            ;CHECK TRANSMIT
          65
          66    034252  005737  002516           TST     TFLAG          ;IS THIS THE FIRST TRANSMIT DONE?
          67    034256  001405                   BEQ     30$            ;YES - OK
          68    034260                          ERRDF   10,EMG10,ERRG2  ;ERROR MULTIPLE TRANSMITS
                034260  104455                                                          TRAP    C$ERDF
                034262  000012                                                          .WORD   10
                034264  020055                                                          .WORD   EMG10
                034266  015112                                                          .WORD   ERRG2
          69    034270  000525                   BR      52$
```

```
     70 034272                                30$:
     71 034272  012737  177777  002516              MOV     #-1,TFLAG       ;FLAG THAT TRANSMIT CHECK IS DONE.
     72 034300  022777  002520  145730              CMP     #TBUF,@SEL4     ;TRANSMIT BUFFER ADDRESS CORRECT?
     73 034306  001405                              BEQ     32$             ;YES - PROCEED
     74 034310                                      ERRDF   11,EMG11,ERRG2  ;BUFFER ADDRESS ERROR
        034310  104455                                                                  TRAP    C$ERDF
        034312  000013                                                                  .WORD   11
        034314  020104                                                                  .WORD   EMG11
        034316  015112                                                                  .WORD   ERRG2
     75 034320  000511                              BR      52$
     76 034322                                32$:
     77 034322  022777  000044  145710              CMP     #TCOUNT,@SEL6   ;COUNT CORRECT ?
     78 034330  001470                              BEQ     50$             ;YES - PROCEED
     79 034332                                      ERRDF   12,EMG12,ERRG2  ;CHARACTER COUNT ERROR
        034332  104455                                                                  TRAP    C$ERDF
        034334  000014                                                                  .WORD   12
        034336  020127                                                                  .WORD   EMG12
        034340  015112                                                                  .WORD   ERRG2
     80 034342  000500                              BR      52$
     81
     82                                       ;CHECK RECEIVE
     83
     84 034344                                40$:
     85 034344  005737  002566                      TST     RFLAG           ;IS THIS THE FIRST RECEIVE DONE ?
     86 034350  001405                              BEQ     41$             ;YES - PROCEED
     87 034352                                      ERRDF   13,EMG13,ERRG2  ;MULTIPLE RECEIVES
        034352  104455                                                                  TRAP    C$ERDF
        034354  000015                                                                  .WORD   13
        034356  020155                                                                  .WORD   EMG13
        034360  015112                                                                  .WORD   ERRG2
     88 034362  000470                              BR      52$
     89 034364                                41$:
     90 034364  012737  177777  002566              MOV     #-1,RFLAG       ;FLAG THAT RECEIVE CHECK HAS BEEN DONE.
     91 034372  022777  002570  145636              CMP     #RBUF,@SEL4     ;IS THE RECEIVE BUFFER ADDRESS CORRECT?
     92 034400  001405                              BEQ     43$             ;YES - PROCEED
     93 034402                                      ERRDF   11,EMG11,ERRG2  ;BUFFER ADDRESS ERROR
        034402  104455                                                                  TRAP    C$ERDF
        034404  000013                                                                  .WORD   11
        034406  020104                                                                  .WORD   EMG11
        034410  015112                                                                  .WORD   ERRG2
     94 034412  000454                              BR      52$
     95 034414                                43$:
     96 034414  022777  000044  145616              CMP     #RCOUNT,@SEL6   ;IS THE BUFFER COUNT CORRECT?
     97 034422  001405                              BEQ     44$             ;YES - PROCEED
     98 034424                                      ERRDF   12,EMG12,ERRG2  ;CHARACTER COUNT ERROR
        034424  104455                                                                  TRAP    C$ERDF
        034426  000014                                                                  .WORD   12
        034430  020127                                                                  .WORD   EMG12
        034432  015112                                                                  .WORD   ERRG2
     99 034434  000443                              BR      52$
    100 034436                                44$:
    101 034436  012700  000044                      MOV     #RCOUNT,R0      ;SET UP FOR DATA CHECK (CHARCATER COUNT)
    102 034442  012701  002520                      MOV     #TBUF,R1        ;GOOD DATA POINTER
    103 034446  012702  002570                      MOV     #RBUF,R2        ;RECEIVE DATA POINTER
    104 034452                                45$:
    105 034452  122122                              CMPB    (R1)+,(R2)+     ;IS THE DATA THE SAME ?
    106 034454  001011                              BNE     46$             ;IF NOT, BRANCH TO DATA ERROR MESSAGE
```

```
TEST 13 - DATA TEST

    107 034456  005300                          DEC     R0              ;CONTINUE CHECKING UNTIL DONE WITH BUFFER.
    108 034460  001374                          BNE     45$
    109 034462  005712                          TST     @R2             ;THIS SHOULD BE 0 - REMEMBER WE CLEARED
    110                                                                 ;2 EXTRA BYTES DURING BUFFER INIT.
    111 034464  001412                          BEQ     50$             ;IF OK - PROCEED
    112 034466                                  ERRDF   14,EMG14,ERRG2  ;RECEIVED EXTRA DATA
        034466  104455                                                                  TRAP    C$ERDF
        034470  000016                                                                  .WORD   14
        034472  020203                                                                  .WORD   EMG14
        034474  015112                                                                  .WORD   ERRG2
    113 034476  000422                          BR      52$
    114 034500                              45$:
    115 034500                                  ERRDF   15,EMG15,ERRG2  ;DATA ERROR
        034500  104455                                                                  TRAP    C$ERDF
        034502  000017                                                                  .WORD   15
        034504  020223                                                                  .WORD   EMG15
        034506  015112                                                                  .WORD   ERRG2
    116 034510  000415                          BR      52$
    117
    118                                     ; TRANSMIT OR RECEIVE CHECK DONE
    119
    120 034512                              50$:
    121 034512  042777  000213  145514          BIC     #RDO+RCV+CMD,@SEL2 ;CLEAR RDO, RCV & COMMMAND BITS (0,1)
    122 034520  005737  002566                  TST     RFLAG           ;IS THE RECEIVE DONE ? (IF DONE, FLAG = -1)
    123 034524  001002                          BNE     51$             ;YES - SEE IF TRANSMIT DONE
    124 034526  000137  034210                  JMP     20$             ;NO - GO BACK AND DO IT.
    125 034532                              51$:
    126 034532  005737  002516                  TST     TFLAG           ;IS THE TRANSMIT DONE ?
    127 034536  001002                          BNE     52$             ;YES - BR TO SHUTDOWN
    128 034540  000137  034210                  JMP     20$             ;NO - DO IT
    129 034544                              52$:
    130 034544                                  SHUTDN                  ;SHUTDOWN DMR
                                                                        ;**** MACRO EXPANSION ****
        034544  004737  012550                  JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                   ****
    131
    132 034550                                  CALL    $ERROR          ;CHECK BASE TABLE AND REPORT ANY SOFT ERRORS
    133
    134 034554                              ENDTST
        034554                                                                  L10073:
        034554  104401                                                                 TRAP    C$ETST
    135
    136
    137
```

```
                        .SBTTL          TEST 14 - EXTENDED ADDRESSING DATA TEST

                        ;*****************************************************************
                        ;*              TEST  14 - DMR-11
                        ;* IN THIS TEST - SEE IF WE HAVE MEMORY MANAGEMENT, IF SO SEE IF We
                        ;* HAVE THE MEMORY TO CHECK BITS 16 & 17 IN SEL6.  THIS WILL ALLOW
                        ;* US TO TRANSFER DATA USING THOSE EXTENDED ADDRESSING BITS. AS IN
                        ;* TEST 13 THE TEST IS NON-INTERRUPT AND INTERNAL (TTL) LOOPBACK IS
                        ;* USED.
                        ;*
                        ;*****************************************************************
034556                  EXNTST
034556                                                          T14::
                                .ENABL  LSB             ;ENABLE LOCAL BLOCK - NEEDED BECAUSE OF
                                                        ;USE  OF SYMBOLIC LABELS "RSFL4" ETC.
034556                          SETVEC  #4,#NOXMEM,#PRI07 ;SET UP TRAP VECTOR 4
034556  012746  000340                                                  MOV     #PRI07,-(SP)
034562  012746  023572                                                  MOV     #NOXMEM,-(SP)
034566  012746  000004                                                  MOV     #4,-(SP)
034572  012746  000003                                                  MOV     #3,-(SP)
034576  104437                                                          TRAP    C$SVEC
034600  062706  000010                                                  ADD     #10,SP
034604  005037  002350                  CLR     NXMFLG          ;CLEAR FLAG - SET IF TRAP TO 4.
034610  005737  177572                  TST     @#177572        ;ADDRESS MEMORY MANAGEMENT REGISTER.
034614                                  CLRVEC  #4              ;RESTORE TRAP VECTOR 4.
034614  012700  000004                                                  MOV     #4,R0
034620  104436                                                          TRAP    C$CVEC
034622  005737  002350                  TST     NXMFLG          ;IS THE FLAG STILL CLEARED?
                                                                ;NOTE: THE FLAG WILL BE SET BY TRAP 4
                                                                ;IF THERE IS NO MEMORY MANAGEMENT.
034626  001404                          BEQ     10$             ;IF FLAG IS CLEARED, PROCEED WITH TEST.
034630  005037  002350                  CLR     NXMFLG          ;RESTORE FLAG
034634  000137  036200                  JMP     85$             ;EXIT - CAN'T TEST WITHOUT MEM. MANAG.
034640                          10$:
                                                                ;NOTE: L$HIMEM IS SIZE OF TOTAL MEMORY IN
                                                                ;PAGE ADDRESS REGISTER FORM - DETERMINED BY
                                                                ;BY DIAGNOSTIC SUPERVISOR AT STARTUP.
034640  023727  002120  002200        CMP     L$HIMEM,#2200   ;DO WE HAVE ENOUGH MEMORY TO ADDRESS BIT 16?
034646  002002                          BGE     15$             ;IF YES - PROCEED WITH TEST
034650  000137  036200                  JMP     85$             ;IF NOT - EXIT
034654                          15$:
034654                          SETPRI  #PRI07          ;MAKF SURE WE ARE IN KERNEL MODE.
034654  012700  000340                                                  MOV     #PRI07,R0
034660  104441                                                          TRAP    C$SPRI
                                                                ;SETTING PRI SHOULD ALSO CLEAR BITS 14 &15
                                                                ;IN PSW WHICH PLACES PROCESSOR IN KERNEL MODE.
034662  012701  172300                  MOV     #172300,R1      ;GET ADDRESS OF KERNEL PDR  REG 0
034666  012700  000010                  MOV     #8.,R0          ;GOING TO WRITE PDR REG 0-7
034672                          20$:
034672  012721  077406                  MOV     #77406,(R1)+    ;WRITE BITS FOR THE FOLLOWING PAGE DESCRIPTION
                                                                ;READ/WRITE ACCESS, 128. BLOCK PAGE LENGTH.
034676  005300                          DEC     R0              ;WRITE ALL PDRS
034700  001374                          BNE     20$
034702  012701  172340                  MOV     #172340,R1      ;GET ADDRESS OF KERNAL PAR 0
034706  005011                          CLR     (R1)            ;PAR 0, ADDRS      0  -  17776
034710  012761  000200  000002          MOV     #200,2(R1)      ;PAR 1, ADDRS  20000  -  37776
034716  012761  000400  000004          MOV     #400,4(R1)      ;PAR 2, ADDRS  40000  -  57776
```

```
TEST 14 - EXTENDED ADDRESSING DATA TEST

     47 034724  012761  000600  000006          MOV     #600,6(R1)      ;PAR 3, ADDRS  60000  -  77776
     48 034732  012761  001000  000010          MOV     #1000,10(R1)    ;PAR 4, ADDRS 100000  - 117776
     49 034740  012761  002000  000012          MOV     #2000,12(R1)    ;PAR 5, ADDRS 200000  - 217776
     50 034746  012761  004000  000014          MOV     #4000,14(R1)    ;PAR 6, ADDRS 400000  - 417776
     51 034754  012761  007600  000016          MOV     #7600,16(R1)    ;PAR 7, ADDRS 160000  - 177776 (I/O PAGE)
     52
     53 034762  012703  000100                  MOV     #64.,R3         ;COUNTER FOR OUTER LOOP OF TEST PATTERN GEN.
     54 034766  012704  120000                  MOV     #120000,R4      ;USE VIRTUAL ADDRESS TO MAP TO PAR 5
     55                                                                 ;GENERATE A TEST PATTERN IN THE 1ST 4K
     56                                                                 ;BYTES OF PAR 5 (VIRTUAL ADDR 120000 - 127776)
     57 034772  005037  002350                  CLR     NXMFLG          ;ENSURE FLAG IS CLEARED
     58 034776                                  SETVEC  #4,#NOXMEM,#PRI07 ;SET UP TRAP VECTOR 4 (WILL SET FLAG)
        034776  012746  000340                                                  MOV     #PRI07,-(SP)
        035002  012746  023572                                                  MOV     #NOXMEM,-(SP)
        035006  012746  000004                                                  MOV     #4,-(SP)
        035012  012746  000003                                                  MOV     #3,-(SP)
        035016  104437                                                          TRAP    C$SVEC
        035020  062706  000010                                                  ADD     #10,SP
     59 035024  012737  000001  177572          MOV     #1,@#177572     ;ENABLE MEMORY MANAGEMENT
     60 035032                          21$:
     61 035032  012701  000040                  MOV     #32.,R1         ;COUNTER FOR INNER LOOP OF TEST PATTERN GEN.
     62 035036  012702  002416                  MOV     #$CCITT,R2      ;ADDRESS FOR 32. WORD TEST PATTERN
     63 035042                          22$:
     64 035042  012224                          MOV     (R2)+,(R4)+     ;WRITE TEST PATTERN INTO 4K BYTES
     65                                                                 ;(PHYSICAL ADDRESS 200000 - 207776)
     66 035044  005737  002350                  TST     NXMFLG          ;NXM TRAP 4?
     67 035050  001014                          BNE     24$             ;IF YES - EXIT
     68 035052  005301                          DEC     R1              ;DO THE INNER LOOP 32. TIMES
     69 035054  001372                          BNE     22$
     70 035056  005303                          DEC     R3              ;DO THE OUTER LOOP 128. TIMES
     71 035060  001364                          BNE     21$
     72 035062  012701  004000                  MOV     #4000,R1        ;COUNTER TO CLEAR THE NEXT 4K BYTES.
     73 035066                          23$:
     74 035066  005024                          CLR     (R4)+           ;CLEAR OUT THE ENTIRE PAR
     75                                                                 ;(PHYSICAL ADDRESS 210000 - 217776)
     76 035070  005737  002350                  TST     NXMFLG          ;NXM TRAP 4?
     77 035074  001002                          BNE     24$             ;IF YES - EXIT
     78 035076  005301                          DEC     R1
     79 035100  001372                          BNE     23$
     80 035102                          24$:
     81 035102  005037  177572                  CLR     @#177572        ;TURN OFF MEMORY MANAGEMENT
     82 035106                                  CLRVEC  #4              ;RESTORE TRAP 4 TO SUPERVISOR
        035106  012700  000004                                                  MOV     #4,R0
        035112  104436                                                          TRAP    C$CVEC
     83 035114  005737  002350                  TST     NXMFLG          ;WAS THIS AN ERROR EXIT
     84 035120  001417                          BEQ     25$             ;IF NOT, PROCEED.
     85 035122                                  ERRDF   19,EMT22
        035122  104455                                                          TRAP    C$ERDF
        035124  000023                                                          .WORD   19
        035126  036202                                                          .WORD   EMT22
        035130  000000                                                          .WORD   0
     86 035132                                  PRINTB  #FMT25,R4
        035132  010446                                                          MOV     R4,-(SP)
        035134  012746  036240                                                  MOV     #FMT25,-(SP)
        035140  012746  000002                                                  MOV     #2,-(SP)
        035144  010600                                                          MOV     SP,R0
        035146  104414                                                          TRAP    C$PNTB
```

```
                035150  062706  000006                                                          ADD     #6,SP
     87         035154  000137  036200                  JMP     85$
     88         035160                          25$:
     89         035160                          CLEAR                   ;MACRO FOR MASTER CLEAR
                                                                        ;**** MACRO EXPANSION ****
                035160  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                        ;****                   ****
     90
     91         035164                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
                035164  104410                                                          TRAP    C$ESCAPE
                035166  001012                                                          .WORD   L10074-.
     92
     93         035170  005737  002254                  TST     DMTURN          ;IS INTERNAL LOOPBACK DESIRED?
     94         035174  001004                  BNE     30$             ;IF NOT, CLEAR INTERNAL LOOPBACK.
     95         035176  052737  004000  035220          BIS     #LPLU,100$      ;SET LINE UNIT LOOPBACK.
     96         035204  000403                  BR      32$
     97         035206                          30$:
     98         035206  042737  004000  035220          BIC     #LPLU,100$      ;CLEAR LINE UNIT LOOPBACK.
     99         035214                          32$:
    100         035214                          CALL    $BASEI          ;BASE IN COMMAND.
    101         035220  000000                  100$:           .WORD   0       ;MAINTENANCE BITS (LINE UNIT LOOP)
    102         035222  002636                                  .WORD   BASE    ;BASE TABLE ADDRESS
    103         035224  000522                                  .WORD   DMR     ;DMR MODE
    104         035226                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
                035226  104410                                                          TRAP    C$ESCAPE
                035230  000750                                                          .WORD   L10074-.
    105
    106         035232                          CALL    $LOOP           ;DMR COMMAND TO SET MAINT. BITS
    107         035236                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
                035236  104410                                                          TRAP    C$ESCAPE
                035240  000740                                                          .WORD   L10074-.
    108
    109         035242                          CNTRIN                  ;MACRO FOR CONTROL IN (FULL DUPLEX)
                                                                        ;**** MACRO EXPANSION ****
                035242  004737  011520                  JSR     PC, $CNTIN      ;CALL CONTROL IN ROUTINE WITH DEFAULT
                035246  000000                                  .WORD   0       ;SEL6 - FULL DUPLEX, RUN MODE, 1 SEC START.
                                                                        ;****                   ****
    110         035250                          ESCAPE  TST             ;IF ERROR, BR TO TEST END.
                035250  104410                                                          TRAP    C$ESCAPE
                035252  000726                                                          .WORD   L10074-.
    111
    112         035254  005037  002516                  CLR     TFLAG           ;CLEAR TRANSMIT FLAG
    113         035260  005037  002566                  CLR     RFLAG           ;CLEAR RECEIVE FLAG
    114         035264  005037  002344                  CLR     SFLAG           ;CLEAR SECOND LOOP FLAG
    115                                                                         ;IF SFLAG = 0, THEN THIS IS A TEST OF BIT 16
    116                                                                         ;IF SFLAG = -1, THEN THIS IS A TEST OF BIT 17
    117         035270  012737  010000  035324          MOV     #10000,RSEL4    ;RECEIVE BUFFER ADDRESS (BITS 0-15)
    118         035276  012737  050000  035326          MOV     #BIT14!10000,RSEL6 ;REC BUFFER ADDR BIT 16 SET AND 4K
    119                                                                         ;BYTE RECEIVE CHARACTER COUNT
    120         035304  005037  035342                  CLR     TSEL4           ;TRANSMIT BUFFER ADDRESS (BITS 0-15)
    121         035310  012737  050000  035344          MOV     #BIT14!10000,TSEL6 ;XMIT BUFFER ADDR BIT 16 SET AND 4K
    122                                                                         ;BYTE XMIT CHARACTER COUNT
    123         035316                          35$:
    124         035316                          CALL    $BACC           ;ISSUE THE BUFFER ADDR/ CHAR COUNT COMMAND
    125         035322  000044                                  .WORD   RQI!BACCR       ;COMMAND FOR BA/CC IN RECEIVE
    126         035324  000000                  RSEL4:          .WORD   0       ;BUFFER ADDRESS BITS 0-15
    127         035326  000000                  RSEL6:          .WORD   0       ;BUFFER ADDR BIT 16 + CHAR. COUNT
```

```
128 035330                              ESCAPE  TST             ;IF ERROR, END TEST
    035330  104410                                                              TRAP    C$ESCAPE
    035332  000646                                                              .WORD   L10074-.
129
130 035334                              CALL    $BACC           ;ISSUE THE BUFFER ADDR/ CHAR COUNT COMMAND
131 035340  000040                      .WORD   RQI!BACCT       ;COMMAND FOR BA/CC IN TRANSMIT
132 035342  000000                TSEL4:.WORD   0               ;BUFFER ADDRESS BITS 0-15
133 035344  000000                TSEL6:.WORD   0               ;BUFFER ADDR BIT 16 + CHAR. COUNT
134 035346                              ESCAPE  TST             ;IF ERROR, END TEST
    035346  104410                                                              TRAP    C$ESCAPE
    035350  000630                                                              .WORD   L10074-.
135 035352                          40$:
136 035352                              WAIT    RDO             ;WAIT FOR RDO TO BE SET
                                                                ;**** MACRO EXPANSION ****
    035352  004737  010274              JSR     PC, $WAIT       ;CALL WAIT ROUTINE
    035356  000001                      .WORD   1               ;FLAG THAT WE'RE WAITING FOR PDO
                                                                ;****                   ****
137 035360                              ESCAPE  TST             ;IF RDO NOT SET BEFORE TIMEOUT, END TEST
    035360  104410                                                              TRAP    C$ESCAPE
    035362  000616                                                              .WORD   L10074-.
138
139 035364  032777  000001  144642      BIT     #CNTRL,@SEL2    ;IS THIS A CONTROL OUT COMMAND?
140 035372  001406                      BEQ     50$             ;NO - PROCEED
141 035374                              ERRDF   9,EMG9,ERRG2    ;UNEXPECTED CONTROL OUT.
    035374  104455                                                              TRAP    C$ERDF
    035376  000011                                                              .WORD   9
    035400  020026                                                              .WORD   EMG9
    035402  015112                                                              .WORD   ERRG2
142 035404  000137  036170              JMP     80$             ;EXIT
143 035410                          50$:
144 035410  032777  000004  144616      BIT     #RCV,@SEL2      ;IS THIS A TRANSMIT OR RECEIVE?
145 035416  001040                      BNE     60$             ;BR FOR RECEIVE
146 035420  005737  002516              TST     TFLAG           ;IS THIS THE 1ST TRANSMIT DONE
147 035424  001406                      BEQ     55$             ;IF YES, PROCEED
148 035426                              ERRDF   10,EMG10,ERRG2  ;MULTIPLE TRANSMITS
    035426  104455                                                              TRAP    C$ERDF
    035430  000012                                                              .WORD   10
    035432  020055                                                              .WORD   EMG10
    035434  015112                                                              .WORD   ERRG2
149 035436  000137  036170              JMP     80$             ;EXIT
150 035442                          55$:
151 035442  012737  177777  002516      MOV     #-1,TFLAG       ;FLAG THAT THE TRANSMIT IS DONE.
152 035450  023777  035342  144560      CMP     TSEL4,@SEL4     ;IS THE BUFFER ADDRESS CORRECT?
153 035456  001406                      BEQ     56$             ;IF OK, PROCEED WITH CHECK.
154 035460                              ERRDF   11,EMG11,ERRG2  ;BUFFER ADDRESS ERROR
    035460  104455                                                              TRAP    C$ERDF
    035462  000013                                                              .WORD   11
    035464  020104                                                              .WORD   EMG11
    035466  015112                                                              .WORD   ERRG2
155 035470  000137  036170              JMP     80$             ;EXIT
156 035474                          56$:
157 035474  023777  035344  144536      CMP     TSEL6,@SEL6     ;IS THE CHAR. COUNT CORRECT?
158 035502  001502                      BEQ     70$             ;IF OK, PROCEED
159 035504                              ERRDF   12,EMG12,ERRG2  ;CHARACTER COUNT ERROR - OR EXT MEM PROBLEM
    035504  104455                                                              TRAP    C$ERDF
    035506  000014                                                              .WORD   12
    035510  020127                                                              .WORD   EMG12
```

TEST 14 - EXTENDED ADDRESSING DATA TEST

```
                035512  015112                                                                  .WORD   ERRG2
    160         035514  000137  036170                  JMP     80$             ;EXIT
    161         035520                          60$:
    162         035520  005737  002566                  TST     RFLAG           ;IS THIS THE 1ST RECEIVE DONE
    163         035524  001406                          BEQ     61$             ;IF YES, PROCEED
    164         035526                                  ERRDF   13,EMG13,ERRG2  ;MULTIPLE RECEIVES
                035526  104455                                                                  TRAP    C$ERDF
                035530  000015                                                                  .WORD   13
                035532  020155                                                                  .WORD   EMG13
                035534  015112                                                                  .WORD   ERRG2
    165         035536  000137  036170                  JMP     80$             ;EXIT
    166         035542                          61$:
    167         035542  012737  177777  002566          MOV     #-1,RFLAG       ;FLAG THAT THE RECEIVE IS DONE.
    168         035550  023777  035324  144460          CMP     RSEL4,@SEL4     ;IS THE BUFFER ADDRESS CORRECT?
    169         035556  001405                          BEQ     62$             ;IF OK, PROCEED WITH CHECK.
    170         035560                                  ERRDF   11,EMG11,ERRG2  ;BUFFER ADDRESS ERROR
                035560  104455                                                                  TRAP    C$ERDF
                035562  000013                                                                  .WORD   11
                035564  020104                                                                  .WORD   EMG11
                035566  015112                                                                  .WORD   ERRG2
    171         035570  000577                          BR      80$             ;EXIT
    172         035572                          62$:
    173         035572  023777  035326  144440          CMP     RSEL6,@SEL6     ;IS THE CHAR. COUNT CORRECT?
    174         035600  001404                          BEQ     63$             ;IF OK, PROCEED
    175         035602                                  ERRDF   12,EMG12,ERRG2  ;CHARACTER COUNT ERROR
                035602  104455                                                                  TRAP    C$ERDF
                035604  000014                                                                  .WORD   12
                035606  020127                                                                  .WORD   EMG12
                035610  015112                                                                  .WORD   ERRG2
    176         035612                          63$:
    177         035612  005737  002344                  TST     SFLAG           ;WHICH EXTENDED ADDRESS ARE WE CHECKING?
    178         035616  001007                          BNE     65$             ;BR FOR BIT 17 CHECK
    179         035620  012700  004000                  MOV     #4000,R0        ;IN THE TEST OF BIT 16 WE SENT 4K BYTES
    180         035624  012701  120000                  MOV     #120000,R1      ;THE XMIT BUFFER BEGAN AT THIS VIRTUAL ADDR
    181                                                                         ;WHICH WILL MAP TO 200000
    182         035630  012702  130000                  MOV     #130000,R2      ;THE REC BUF. MAPS TO 210000
    183         035634  000406                          BR      66$             ;GO COMPARE THE XMIT AND REC BUFFERS
    184         035636                          65$:
    185         035636  012700  010000                  MOV     #10000,R0       ;IN THE TEST OF BIT 17 WE SENT 8K BYTES
    186         035642  012701  120000                  MOV     #120000,R1      ;THE XMIT BUFFER MAPS TO 200000
    187         035646  012702  140000                  MOV     #140000,R2      ;THE REC BUF. MAPS TO 400000
    188         035652                          66$:
    189         035652  012737  000001  177572          MOV     #1,@#177572     ;TURN MEMORY MANAGEMENT BACK ON.
    190         035660                          67$:
    191         035660  022122                          CMP     (R1)+,(R2)+     ;IS THE DATA THE SAME?
    192         035662  001003                          BNE     68$             ;IF NOT THERE IS A DATA ERROR.
    193         035664  005300                          DEC     R0              ;CHECK ENTIRE BUFFER
    194         035666  001374                          BNE     67$
    195         035670  000407                          BR      70$             ;IF DATA OK, PROCEED WITH TEST.
    196         035672                          68$:
    197         035672  005037  177572                  CLR     @#177572        ;TURN MEMORY MANAGEMENT OFF.
    198         035676                                  ERRDF   15,EMG15,ERRG2  ;DATA ERROR
                035676  104455                                                                  TRAP    C$ERDF
                035700  000017                                                                  .WORD   15
                035702  020223                                                                  .WORD   EMG15
                035704  015112                                                                  .WORD   ERRG2
    199         035706  000530                          BR      80$             ;EXIT
```

```
                                        70$:
035710                                          CLR     @#177572        ;TURN MEMORY MANAGEMENT OFF.
035710  005037  177572                          BIC     #RDO+RCV+CMD,@SEL2 ;CLEAR RDO, RCV & COMMMAND BITS (0,1)
035714  042777  000213  144312                  TST     RFLAG           ;IS THE RECEIVE DONE ? (IF DONE, FLAG = -1)
035722  005737  002566                          BNE     71$             ;YES - SEE IF TRANSMIT DONE
035726  001002                                  JMP     40$             ;NO - GO BACK AND DO IT.
035730  000137  035352
035734                                  71$:
035734  005737  002516                          TST     TFLAG           ;IS THE TRANSMIT DONE ?
035740  001002                                  BNE     72$             ;YES - SEE IF THERE IS MORE
035742  000137  035352                          JMP     40$             ;NO - DO IT
035746                                  72$:
035746  005737  002344                          TST     SFLAG           ;HAVE WE ALREADY TESTED BIT 17
035752  001106                                  BNE     80$             ;IF SO - END OF TEST

035754  012737  177777  002344                  MOV     #-1,SFLAG       ;FLAG SO WE DON'T COME THIS WAY AGAIN.
035762  023727  002120  004200                  CMP     L$HIMEM,#4200   ;IS THERE ENOUGH MEMORY TO TEST BIT 17?
035770  002477                                  BLT     80$             ;IF NOT - END OF TEST.
035772  005037  002516                          CLR     TFLAG           ;CLEAR FLAGS FOR NEXT TEST
035776  005037  002566                          CLR     RFLAG

                                        ;
                                        ;SET UP TO TEST BIT 17, IF THERE IS ENOUGH MEMORY.
                                        ;THIS TEST WILL TRANSMIT 8K BYTES STARTING AT PHYSICAL ADDRESS 200000
                                        ;TO PHYSICAL ADDRESS 400000.  THE TRANSMITTED BUFFER STILL CONTAINS
                                        ;THE TEST PATTERN GENERATED IN THE BIT 16 TEST.
                                        ;
036002  005037  035324                          CLR     RSEL4           ;RECEIVE BUFFER ADDRESS (BITS 0-15)
036006  012737  120000  035326                  MOV     #BIT15!20000,RSEL6 ;REC BUFFER ADDR BIT 17 SET AND 8K
                                                                        ;BYTE RECEIVE CHARACTER COUNT
036014  005037  035342                          CLR     TSEL4           ;TRANSMIT BUFFER ADDRESS (BITS 0-15)
036020  012737  060000  035344                  MOV     #BIT14!20000,TSEL6 ;XMIT BUFFER ADDR BIT 16 SET AND 8K
                                                                        ;BYTE XMIT CHARACTER COUNT
036026  012701  010000                          MOV     #10000,R1       ;COUNTER TO CLEAR 8K BYTES
036032  012704  140000                          MOV     #140000,R4      ;VIRTUAL ADDRESS THAT WILL MAP INTO PAR 6
                                                                        ;WITH THE PHYSICAL ADDRESS 400000
036036  005037  002350                          CLR     NXMFLG          ;ENSURE FLAG IS CLEAR
036042                                          SETVEC  #4,#NOXMEM,#PRI07 ;SET UP TRAP TO VECTOR 4 (WILL SET FLAG)
        036042  012746  000340                                                  MOV     #PRI07,-(SP)
        036046  012746  023572                                                  MOV     #NOXMEM,-(SP)
        036052  012746  000004                                                  MOV     #4,-(SP)
        036056  012746  000003                                                  MOV     #3,-(SP)
        036062  104437                                                          TRAP    C$SVEC
        036064  062706  000010                                                  ADD     #10,SP
036070  012737  000001  177572                  MOV     #1,@#177572     ;TURN ON MEMORY MANAGEMENT
036076                                  74$:
036076  005024                                  CLR     (R4)+           ;CLEAR 400000 - 417776
036100  005737  002350                          TST     NXMFLG          ;DOES A NXM TRAP 4 OCCUR?
036104  001002                                  BNE     75$             ;IF YES, EXIT
036106  005300                                  DEC     R0
036110  001372                                  BNE     74$
036112                                  75$:
036112  005037  177572                          CLR     @#177572        ;TURN OFF MEMORY MANAGEMENT
036116                                          CLRVEC  #4              ;RESTORE TRAP 4
        036116  012700  000004                                                  MOV     #4,R0
        036122  104436                                                          TRAP    C$CVEC
036124  005737  002350                          TST     NXMFLG          ;WAS THIS AN ERROR EXIT?
036130  001002                                  BNE     76$             ;IF YES - REPORT ERROR
036132  000137  035316                          JMP     35$             ;START THE SECOND TEST
```

```
                                        76$:
                                                ERRDF   19,EMT22
036136  104455                                                          TRAP    C$ERDF
036140  000023                                                          .WORD   19
036142  036202                                                          .WORD   EMT22
036144  000000                                                          .WORD   0
                                                PRINTB  #FMT25,R4
036146  010446                                                          MOV     R4,-(SP)
036150  012746  036240                                                  MOV     #FMT25,-(SP)
036154  012746  000002                                                  MOV     #2,-(SP)
036160  010600                                                          MOV     SP,R0
036162  104414                                                          TRAP    C$PNTB
036164  062706  000006                                                  ADD     #6,SP
                                        80$:
                                                SHUTDN                  ;SHUTDOWN DMR
                                                                        ;**** MACRO EXPANSION ****
036170  004737  012550                        JSR     PC, $HALT       ;DMR HALT ROUTINE.
                                                                        ;****                   ****
                                                CALL    $ERROR          ;CHECK BASE TABLE AND REPORT ANY SOFT ERRORS

                                        85$:
                                                .DSABL  LSB             ;DISABLE LOCAL SYMBOL BLOCK
                                        ENDTST
036200                                                                                  L10074:
036200  104401                                                                          TRAP    C$ETST


036202  103     101     116     EMT22:  .ASCIZ  /CAN'T ADDRESS EXTENDED MEMORY/
036205  047     124     040
036210  101     104     104
036213  122     105     123
036216  123     040     105
036221  130     124     105
036224  116     104     105
036227  104     040     115
036232  105     115     117
036235  122     131     000
036240  045     101     115     FMT25:  .ASCIZ  /%AMEMORY ADDRESS %06% DOES NOT RESPOND - TRAP 4%N/
036243  105     115     117
036246  122     131     040
036251  101     104     104
036254  122     105     123
036257  123     040     045
036262  117     066     045
036265  040     104     117
036270  105     123     040
036273  116     117     124
036276  040     122     105
036301  123     120     117
036304  116     104     040
036307  055     040     124
036312  122     101     120
036315  040     064     045
036320  116     000
                                                .EVEN
```

.

```
                        .SBTTL          TEST 15 - DMC MODE (RESUME) INTERRUPT TEST
                        ;*****************************************************************************
                        ;*              TEST 15 - DMR-11
                        ;* RESUME BASE IN - DMC MODE
                        ;* **  WILL NOT RUN IF MODEM LOOPBACK IS SELECTED  **
                        ;* IN THIS TEST THE DMR WILL TRANSMIT AND RECEIVE 7 BUFFERS. DURING THE
                        ;* TEST THE DMR WILL BE HALTED AND RESTARTED BY A BASE-IN RESUME IN THE
                        ;* FOLLOWING MANNER:
                        ;*      BASE IN
                        ;*      CONTROL IN
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      1 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      1 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*
                        ;*      ALL BA/CC OUTS RECEIVES AND TRANSMITS WILL BE ACCOUNTED FOR AND
                        ;*      THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                        ;*      THE RECEIVE/TRANSMIT TABLE.
                        ;*
                        ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                        ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                        ;*      SEVEN RECEIVE AND SEVEN TRANSMIT BUFFERS.  THE ROUTINE WILL
                        ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                        ;*      HIERARCHY:
                        ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                        ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                        ;*                 THAN 2K BYTES, USE THAT MEMORY
                        ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                        ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                        ;*
                        ;*****************************************************************************
036322                  BGNTST
036322                                                                          T15::
036322  005737  002306          TST     WMAINT          ;DO WE NEED TO WRITE MODEM
                                                        ;MAINTENACE 1 OR 2?
036326  001036                  BNE     40$             ;IF YES WE CAN'T RUN THIS TEST
                                                        ;(NOTE: CAN'T WRITE MODEM IN DMC MODE)
036330  012737  000007  002324  MOV     #7,BUFNUM       ;# OF RCV & XMIT BUFFERS.
036336  012737  000001  002274  MOV     #1,RESUME       ;FLAG SET TO REQUEST USE OF RESUME.
036344  012737  000001  002276  MOV     #1,DMCMDE       ;FLAG SET TO REQUEST DMC MODE.
036352  005037  002300          CLR     MNTMDE          ;FLAG NOT TO REQUEST MAINTENANCE MODE.

036356                          CALL    $BUFFS          ;DETERMINE 7 RCV & 7 XMIT BUFFERS
```

```
TEST 15 - DMC MODE (RESUME) INTERRUPT TEST

     57
     58 036362                                  CLEAR                    ;MASTER CLEAR
                                                                         ;**** MACRO EXPANSION ****
        036362  004737  011066                  JSR     PC, $MSCLR       ;ISSUE A DMR MASTER CLEAR
                                                                         ;****                 ****
     59
     60 036366                                  ESCAPE  TST              ;IF ERROR, EXIT TEST
        036366  104410                                                                  TRAP    C$ESCAPE
        036370  000034                                                                  .WORD   L10075-.
     61
     62                                                                  ;ISSUE A DMR MODE BASEIN
     63                                                                  ;IN DMR MODE, IF A INTERFACE IS REQUIRED
     64 036372                                  BASEIN                   ;TO BE WRITTEN - IT WILL BE DONE.
                                                                         ;**** MACRO EXPANSION ****
        036372  004737  011264                  JSR     PC, $BASEI       ;CALL BASE IN ROUTINE WITH DEFAULTS
        036376  004000                                  .WORD   LPLU     ;SET LINE UNIT LOOP
        036400  002636                                  .WORD   BASE     ;BASE TABLE ADDRESS
        036402  000522                                  .WORD   DMR      ;DMR-11 MODE
                                                                         ;****                 ****
     65
     66 036404                                  ESCAPE  TST              ;IF ERROR, EXIT TEST
        036404  104410                                                                  TRAP    C$ESCAPE
        036406  000016                                                                  .WORD   L10075-.
     67 036410                                  SHUTDN                   ;HALT
                                                                         ;**** MACRO EXPANSION ****
        036410  004737  012550                  JSR     PC, $HALT        ;DMR HALT ROUTINE.
                                                                         ;****                 ****
     68 036414                                  ESCAPE  TST              ;IF ERROR, EXIT TEST.
        036414  104410                                                                  TRAP    C$ESCAPE
        036416  000006                                                                  .WORD   L10075-.
     69                                                                  ;AFTER SETTING INTERFACE OR LOOPBACK MAINT.
     70                                                                  ;(CAN'T BE DONE IN DMC MODE), START IN
     71                                                                  ;DMC MODE.
     72
     73
     74 036420                                  CALL    $INOUT           ;THIS ROUTINE WILL MANAGE ALL THE DMR
     75                                                                  ;COMMANDS ISSUED IN THE INTERRUPT ROUTINES
     76                                                                  ;(FROM BASE IN UNTIL SHUT DOWN).  BESIDES
     77                                                                  ;CONTROLLING THE SOFTWARE TIMEOUT, THIS
     78                                                                  ;ROUTINE WILL ALSO CHECK THAT BUFFER
     79                                                                  ;CHARACTER COUNTS AND ADDRESSES ARE CORRECT
     80                                                                  ;AND THAT THE DATA IS CORRECT IN THOSE BUFFERS
     81
     82 036424                          40$:
     83 036424                          ENDTST
        036424                                                                  L10075:
        036424  104401                                                                  TRAP    C$ETST
     84
     85
     86
```

```
TEST 16 - DMR MODE (RESUME) INTERRUPT TEST

                        .SBTTL          TEST 16 - DMR MODE (RESUME) INTERRUPT TEST
                        ;*******************************************************************************
                        ;*              TEST 16 - DMR-11
                        ;* RESUME BASE IN - DMR MODE
                        ;* IN THIS TEST THE DMR WILL TRANSMIT AND RECEIVE 7 BUFFERS. DURING THE
                        ;* TEST THE DMR WILL BE HALTED AND RESTARTED BY A BASE-IN RESUME IN THE
                        ;* FOLLOWING MANNER:
                        ;*      BASE IN
                        ;*      CONTROL IN
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      1 BA/CC IN RECEIVE
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      2 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*      1 BA/CC IN TRANSMIT
                        ;*      HALT    -       BASE IN RESUME
                        ;*
                        ;*      ALL BA/CC OUTS RECEIVES AND TRANSMITS WILL BE ACCOUNTED FOR AND
                        ;*      THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                        ;*      THE RECEIVE/TRANSMIT TABLE.
                        ;*
                        ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                        ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                        ;*      SEVEN RECEIVE AND SEVEN TRANSMIT BUFFERS.  THE ROUTINE WILL
                        ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                        ;*      HIERARCHY:
                        ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                        ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                        ;*                 THAN 2K BYTES, USE THAT MEMORY
                        ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                        ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                        ;*
                        ;*
                        ;*******************************************************************************
036426                  BGNTST
036426                                                                          T16::
036426  012737  000007  002324          MOV     #7,BUFNUM       ;# OF RCV & XMIT BUFFERS.
036434  012737  000001  002274          MOV     #1,RESUME       ;FLAG SET TO REQUEST USE OF RESUME.
036442  005037  002276                  CLR     DMCMDE          ;FLAG CLEARED - DMR MODE.
036446  005037  002300                  CLR     MNTMDE          ;FLAG NOT TO REQUEST MAINTENANCE MODE.

036452                                  CALL    $BUFFS          ;DETERMINE 7 RCV &  7 XMIT BUFFERS

036456                                  CLEAR                   ;MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
036456  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
```

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

     55
     56 036462                          ESCAPE  TST      ;IF ERROR, EXIT TEST
        036462  104410                                                  TRAP    C$ESCAPE
        036464  000006                                                  .WORD   L10076-.
     57
     58 036466                          CALL    $INOUT   ;THIS ROUTINE WILL MANAGE ALL THE DMR
     59                                                  ;COMMANDS ISSUED IN THE INTERRUPT ROUTINES
     60                                                  ;(FROM BASE IN UNTIL SHUT DOWN).  BESIDES
     61                                                  ;CONTROLLING THE SOFTWARE TIMEOUT, THIS
     62                                                  ;ROUTINE WILL ALSO CHECK THAT BUFFER
     63                                                  ;CHARACTER COUNTS AND ADDRESSES ARE CORRECT
     64                                                  ;AND THAT THE DATA IS CORRECT IN THOSE BUFFERS
     65
     66
     67
     68 036472                      ENDTST
        036472                                                  L10076:
        036472  104401                                                  TRAP    C$ETST
     69
```

TEST 17 - DMR MODE INTERRUPT EXERCISE

```
                                .SBTTL          TEST 17 - DMR MODE INTERRUPT EXERCISE
                                ;*****************************************************************************
                                ;*                      TEST 17 - DMR-11
                                ;* INTERRUPT DRIVEN EXERCISE
                                ;* IN THIS TEST 64 BUFFERS WILL BE TRANSMITTED AND RECEIVED
                                ;*
                                ;* ALL BA/CC OUTS RECEIVES AND TRANSMITS WILL BE ACCOUNTED FOR AND
                                ;* THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                                ;* THE RECEIVE/TRANSMIT TABLE.
                                ;*
                                ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                                ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                                ;*      64 RECEIVE AND 64 TRANSMIT BUFFERS.  THE ROUTINE WILL
                                ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                                ;*      HIERARCHY:
                                ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                                ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                                ;*                 THAN 2K BYTES, USE THAT MEMORY
                                ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                                ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                                ;*
                                ;*****************************************************************************
                                BGNTST
                                                                                        T17::
036474  012737  000100  002324          MOV     #64.,BUFNUM     ;# OF RCV & XMIT BUFFERS.

036502  005037  002274                  CLR     RESUME          ;FLAG CLEARED IN ORDER NOT TO USE RESUME.
036506  005037  002276                  CLR     DMCMDE          ;FLAG CLEARED TO ALLOW DMR MODE.
036512  005037  002300                  CLR     MNTMDE          ;FLAG NOT TO REQUEST MAINTENANCE MODE.

036516                                  CALL    $BUFFS          ;DETERMINE 64 RCV &  64 XMIT BUFFERS

036522                                  CLEAR                   ;MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
036522  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****

036526                                  ESCAPE  TST             ;IF ERROR, EXIT TEST
036526  104410                                                                  TRAP    C$ESCAPE
036530  000012                                                                  .WORD   L10077-.

036532                                  CALL    $INOUT          ;THIS ROUTINE WILL MANAGE ALL THE DMR
                                                                ;COMMANDS ISSUED IN THE INTERRUPT ROUTINES
                                                                ;(FROM BASE IN UNTIL SHUT DOWN).  BESIDES
                                                                ;CONTROLLING THE SOFTWARE TIMEOUT, THIS
                                                                ;ROUTINE WILL ALSO CHECK THAT BUFFER
                                                                ;CHARACTER COUNTS AND ADDRESSES ARE CORRECT
                                                                ;AND THAT THE DATA IS CORRECT IN THOSE BUFFERS

036536                                  CALL    $ERROR          ;CHECK BASE TABLE FOR SOFT ERRORS


036542                          ENDTST
                                                                L10077:
036542  104401                                                                  TRAP    C$ETST
```

TEST 18 - DMR MODE LARGE MESSAGE

```
                                .SBTTL          TEST 18 - DMR MODE LARGE MESSAGE
                                ;*****************************************************************************
                                ;*              TEST  18 - DMR-11
                                ;* LARGE MESSAGE
                                ;* IN THIS MODE TRANSMIT AND RECEIVE 1 LARGE BUFFER
                                ;*
                                ;* THE BA/CC OUT RECEIVE AND TRANSMIT WILL BE ACCOUNTED FOR AND
                                ;* THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                                ;* THE RECEIVE/TRANSMIT TABLE.
                                ;*
                                ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                                ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                                ;*      ONE RECEIVE AND ONE TRANSMIT BUFFER.  THE ROUTINE WILL
                                ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                                ;*      HIERARCHY:
                                ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                                ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                                ;*                 THAN 2K BYTES, USE THAT MEMORY
                                ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                                ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                                ;*
                                ;*****************************************************************************
036544                          BGNTST
036544                                                                          T18::

036544  012737  000001  002324          MOV     #1,BUFNUM       ;# OF RCV & XMIT BUFFERS.

036552  005037  002274                  CLR     RESUME          ;FLAG CLEARED IN ORDER NOT TO USE RESUME.
036556  005037  002276                  CLR     DMCMDE          ;FLAG CLEARED TO ALLOW DMR MODE.
036562  005037  002300                  CLR     MNTMDE          ;FLAG NOT TO REQUEST MAINTENANCE MODE.

036566                                  CALL    $BUFFS          ;DETERMINE 1 RCV &  1 XMIT BUFFER

036572                                  CLEAR                   ;MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
036572  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****

036576                                  ESCAPE  TST             ;IF ERROR, EXIT TEST
036576  104410                                                                  TRAP    C$.SCAPE
036600  000012                                                                  .WORD   L10100-.

036602                                  CALL    $INOUT          ;THIS ROUTINE WILL MANAGE ALL THE DMR
                                                                ;COMMANDS ISSUED IN THE INTERRUPT ROUTINES
                                                                ;(FROM BASE IN UNTIL SHUT DOWN).  BESIDES
                                                                ;CONTROLLING THE SOFTWARE TIMEOUT, THIS
                                                                ;ROUTINE WILL ALSO CHECK THAT BUFFER
                                                                ;CHARACTER COUNTS AND ADDRESSES ARE CORRECT
                                                                ;AND THAT THE DATA IS CORRECT IN THOSE BUFFERS

036606                                  CALL    $ERROR          ;CHECK BASE TABLE FOR SOFT ERRORS
                                                                ;NOTE: NORMALLY ANY NON-ZERO ERROR COUNT IS
                                                                ;REPORTED; HOWEVER IN THIS TEST A REP COUNT
                                                                ;OF 1 IS ALLOWED, BECAUSE AT LOW BAUD RATES
                                                                ;WE WOULD EXPECT 1 REP.
```

```
     52
     53 036612                          ENDTST
        036612                                                    L10100:
        036612  1044C                                                      TRAP    C$ETST
     54
```

```
                                .SBTTL          TEST 19 - DMR MAINTENANCE MODE MESSAGE

                                ;*****************************************************************
                                ;*              TEST 19 - DMR-11
                                ;* MAINTENANCE MODE OPERATION
                                ;*
                                ;* THE BA/CC OUT RECEIVE AND TRANSMIT WILL BE ACCOUNTED FOR AND
                                ;* THE CHARACTER COUNTS AND BUFFER ADDRESSES WILL BE CHECKED AGAINST
                                ;* THE RECEIVE/TRANSMIT TABLE.
                                ;*
                                ;*      THE BUFFERS ARE DETERMINED IN THE SUBROUTINE $BUFFS.  THIS
                                ;*      SUBROUTINE WILL DETERMINE THE ADDRESS AND CHARACTER COUNT OF
                                ;*      ONE RECEIVE AND ONE TRANSMIT BUFFER.  THE ROUTINE WILL
                                ;*      ATTEMPT TO USE AS LARGE BUFFERS AS POSSIBLE IN THE FOLLOWING
                                ;*      HIERARCHY:
                                ;*              A. IF THERE IS MEMORY MANAGEMENT, USE A PAGE ABOVE 32K.
                                ;*              B. IF THERE IS FREE MEMORY ABOVE THE SUPERVISOR GREATER
                                ;*                 THAN 2K BYTES, USE THAT MEMORY
                                ;*              C. IF NEITHER OF THE PRECEEDING TWO ARE POSSIBLE, USE
                                ;*                 THE 2K BYTE DEFAULT BUFFER WITHIN THIS DIAGNOSTIC.
                                ;*
                                ;*****************************************************************
                                BGNTST
                                                                                        T19::
036614  012737  000001  002324          MOV     #1,BUFNUM       ;# OF RCV & XMIT BUFFERS.

036622  005037  002274                  CLR     RESUME          ;DON'T ALLOW RESUME
036626  005037  002276                  CLR     DMCMDE          ;FLAG CLEARED TO ALLOW DMR MODE.
036632  012737  000001  002300          MOV     #1,MNTMDE       ;FLAG SET TO REQUEST MAINTENANCE MODE.

036640                                  CALL    $BUFFS          ;DETERMINE 1 RCV &  1 XMIT BUFFER

036644                                  CLEAR                   ;MASTER CLEAR
                                                                ;**** MACRO EXPANSION ****
036644  004737  011066                  JSR     PC, $MSCLR      ;ISSUE A DMR MASTER CLEAR
                                                                ;****                 ****

                                ESCAPE  TST                     ;IF ERROR, EXIT TEST
036650  104410                                                          TRAP    C$ESCAPE
036652  000012                                                          .WORD   L10101-.

036654                                  CALL    $INOUT          ;THIS ROUTINE WILL MANAGE ALL THE DMR
                                                                ;COMMANDS ISSUED IN THE INTERRUPT ROUTINES
                                                                ;(FROM BASE IN UNTIL SHUT DOWN).  BESIDES
                                                                ;CONTROLLING THE SOFTWARE TIMEOUT, THIS
                                                                ;ROUTINE WILL ALSO CHECK THAT BUFFER
                                                                ;CHARACTER COUNTS AND ADDRESSES ARE CORRECT
                                                                ;AND THAT THE DATA IS CORRECT IN THOSE BUFFERS

036660                                  CALL    $ERROR          ;CHECK BASE TABLE FOR SOFT ERRORS


                                ENDTST
                                                                L10101:
036664  104401                                                        TRAP    C$ETST
```

```
                        .SBTTL  HARDWARE PARAMETER CODING SECTION

                        ;*****************************************************************
                        ;  THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                        ;  THAT ARE USED BY THER SUPERVISOR TO BUILD P-TABLES.  THE
                        ;  MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                        ;  INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                        ;  MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                        ;  WITH THE OPERATOR.
                        ;*****************************************************************

036666                          BGNHRD
036666  000015                                                          .WORD L10102-L$HARD/2
036670                                                          L$HARD::

036670                          GPRMA   P1,2,0,160000,177776,YES
036670  001031                                                          .WORD   T$CODE
036672  036722                                                          .WORD   P1
036674  160000                                                          .WORD   T$LOLIM
036676  177776                                                          .WORD   T$HILIM
036700                          GPRMA   P2,4,0,0,776,YES
036700  002031                                                          .WORD   T$CODE
036702  036740                                                          .WORD   P2
036704  000000                                                          .WORD   T$LOLIM
036706  000776                                                          .WORD   T$HILIM
036710                          GPRMD   P3,20,0,7,0,7,YES
036710  010032                                                          .WORD   T$CODE
036712  036761                                                          .WORD   P3
036714  000007                                                          .WORD   7
036716  000000                                                          .WORD   T$LOLIM
036720  000007                                                          .WORD   T$HILIM

036722                          ENDHRD
                                                                        .EVEN
036722                                                          L10102:

036722  103     123     122     P1:     .ASCIZ  /CSR ADDRESS: /
036725  040     101     104
036730  104     122     105
036733  123     123     072
036736  040     000
036740  126     105     103     P2:     .ASCIZ  /VECTOR ADDRESS: /
036743  124     117     122
036746  040     101     104
036751  104     122     105
036754  123     123     072
036757  040     000
036761  124     105     123     P3:     .ASCII  /TEST CONFIGURATION -/<CR><LF>
036764  124     040     103
036767  117     116     106
036772  111     107     125
036775  122     101     124
037000  111     117     116
037003  040     055     015
037006  012
037007  040     040     060             .ASCII  /  0 = INTERNAL (NO CONNECTOR)/<CR><LF>
```

HARDWARE PARAMETER CODING SECTION

```
                037012  040     075     040
                037015  111     116     124
                037020  105     122     116
                037023  101     114     040
                037026  050     116     117
                037031  040     103     117
                037034  116     116     105
                037037  103     124     117
                037042  122     051     015
                037045  012
    25          037046  040     040     061             .ASCII  /  1 = H3254 - V.35      (NOTE:  MODE 1-4 ALLOWS/<CR><LF>
                037051  040     075     040
                037054  110     063     062
                037057  065     064     040
                037062  055     040     126
                037065  056     063     065
                037070  040     040     040
                037073  040     040     040
                037076  050     116     117
                037101  124     105     072
                037104  040     040     115
                037107  117     104     105
                037112  040     061     055
                037115  064     040     101
                037120  114     114     117
                037123  127     123     015
                037126  012
    26          037127  040     040     062             .ASCII  /  2 = H3254 - INTEGRAL   PROGRAM INTERFACE SELECTION)/
                037132  040     075     040
                037135  110     063     062
                037140  065     064     040
                037143  055     040     111
                037146  116     124     105
                037151  107     122     101
                037154  114     040     040
                037157  040     120     122
                037162  117     107     122
                037165  101     115     040
                037170  111     116     124
                037173  105     122     106
                037176  101     103     105
                037201  040     123     105
                037204  114     105     103
                037207  124     111     117
                037212  116     051
    27          037214  015     012     040             .ASCII  <CR><LF>/  3 = H3255 - RS232C/<57>/423/<CR><LF>
                037217  040     063     040
                037222  075     040     110
                037225  063     062     065
                037230  065     040     055
                037233  040     122     123
                037236  062     063     062
                037241  103     057     064
                037244  062     063     015
                037247  012
    28
    29          037250  040     040     064             .ASCII  /  4 = H3255 - RS422/<CR><LF>
```

```
                037253  040     075     040
                037256  110     063     062
                037261  065     065     040
                037264  055     040     122
                037267  123     064     062
                037272  062     015     012
     30         037275  040     040     065             .ASCII  /  5 = CABLE AND SW PACK INTERFACE SELECTED/<CR><LF>
                037300  040     075     040
                037303  103     101     102
                037306  114     105     040
                037311  101     116     104
                037314  040     123     127
                037317  040     120     101
                037322  103     113     040
                037325  111     116     124
                037330  105     122     106
                037333  101     103     105
                037336  040     123     105
                037341  114     105     103
                037344  124     105     104
                037347  015     012
     31         037351  040     040     040             .ASCII  /      (V.35-H3250, INTEGRAL-BC55A-16,/
                037354  040     040     040
                037357  050     126     056
                037362  063     065     055
                037365  110     063     062
                037370  065     060     054
                037373  040     111     116
                037376  124     105     107
                037401  122     101     114
                037404  055     102     103
                037407  065     065     101
                037412  055     061     060
                037415  054
     32         037416  040     122     123             .ASCII  / RS232C-H325, RS423/<57>/422-H3251)/<CR><LF>
                037421  062     063     062
                037424  103     055     110
                037427  063     062     065
                037432  054     040     122
                037435  123     064     062
                037440  063     057     064
                037443  062     062     055
                037446  110     063     062
                037451  065     061     051
                037454  015     012
     33         037456  052     040     123             .ASCII  /* SELECT THE FOLLOWING ONLY IF THE MODEM SUPPORTS LOOPBACK */
                037461  105     114     105
                037464  103     124     040
                037467  124     110     105
                037472  040     106     117
                037475  114     114     117
                037500  127     111     116
                037503  107     040     117
                037506  116     114     131
                037511  040     111     106
                037514  040     124     110
                037517  105     040     115
```

HARDWARE PARAMETER CODING SECTION

```
        037522      117     104     105
        037525      115     040     123
        037530      125     120     120
        037533      117     122     124
        037536      123     040     114
        037541      117     117     120
        037544      102     101     103
        037547      113     040     052
    34  037552      015     012     040         .ASCII  <CR><LF>/  6 = LOCAL LOOP/<CR><LF>
        037555      040     066     040
        037560      075     040     114
        037563      117     103     101
        037566      114     040     114
        037571      117     117     120
        037574      015     012
    35  037576      040     040     067         .ASCIZ  /  7 = REMOTE LOOP/<CR><LF>
        037601      040     075     040
        037604      122     105     115
        037607      117     124     105
        037612      040     114     117
        037615      117     120     015
        037620      012     000
    36                                          .EVEN
    37
```

```
                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                ;*****************************************************************
                                ;  THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ;  THAT ARE USED BY THER SUPERVISOR TO BUILD P-TABLES.  THE
                                ;  MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ;  INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ;  MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ;  WITH THE OPERATOR.
                                ;*****************************************************************

037622                                  BGNSFT
037622  000005                                                          .WORD L10103-L$SOFT/2
037624                                                          L$SOFT::

037624                                  GPRMD   S1,0,0,7,1,5,YES
037624  000032                                                          .WORD   T$CODE
037626  037636                                                          .WORD   S1
037630  000007                                                          .WORD   7
037632  000001                                                          .WORD   T$LOLIM
037634  000005                                                          .WORD   T$HILIM

037636                                  ENDSFT
                                                                        .EVEN
037636                                                          L10103:

037636  123     105     114     S1:     .ASCII  /SELECTABLE PROGRAM LOOP TIME-OUT VARIABLE/<CR><LF>
037641  105     103     124
037644  101     102     114
037647  105     040     120
037652  122     117     107
037655  122     101     115
037660  040     114     117
037663  117     120     040
037666  124     111     115
037671  105     055     117
037674  125     124     040
037677  126     101     122
037702  111     101     102
037705  114     105     015
037710  012
037711  133     122     105             .ASCIZ  /[REFER TO LISTING 6.3.13]   (MAX=5; MIN=1) /
037714  106     105     122
037717  040     124     117
037722  040     114     111
037725  123     124     111
037730  116     107     040
037733  066     056     063
037736  056     061     063
037741  135     040     040
037744  040     050     115
037747  101     130     075
037752  065     073     040
037755  115     111     116
037760  075     061     051
037763  040     000
```

```
                                        .EVEN
                                ;********************      PATCH AREA      ********************************
 037766                         PATCH:
         040066                         .=.+100
 040066  000240                 NOP
 040070  000240                 NOP
 040072  000240                 NOP
                                ;*************************************************************************
 040074                         ENDMOD

                                LASTAD
                                                                                        .EVEN
 040074  000000                                                                        .WORD   0
 040076  000000                                                                        .WORD   0
 040100                         L$LAST::
         000001                 .END
```

SYMBOL TABLE

```
A      = 000044          C$AUTO= 000061          DMR    = 000522          ERRT1   026116 G        FRSTIM  002264
ADR    = 000020 G        C$BRK = 000022          DMRFLG  002260          ERRT2   031136 G        F$AU   = 000015
ASSEMB= 000010           C$BSEG= 000004          DMRRUN= 000040          ERRT3   027230 G        F$AUTO= 000020
AX3      002304          C$BSUB= 000002          DMRVEC  002226          ERRT4   031732 G        F$BGN  = 000040
BACCR  = 000004          C$CEFG= 000045          DMTURN  002254          EVL    = 000004 G       F$CLEA= 000007
BACCT  = 000000          C$CLCK= 000062          DMTVEC  002230          EXERR  = 000006          F$DU   = 000016
BASE     002636          C$CLEA= 000012          DTR    = 000100          E$END  = 002100          F$END  = 000041
BASEI  = 000003          C$CLOS= 000035          DXERR  = 000007          E$LOAD= 000035          F$HARD= 000004
BASEUP= 020000           C$CLP1= 000006          EF.CON= 000036 G        FINIT1  021500          F$HW   = 000013
BIGBUF   004236          C$CVEC= 000036          EF.NEW= 000035 G        FINIT2  021567          F$INIT= 000006
BIT0   = 000001 G        C$DCLN= 000044          EF.PWR= 000034 G        FINIT3  021656          F$JMP  = 000050
BIT00  = 000001 G        C$DODU= 000051          EF.RES= 000037 G        FLAG     002342         F$MOD  = 000000
BIT01  = 000002 G        C$DRPT= 000024          EF.STA= 000040 G        FMDROP  023632          F$MSG  = 000011
BIT02  = 000004 G        C$DU   = 000053         EMG1     017704         FMG1    016270          F$PROT= 000021
BIT03  = 000010 G        C$EDIT= 000003          EMG10    020055         FMG10   016703          F$PWR  = 000017
BIT04  = 000020 G        C$ERDF= 000055          EMG11    020104         FMG11   016741          F$RPT  = 000012
BIT05  = 000040 G        C$ERHR= 000056          EMG12    020127         FMG12   016773          F$SEG  = 000003
BIT06  = 000100 G        C$ERRO= 000060          EMG13    020155         FMG13   017024          F$SOFT= 000005
BIT07  = 000200 G        C$ERSF= 000054          EMG14    020203         FMG14   017100          F$SRV  = 000010
BIT08  = 000400 G        C$ERSO= 000057          EMG15    020223         FMG15   017154          F$SUB  = 000002
BIT09  = 001000 G        C$ESCA= 000010          EMG16    020236         FMG16   017203          F$SW   = 000014
BIT1   = 000002 G        C$ESEG= 000005          EMG17    020267         FMG17   017262          F$TEST= 000001
BIT10  = 002000 G        C$ESUB= 000003          EMG18    020341         FMG18   017335          GETPRM  020616
BIT11  = 004000 G        C$ETST= 000001          EMG19    020370         FMG19   017424          G$CNTO= 000200
BIT12  = 010000 G        C$EXIT= 000032          EMG2     017715         FMG2    016322          G$DELM= 000372
BIT13  = 020000 G        C$GETB= 000026          EMG8     017762         FMG21   017447          G$DISP= 000003
BIT14  = 040000 G        C$GETW= 000027          EMG9     020026         FMG22   017515          G$EXCP= 000400
BIT15  = 100000 G        C$GMAN= 000043          EMS3     012526         FMG23   017542          G$HILI= 000002
BIT2   = 000004 G        C$GPHR= 000042          EMS4     012712         FMG24   017623          G$LOLI= 000001
BIT3   = 000010 G        C$GPLO= 000030          EMT0     024062         FMG3    016354          G$NO   = 000000
BIT4   = 000020 G        C$GPRI= 000040          EMT1     025434         FMG4    016426          G$OFFS= 000400
BIT5   = 000040 G        C$INIT= 000011          EMT10    030546         FMG5    016457          G$OFSI= 000376
BIT6   = 000100 G        C$INLP= 000020          EMT11    030574         FMG7    016510          G$PRMA= 000001
BIT7   = 000200 G        C$MANI= 000050          EMT12    030630         FMG8    016561          G$PRMD= 000002
BIT8   = 000400 G        C$MEM  = 000031         EMT13    031170         FMG9    016632          G$PRML= 000000
BIT9   = 001000 G        C$MSG  = 000023         EMT2     025454         FMS1    010616          G$RADA= 000140
BOE    = 000400 G        C$OPEN= 000034          EMT20    031770         FMS2    010651          G$RADB= 000000
BSEL0  = 002232          C$PNTB= 000014          EMT22    036202         FMS3    011744          G$RADD= 000040
BSEL1    002242          C$PNTI= 000017          EMT3     025610         FMT0    024111          G$RADL= 000120
BSEL2  = 002234          C$PNTS= 000016          EMT4     026336         FMT1    025146          G$RADO= 000020
BSEL3    002244          C$PNTX= 000015          EMT5     026363         FMT11   027624          G$XFER= 000004
BSEL4  = 002236          C$QIO  = 000377         EMT6     026431         FMT12   027655          G$YES  = 000010
BSEL5    002246          C$RDBU= 000007          EMT7     027536         FMT13   027712          HALTC  = 001000
BSEL6  = 002240          C$REFG= 000047          EMT8     027567         FMT14   027747          HDX    = 002000
BSEL7    002250          C$RESE= 000033          EMT9     030516         FMT15   030004          HELP   = 000000
BUFNUM   002324          C$REVI= 000003          END      021476         FMT16   030041          HICRC    002402
BUFSIZ   002322          C$RFLA= 000021          ERRFLG   002360         FMT19   031214          HIWORD   002406
CD     = 002000          C$RPT  = 000025         ERRG1    014604 G       FMT2    025215          HLT    = 000002
CHIPNO   002412          C$SEFG= 000046          ERRG10   016152 G       FMT25   036240          HOE    = 100000 G
CLRNO    002376          C$SPRI= 000041          ERRG11   016204 G       FMT3    025272          IBE    = 010000 G
CMD    = 000007          C$SVEC= 000037          ERRG12   016236 G       FMT4    025356          IDU    = 000040 G
CNTRL  = 000001          C$TPRI= 000013          ERRG2    015112 G       FMT5    026470          IECLR  = 000020
COUNT    002414          DDMC   = 000010         ERRG3    015226 G       FMT6    026521          IEO    = 000100
CR     = 000015          DFPTBL   002174 G       ERRG4    015456 G       FMT7    026552          IER    = 020000 G
CSR      002232          DIAGMC= 000000          ERRG7    015752 G       FMT8    026603          IESET  = 000100
CTS    = 010000          DISCON= 000100          ERRG8    016050 G       FMT9    026634          INFACE   002262
C$AU   = 000052          DMCMDE   002276         ERROR    002364         FRSPAS   002266         INFLAG   002352
```

SYMBOL TABLE

```
INISR   022052 G    L$ETP   002102 G    L10033  025764    NOBFR = 000004      RUN   = 100000
INRCV   002326      L$EXP1  002046 G    L10034  026112    NOXMEM  023572 G    SAVE    002340
INTER = 000015      L$EXP4  002064 G    L10035  026334    NXM   = 000400      SECN  = 004000
INXMIT  002330      L$EXP5  002066 G    L10036  027226    NXMFLG  002350      SEL0  = 002232
ISP13 = 000076      L$HARD  036670 G    L10037  027046    OUTFLG  002354      SEL2    002234
ISP7  = 000072      L$HIME  002120 G    L10040  027224    OUTISR  023134 G    SEL4    002236
ISR   = 000100 G    L$HPCP  002016 G    L10041  027534    OUTRCV  002332      SEL6    002240
IXE   = 004000 G    L$HPTP  002022 G    L10042  030514    OUTXMT  002334      SFLAG   002344
I$AU  = 000041      L$HW    002174 G    L10043  030232    O$APTS= 000000      SFPTBL  002224 G
I$AUTO= 000041      L$ICP   002104 G    L10044  030322    O$AU  = 000000      SKIP    002346
I$CLN = 000041      L$INIT  020440 G    L10045  030416    O$BGNR= 000000      SPEED   002224
I$DU  = 000041      L$LADP  002026 G    L10046  030512    O$BGNS= 000001      STARES  002270
I$HRD = 000041      L$LAST  040100 G    L10047  031122    O$DU  = 000001      STARST  020574
I$INIT= 000041      L$LOAD  002100 G    L10050  031022    O$ERRT= 000000      START   002272
I$MOD = 000041      L$LUN   002074 G    L10051  031120    O$GNSW= 000001      STLU  = 010000
I$MSG = 000041      L$MREV  002050 G    L10052  031166    O$POIN= 000001      STREC = 000200
I$PROT= 000040      L$NAME  002000 G    L10053  031730    O$SETU= 000000      STUP  = 000400
I$PTAB= 000041      L$PRIO  002042 G    L10054  031522    PATCH   037766      SUBRPC  002372
I$PWR = 000041      L$PROT  020432 G    L10055  031726    PNT   = 001000 G    SVCGBL= 000000
I$RPT = 000041      L$PRT   002112 G    L10056  031766    PRETIM= 000055      SVCINS= 000001
I$SEG = 000041      L$REPP  002062 G    L10057  032514    PRI   = 002000 G    SVCSUB= 000001
I$SETU= 000041      L$REV   002010 G    L10060  032146    PRI00 = 000000 G    SVCTAG= 000001
I$SFT = 000041      L$SOFT  037624 G    L10061  032326    PRI01 = 000040 G    SVCTST= 000001
I$SRV = 000041      L$SPC   002056 G    L10062  032512    PRI02 = 000100 G    SW00  = 000001
I$SUB = 000041      L$SPCP  002020 G    L10063  032740    PRI03 = 000140 G    SW01  = 000002
I$TST = 000041      L$SPTP  002024 G    L10064  033120    PRI04 = 000200 G    SW02  = 000004
J$JMP = 000167      L$STA   002030 G    L10065  034024    PRI05 = 000240 G    SW03  = 000010
LAST    002362      L$SW    002224 G    L10066  033250    PRI06 = 000300 G    SW04  = 000020
LF    = 000012      L$TEST  002114 G    L10067  033366    PRI07 = 000340 G    SW05  = 000040
LLOOP = 000006      L$TIML  002014 G    L10070  033504    PSTACK  002370      SW06  = 000100
LOCATE  024004 G    L$UNIT  002012 G    L10071  033662    P1      036722      SW07  = 000200
LOCRC   002400      L10000  002222      L10072  034022    P2      036740      SW08  = 000400
LOE   = 040000 G    L10001  002226      L10073  034554    P3      036761      SW09  = 001000
LOGDEV  002366      L10002  015110      L10074  036200    R     = 000042      SW10  = 002000
LOT   = 000010 G    L10003  015224      L10075  036424    RBUF    002570      SW11  = 004000
LOWORD  002404      L10004  015454      L10076  036472    RCOUNT= 000044      SW12  = 010000
LPLU  = 004000      L10005  015750      L10077  036542    RCV   = 000004      SW13  = 020000
L$ACP   002110 G    L10006  016046      L10100  036612    RCVBUF  003636      SW14  = 040000
L$APT   002036 G    L10007  016150      L10101  036664    RDI   = 000200      SW15  = 100000
L$AUT   002070 G    L10010  016202      L10102  036722    RDO   = 000200      S$LSYM= 010000
L$AUTO  021744 G    L10011  016234      L10103  037636    RES   = 010000      S1      037636
L$CCP   002106 G    L10012  016266      MAINT = 000400    RESFLG  002356      T     = 000045
L$CLEA  022034 G    L10014  021476      MAINT1= 000010    RESUME  002274      TBUF    002520
L$CO    002032 G    L10015  022032      MAINT2= 000004    RETURN= 000207      TCOUNT= 000044
L$DEPO  002011 G    L10016  022050      MANUF   002310    REV1    025502      TEMP    002336
L$DESC  010244 G    L10017  023132      MCLR  = 040000    REV2    025504      TFLAG   002516
L$DESP  002076 G    L10020  023570      MDIAG = 020000    RFLAG   002566      THRESH= 000013
L$DEVP  002060 G    L10021  023600      MICRO   002256    RLOOP = 000007      TH1L  = 000060
L$DISP  002124 G    L10022  023630      MMANAG  002302    RMODEM= 000017      TH2L  = 000062
L$DLY   002116 G    L10023  024002      MNTMDE  002300    ROMADR  002410      TH3L  = 000064
L$DTP   002040 G    L10024  024060      MNTREC= 000010    ROMI  = 001000      TH4L  = 000066
L$DTYP  002034 G    L10025  025144      MODEM   031124    ROMLOC  025473      TIMER = 000012
L$DU    023602 G    L10026  024346      N     = 000043    ROMO  = 002000      TOLONG= 000020
L$DUT   002072 G    L10027  024770      NAKS  = 000001    RQI   = 000040      TOUT  = 000002
L$DVTY  010236 G    L10030  025142      NESTPC  002374    RRAM  = 000014      TSEL4   035342
L$EF    002052 G    L10031  025606      NEWST   020600    RSEL4   035324      TSEL6   035344
L$ENVI  002044 G    L10032  026114      NEXT    022606    RSEL6   035326      T$ARGC= 000002
```

SYMBOL TABLE

```
T$CODE= 000032          T$TSTM= 177777          T12.4   033506          T6.2    030234          X     = 000046
T$ERRN= 000023          T$TSTS= 000001          T12.5   033664          T6.3    030324          XMTBUF  003236
T$EXCP= 000000          T$$AUT= 010015          T13     034026 G        T6.4    030420          X$ALWA= 000000
T$FLAG= 000040          T$$CLE= 010016          T14     034556 G        T7      030660 G        X$FALS= 000040
T$GMAN= 000000          T$$DU = 010022          T15     036322 G        T7.1    030660          X$OFFS= 000400
T$HILI= 000005          T$$HAR= 010102          T16     036426 G        T7.2    031024          X$TRUE= 000020
T$LAST= 000001          T$$HW = 010000          T17     036474 G        T8      031302 G        $BACC   012270
T$LOLI= 000001          T$$INI= 010014          T18     036544 G        T8.1    031302          $BASEI  011264
T$LSYM= 010000          T$$MSG= 010056          T19     036614 G        T8.2    031524          $BUFFS  013174
T$LTNO= 000023          T$$PRO= 010013          T2      024172 G        T9      032004 G        $CCITT  002416
T$NEST= 177777          T$$SOF= 010103          T2.1    024172          T9.1    032004          $CLRQI  010704
T$NS0 = 000000          T$$SRV= 010024          T2.2    024350          T9.2    032150          $CNTIN  011520
T$NS1 = 000005          T$$SUB= 010072          T2.3    024772          T9.3    032330          $DMRIN  012060
T$NS2 = 000002          T$$SW = 010001          T3      025506 G        JAM   = 000200 G        $ERROR  012402
T$PTNU= 000000          T$$TES= 010101          T4      025640 G        UPDATE= 000011          $HALT   012550
T$SAVL= 177777          T1      023662 G        T4.1    025640          WAIT1   002312          $INOUT  014126
T$SEGL= 177777          T10     032516 G        T4.2    025766          WAIT2   002314          $LOOP   013052
T$SUBN= 000000          T11     032742 G        T5      026666 G        WAIT3   002316          $LSTIN= 000001
T$TAGL= 177777          T12     033122 G        T5.1    026666          WAIT4   002320          $LSTTA= 000001
T$TAGN= 010104          T12.1   033122          T5.2    027050          WMAINT  002306          $MSCLR  011066
T$TEMP= 000000          T12.2   033252          T6      030100 G        WMODEM= 000005          $ROMO   012732
T$TEST= 000023          T12.3   033370          T6.1    030100          WTYPE   002252          $WAIT   010274

. ABS.  040100      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  23264 WORDS  ( 91 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  69 PAGES
CZDMIC.BIN,DB2:CZDMIC.SEQ/C/N:TOC=#SVC34R.MLB,CZDMIC.P11
```

CROSS REFERENCE TABLE (CREF V01-05)

```
$BACC   34-29#  60-36   60-82   61-57   61-59   61-86   61-93   62-34   64-19   64-24   65-77   65-101  65-107  65-134
        67-45   67-49   68-124  68-130
$BASEI  31-36#  56-23   56-56   57-22   57-36   57-55   58-25   58-48   58-67   58-93   59-21   60-19   60-67   61-18
        61-27   61-47   61-80   62-14   64-13   65-20   65-25   65-98   65-128  67-33   68-100  70-64
$BUFFS  40-34#  70-56   71-52   72-31   73-32   74-30
$CCITT  20-151# 40-75   40-154  68-62
$CLRQI  29-29#  31-54   31-78   32-50   33-69   34-45   37-25   48-169  58-38   59-44   59-66
$CNTIN  32-34#  58-28   58-50   58-70   58-102  60-22   60-70   61-50   61-83   62-27   64-16   65-53   67-42   68-109
$DMRIN  33-35#  39-41   41-111  57-25   57-38   57-58   57-67   59-29   59-54   60-31   60-79   62-21   62-24   62-32
$ERROR  35-25#  67-132  68-254  72-45   73-46   74-44
$HALT   37-17#  41-115  56-26   56-59   57-28   57-41   57-70   58-39   58-59   58-73   59-67   60-59   60-96   61-21
        62-62   64-40   67-130  68-253  70-67
$INOUT  41-22#  70-74   71-58   72-37   73-38   74-36
$LOOP   39-22#  58-98   67-39   68-106
$LSTIN  14-21#
$LSTTA  14-22#
$MSCLR  30-36#  54-30   54-39   56-19   56-51   57-18   57-51   58-22   58-64   58-83   59-18   60-16   60-64   61-15
        61-44   61-77   62-11   64-10   65-18   65-44   65-72   65-95   65-125  67-23   68-89   70-58   71-54   72-33
        73-34   74-32
$ROMO   38-17#  53-42   53-81   53-85   53-167
$WAIT   28-37#  31-42   31-74   32-39   32-54   33-48   34-35   37-23   37-27   41-12   58-33   58-54   59-36   59-58
        60-38   60-56   60-84   61-29   61-61   61-95   62-37   64-26   65-27   65-55   65-79   65-109  65-136  67-54
        68-136
A       19-121# 56-39   56-72   56-95   56-97
ADR     19-8#
ASSEMB  14-15   14-15
AX3     20-59#  31-76   45-121* 45-125* 45-130* 45-135* 45-140* 45-146* 48-44
BACCR   19-93#  48-23   48-233  61-57   61-86   64-19   65-77   65-101  65-134  67-45   68-125
BACCT   19-89#  48-25   48-253  60-36   60-82   61-59   61-93   62-34   64-24   65-107  67-49   68-131
BASE    20-185# 35-34   42-69   42-71   42-74   42-74   42-76   42-78   42-81   42-81   42-83   42-85   42-88   42-88
        42-90   42-92   42-95   42-95   48-78   56-23   56-27   56-35   56-37   56-39   56-41   56-43   56-56   56-60
        56-68   56-70   56-72   56-74   56-76   56-86   56-88   56-90   56-92   56-95   56-97   56-99   56-101  56-103
        56-105  57-22   57-30   57-36   57-43   57-55   57-72   57-74   57-76   57-78   57-80   57-90   57-91   57-93
        57-95   57-97   57-99   57-101  57-103  57-105  57-107  57-109  58-25   58-41   58-48   58-67   58-75   58-95
        59-21   60-19   60-67   60-97   60-99   60-110  60-110  61-18   61-47   61-80   62-14   64-13   65-20   65-25
        65-98   65-128  67-35   68-102  70-64
BASEI   19-92#  31-40   41-41   48-27   48-185  48-191
BASEUP  19-57#
BIGBUF  20-197# 40-125
BIT0    19-8#   19-82   30-49   40-122  40-193  48-220  48-240  53-189  57-30   57-43
BIT00   19-8    19-8#
BIT01   19-8    19-8#
BIT02   19-8    19-8#
BIT03   19-8    19-8#
BIT04   19-8    19-8#
BIT05   19-8    19-8#
BIT06   19-8    19-8#
BIT07   19-8    19-8#
BIT08   19-8    19-8#
BIT09   19-8    19-8#
BIT1    19-8#   19-81   58-75
BIT10   19-8#   19-39   19-64   19-65
BIT11   19-8#   19-38   19-62
BIT12   19-8#   19-37   19-59   19-61
BIT13   19-8#   19-36   19-57   48-136  48-146
BIT14   19-8#   19-35   48-125  48-142  48-146  48-299  48-306  61-27   61-57   61-93   68-118  68-121  68-229
```

CROSS REFERENCE TABLE (CREF V01-05)

```
BIT15   19-8#   19-34   48-306  61-27   61-57   61-93   68-226
BIT2    19-8#   19-50   19-79   19-80
BIT3    19-8#   19-77   19-78   45-130
BIT4    19-8#   19-47   19-76   45-125  56-27   56-60   58-34   58-41   58-55   62-32
BIT5    19-8#   19-46   19-75
BIT6    19-8#   19-44   19-54   19-73   19-74   45-135
BIT7    19-8#   19-43   19-53   19-72   45-140
BIT8    19-8#   19-41   19-67   19-68   19-71
BIT9    19-8#   19-40   19-66
BOE     19-8#
BSEL0   20-20#  31-40*  31-73*  32-37*  33-42*  34-32*  41-41*  48-202*  48-207*  48-213*  48-228*  48-233*  48-248*  48-253*
BSEL1   20-21#  45-58*  45-59*
BSEL2   20-22#
BSEL3   20-23#  30-42*  42-44   42-49   42-57   45-62*  45-63*  54-33   54-38   54-42
BSEL4   20-24#
BSEL5   20-25#  45-66*  45-67*
BSEL6   20-26#  31-56   53-43   53-82   53-86   53-168  59-39   59-61   59-76
BSEL7   20-27#  31-76*  45-70*  45-71*  48-44*  55-44   53-83   53-87   53-172
BUFNUM  20-88#  40-96   40-101  40-131  40-133  40-174  40-185  41-26   41-27   41-28   41-29   41-67   42-12   42-18
        42-19   42-20   42-21   70-51*  71-47*  72-25*  73-26*  74-24*
BUFSIZ  20-87#  40-98*  40-103* 40-106* 40-146* 40-147* 40-149* 40-177  40-178  40-189  40-191  42-13
C$AU    14-15#
C$AUTO  14-15#  46-28
C$BRK   14-15#  28-59   29-46   30-70   41-45
C$BSEG  14-15#
C$BSUB  14-15#  53-33   53-59   53-162  56-18   56-50   57-17   57-50   58-21   58-47   58-63   58-81   59-17   59-52
        60-15   60-63   61-14   61-43   61-76   65-16   65-42   65-70   65-94   65-124
C$CEFG  14-15#
C$CLCK  14-15#
C$CLEA  14-15#  47-16
C$CLOS  14-15#
C$CLP1  14-15#
C$CVEC  14-15#  40-113  45-25   46-21   51-45   68-18   68-82   68-245
C$DCLN  14-15#  46-25   51-42
C$DODU  14-15#  46-24   51-41
C$DRPT  14-15#
C$DU    14-15#  49-13
C$EDIT  14-15#  15-11
C$ERDF  14-15#  28-67   28-78   29-52   30-76   32-61   32-66   37-31   37-36   41-59   41-81   41-96   48-37   48-272
        48-283  48-294  48-303  48-334  48-339  48-345  51-55   53-138  53-150  53-182  54-49   56-31   56-46   56-64
        56-79   57-33   57-46   57-83   58-36   58-43   58-57   58-77   59-42   59-64   60-47   60-52   60-88   60-93
        60-102  61-32   61-37   61-64   61-69   61-98   61-103  62-44   62-55   62-60   64-30   64-36   65-31   65-36
        65-59   65-64   65-83   65-88   65-113  65-118  65-140  65-145  67-58   67-68   67-74   67-79   67-87   67-93
        67-98   67-112  67-115  68-85   68-141  68-148  68-154  68-159  68-164  68-170  68-175  68-198  68-250
C$ERHR  14-15#
C$ERRO  14-15#
C$ERSF  14-15#
C$ERSO  14-15#  35-54
C$ESCA  14-15#  54-32   54-41   56-21   56-25   56-53   56-58   57-20   57-24   57-27   57-29   57-40   57-42   57-53
        57-57   57-60   57-69   57-71   58-24   58-27   58-30   58-40   58-52   58-66   58-69   58-72   58-74   58-85
        58-97   58-101  59-20   59-23   59-33   59-37   59-45   59-56   59-59   60-18   60-21   60-24   60-33   60-39
        60-57   60-66   60-69   60-72   60-81   60-85   61-17   61-20   61-22   61-46   61-49   61-52   61-79   61-82
        61-85   61-88   62-13   62-23   62-26   62-29   62-36   62-38   64-12   64-15   64-18   64-27   65-28   65-56
        65-80   65-97   65-100  65-103  65-110  65-127  65-130  65-137  67-25   67-37   67-40   67-43   67-47   67-51
        68-91   68-104  68-107  68-110  68-128  68-134  68-137  70-60   70-66   70-68   71-56   72-35   73-36   74-34
C$ESEG  14-15#
C$ESUB  14-15#  53-56   53-160  53-195  56-48   56-81   57-48   57-85   58-45   58-61   58-79   58-103  59-50   59-69
```

CROSS REFERENCE TABLE (CREF V01-05)

```
        60-61   60-105  61-41   61-74   61-107  65-40   65-68   65-92   65-122  65-149
C$ETST  14-15#  51-47   53-197  54-51   56-83   57-86   58-107  59-71   60-106  61-109  62-65   64-44   65-151  67-134
        68-258  70-83   71-68   72-48   73-53   74-47
C$EXIT  14-15#
C$GETB  14-15#
C$GETW  14-15#
C$GMAN  14-15#
C$GPHR  14-15#  45-48
C$GPLO  14-15#
C$GPRI  14-15#
C$INIT  14-15#  45-171
C$INLP  14-15#
C$MANI  14-15#
C$MEM   14-15#  40-114
C$MSG   14-15#  42-24   42-34   42-61   42-97   42-105  42-111  42-116  42-120  42-126  56-107  57-111  59-77   60-111
C$OPEN  14-15#
C$PNTB  14-15#  28-75   28-84   32-56   42-9    42-10   42-11   42-12   42-13   42-22   42-23   42-30   42-32   42-33
        42-39   42-41   42-46   42-51   42-54   42-59   42-67   42-74   42-81   42-88   42-95   42-102  42-103  42-104
        42-108  42-109  42-110  42-115  42-119  42-125  45-55   45-76   45-163  53-40   53-46   53-140  53-152  53-184
        54-35   56-88   56-92   56-97   56-101  56-105  57-89   57-90   57-93   57-97   57-101  57-105  57-109  59-76
        60-110  68-86   68-251
C$PNTF  14-15#  49-11
C$PNTS  14-15#
C$PNTX  14-15#  51-58
C$QIO   14-15#
C$RDBU  14-15#
C$REFG  14-15#  45-27   45-29   45-31   45-33
C$RESE  14-15#  14-15#  49-10
C$REVI  14-15#  15-11
C$RFLA  14-15#
C$RPT   14-15#
C$SEFG  14-15#
C$SPRI  14-15#  40-48   41-38   41-117  45-10   68-33
C$SVEC  14-15#  40-38   45-93   45-94   46-10   51-21   68-15   68-58   68-235
C$TPRI  14-15#
CD      19-65#
CHIPNO  20-135#
CLKNO   20-125#  30-49   30-62*  45-16*
CMD     19-110#  32-69   37-38   48-360  60-42   60-55   60-58   61-39   61-72   61-105  65-38   65-66   65-90   65-120
        65-147   67-121  68-202
CNTRL   19-90#   28-73   28-76   31-67   32-37   32-59   37-29   48-29   48-213  48-275  60-45   60-86   61-23   61-30
        61-53    61-62   61-89   61-96   62-53   64-21   64-28   65-22   65-29   65-46   65-57   65-74   65-81   65-104
        65-111   65-131  65-138  67-56   68-139
COUNT   20-136#  28-39*  28-60*  62-39
CR      19-143#  75-23   75-24   75-25   75-27   75-27   75-29   75-30   75-32   75-34   75-34   75-35   76-19
CSR     20-15#   20-19   20-20   45-57*  46-12   51-58
CTS     19-61#
DDMC    19-97#
DFPTBL  17-10#
DIAGMC  14-15    14-15
DISCON  19-73#
DMCMDE  20-54#   39-23   45-15*  48-80   48-156  48-188  70-53*  71-49*  72-28*  73-29*  74-27*
DMR     19-68#   48-82   56-23   57-22   57-36   57-55   58-25   58-48   58-67   58-96   59-21   60-19   60-67   61-18
        61-27    61-47   61-80   62-14   64-13   65-20   65-25   65-98   65-128  67-36   68-103  70-64
DMRFLG  20-41#   31-61*  31-64*  32-48*  32-51   32-53*  65-49*
DMRRUN  19-75#   32-64   48-279
DMRVEC  20-13#   45-78*  45-93
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CROSS REFERENCE TABLE (CREF V01-05)

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DMTURN  20-33#  39-29   45-97*  45-123  45-128  45-133  45-138  45-152  45-154  45-157  45-159  48-54   48-97   58-86
        67-26   68-93
DMTVEC  20-14#  45-79*  45-88*  45-94
DTR     19-74#  48-57   48-61
DXERR   19-96#  57-38
ESEND   14-15#
ESLOAD  14-15#  15-11
EF.CON  19-8#   45-33
EF.NEW  19-8#   45-31
EF.PWR  19-8#
EF.RES  19-8#   45-29
EF.STA  19-8#   45-27
EMG1    28-67   29-52   30-76   42-156#
EMG10   42-160# 67-68   68-148
EMG11   42-161# 48-303  48-334  48-345  67-74   67-93   68-154  68-170
EMG12   41-81   42-162# 48-339  67-79   67-98   68-159  68-175
EMG13   42-163# 67-87   68-164
EMG14   42-164# 67-112
EMG15   41-96   42-165# 67-115  68-198
EMG16   42-166# 48-294
EMG17   42-167# 48-37
EMG18   42-168# 48-272
EMG19   42-169# 62-44
EMG2    41-59   42-157#
EMG8    32-61   42-158# 60-47   60-88   61-32   61-64   61-98   62-55   64-30   65-31   65-59   65-83   65-113  65-140
EMG9    28-78   32-66   42-159# 48-283  60-52   60-93   61-37   61-69   61-103  62-60   64-36   65-36   65-64   65-88
        65-118  65-145  67-58   68-141                                                                 :
EMS3    35-54   35-64#
EMS4    37-31   37-36   37-43#
EMT0    51-55   51-62#
EMT1    53-138  53-150  53-203#
EMT10   58-43   58-110#
EMT11   58-57   58-111#
EMT12   58-77   58-112#
EMT13   59-42   59-64   59-80#
EMT2    53-182  53-204#
EMT20   60-102  60-113#
EMT22   68-85   68-250  68-261#
EMT3    54-49   54-53#
EMT4    56-31   56-109#
EMT5    56-46   56-79   56-110#
EMT6    56-64   56-111#
EMT7    57-33   57-46   57-114#
EMT8    57-83   57-115#
EMT9    58-36   58-109#
END     45-35   45-167  45-170#
ERRFLG  20-113# 28-38*  28-68*  28-79*  28-92   29-30*  29-53*  29-61
ERRG1   41-59   42-8#
ERRG10  41-81   42-114#
ERRG11  42-118#
ERRG12  41-96   42-122#
ERRG2   28-67   28-78   29-52   32-61   32-66   37-31   37-36   42-27#  48-37   48-272  48-283  48-303  60-47   60-52
        60-88   60-93   61-32   61-37   61-64   61-69   61-98   61-103  62-55   62-60   64-30   64-36   65-31   65-36
        65-59   65-64   65-83   65-88   65-113  65-118  65-140  65-145  67-58   67-68   67-74   67-79   67-87   67-93
        67-98   67-112  67-115  68-141  68-148  68-154  68-159  68-164  68-170  68-175  68-198
ERRG3   30-76   42-36#  54-49
ERRG4   35-54   42-64#
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CROSS REFERENCE TABLE (CREF V01-05)

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ERRG7   42-101#  48-345
ERRG8   42-107#  48-334   48-339
ERROR   20-119#  28-73    31-67    45-13*   61-23*   61-40*   61-53*   61-73*   61-89*   61-106*  64-21*   64-39*   65-22*   65-39*
        65-46*   65-67*   65-74*   65-91*   65-104*  65-121*  65-131*  65-148*
ERRT1   56-46    56-79    56-85#
ERRT2   59-42    59-64    59-75#
ERRT3   57-83    57-88#
ERRT4   60-102   60-109#
EVL     19-8#
EXERR   19-95#   57-25
F$AU    14-15#
F$AUTO  14-15#   46-8     46-28
F$BGN   14-15#   14-18    42-8     42-27    42-36    42-64    42-101   42-107   42-114   42-118   42-122   44-8     45-8     46-8
        47-9     48-9     48-267   48-367   49-8     51-19    51-47    51-50    53-32    53-33    53-33    53-56    53-59    53-59
        53-160   53-162   53-162   53-195   53-197   54-29    54-32    54-41    54-51    56-17    56-18    56-18    56-21    56-25
        56-48    56-50    56-50    56-53    56-58    56-81    56-83    56-85    57-16    57-17    57-17    57-20    57-24    57-27
        57-29    57-40    57-42    57-48    57-50    57-50    57-53    57-57    57-60    57-69    57-71    57-85    57-86    57-88
        58-20    58-21    58-21    58-24    58-27    58-30    58-40    58-45    58-47    58-47    58-52    58-61    58-63    58-63
        58-66    58-69    58-72    58-74    58-79    58-81    58-81    58-85    58-97    58-101   58-103   58-107   59-15    59-17
        59-17    59-20    59-23    59-33    59-37    59-45    59-50    59-52    59-52    59-56    59-59    59-69    59-71    59-75
        60-14    60-15    60-15    60-18    60-21    60-24    60-33    60-39    60-57    60-61    60-63    60-63    60-66    60-69
        60-72    60-81    60-85    60-105   60-106   60-109   61-13    61-14    61-14    61-17    61-20    61-22    61-41    61-43
        61-43    61-46    61-49    61-52    61-74    61-76    61-76    61-79    61-82    61-85    61-88    61-107   61-109   62-10
        62-13    62-23    62-26    62-29    62-36    62-38    62-65    64-9     64-12    64-15    64-18    64-27    64-44    65-15
        65-16    65-16    65-28    65-40    65-42    65-42    65-56    65-68    65-70    65-70    65-80    65-92    65-94    65-94
        65-97    65-100   65-103   65-110   65-122   65-124   65-124   65-127   65-130   65-137   65-149   65-151   67-11    67-25
        67-37    67-40    67-43    67-47    67-51    67-134   68-12    68-91    68-104   68-107   68-110   68-128   68-134   68-137
        68-258   70-46    70-60    70-66    70-68    70-83    71-46    71-56    71-68    72-24    72-35    72-48    73-24    73-36
        73-53    74-23    74-34    74-47    75-13    76-13    76-30
F$CLEA  14-15#   47-9     47-16
F$DU    14-15#   49-8     49-13
F$END   14-15    14-15    14-15    14-15    14-15    14-15    14-15    14-15    14-15    14-15    14-15    14-15    14-15    14-15
        14-15    14-15    14-15#   14-18    42-24    42-34    42-61    42-97    42-105   42-111   42-116   42-120   42-126   45-171
        46-28    47-16    48-262   48-362   48-371   49-13    51-19    51-19    51-19    51-47    51-47    51-60    53-32    53-32
        53-32    53-33    53-33    53-56    53-56    53-59    53-59    53-160   53-160   53-162   53-162   53-195   53-195   53-197
        53-197   54-29    54-29    54-29    54-32    54-41    54-51    54-51    56-17    56-17    56-17    56-18    56-18    56-21
        56-25    56-48    56-48    56-50    56-50    56-53    56-58    56-81    56-81    56-83    56-83    56-107   57-16    57-16
        57-16    57-17    57-17    57-20    57-24    57-27    57-29    57-40    57-42    57-48    57-48    57-50    57-50    57-53
        57-57    57-60    57-69    57-71    57-85    57-85    57-86    57-86    57-111   58-20    58-20    58-20    58-21    58-21
        58-24    58-27    58-30    58-40    58-45    58-45    58-47    58-47    58-52    58-61    58-61    58-63    58-63    58-66
        58-69    58-72    58-74    58-79    58-79    58-81    58-81    58-85    58-97    58-101   58-103   58-103   58-107   58-107
        59-15    59-15    59-15    59-17    59-17    59-20    59-23    59-33    59-37    59-45    59-50    59-50    59-52    59-52
        59-56    59-59    59-69    59-69    59-71    59-71    59-77    60-14    60-14    60-14    60-15    60-15    60-18    60-21
        60-24    60-33    60-39    60-57    60-61    60-61    60-63    60-63    60-66    60-69    60-72    60-81    60-85    60-105
        60-105   60-106   60-106   60-111   61-13    61-13    61-13    61-14    61-14    61-17    61-20    61-22    61-41    61-41
        61-43    61-43    61-46    61-49    61-52    61-74    61-74    61-76    61-76    61-79    61-82    61-85    61-88    61-107
        61-107   61-109   61-109   62-10    62-10    62-10    62-13    62-23    62-26    62-29    62-36    62-38    62-65    62-65
        64-9     64-9     64-9     64-12    64-15    64-18    64-27    64-44    64-44    65-15    65-15    65-15    65-16    65-16
        65-28    65-40    65-40    65-42    65-42    65-56    65-68    65-68    65-70    65-70    65-80    65-92    65-92    65-94
        65-94    65-97    65-100   65-103   65-110   65-122   65-122   65-124   65-124   65-127   65-130   65-137   65-149   65-149
        65-151   65-151   67-11    67-11    67-11    67-25    67-37    67-40    67-43    67-47    67-51    67-134   67-134   68-12
        68-12    68-12    68-91    68-104   68-107   68-110   68-128   68-134   68-137   68-258   68-258   70-46    70-46    70-46
        70-60    70-66    70-68    70-83    70-83    71-46    71-46    71-46    71-56    71-68    71-68    72-24    72-24    72-24
        72-35    72-48    72-48    73-24    73-24    73-24    73-36    73-53    73-53    74-23    74-23    74-23    74-34    74-47
        74-47    75-19    76-17    76-30
F$HARD  14-15#   75-13    75-19
F$HW    14-15#   17-10    17-24
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CROSS REFERENCE TABLE (CREF V01-05)

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F$INIT  14-15#  45-8    45-171
F$JMP   14-15#
F$MOD   14-15#  14-18   76-30
F$MSG   14-15#  42-8    42-24   42-27   42-34   42-36   42-61   42-64   42-97   42-101  42-105  42-107  42-111  42-114
        42-116  42-118  42-120  42-122  42-126  56-85   56-107  57-88   57-111  59-75   59-77   60-109  60-111
F$PROT  14-15#  44-8    44-14
F$PWR   14-15#
F$RPT   14-15#
F$SEG   14-15#
F$SOFT  14-15#  76-13   76-17
F$SRV   14-15#  48-9    48-262  48-267  48-362  48-367  48-371  51-50   51-60
F$SUB   14-15#  53-33   53-56   53-59   53-160  53-162  53-195  56-18   56-48   56-50   56-81   57-17   57-48   57-50
        57-85   58-21   58-45   58-47   58-61   58-63   58-79   58-81   58-103  59-17   59-50   59-52   59-69   60-15
        60-61   60-63   60-105  61-14   61-41   61-43   61-74   61-76   61-107  65-16   65-40   65-42   65-68   65-70
        65-92   65-94   65-122  65-124  65-149
F$SW    14-15#  18-8    18-12
F$TEST  14-15#  51-19   51-47   53-32   53-197  54-29   54-51   56-17   56-83   57-16   57-86   58-20   58-107  59-15
        59-71   60-14   60-106  61-13   61-109  62-10   62-65   64-9    64-44   65-15   65-151  67-11   67-134  68-12
        68-258  70-46   70-83   71-46   71-68   72-24   72-48   73-24   73-53   74-23   74-47
FINIT1  45-55   45-172#
FINIT2  45-76   45-173#
FINIT3  45-163  45-174#
FLAG    20-100# 53-60*  53-134  53-137*  53-146  53-149*  53-163*  53-178  53-181*
FMDROP  49-11   49-16#
FMG1    42-10   42-32   42-41   42-133#  57-89
FMG10   42-95   42-141#
FMG11   42-108  42-142#
FMG12   42-102  42-143#
FMG13   42-103  42-109  42-144#
FMG14   42-110  42-145#
FMG15   42-104  42-146#
FMG16   42-115  42-147#
FMG17   42-119  42-148#
FMG18   42-125  42-149#
FMG19   42-59   42-150#  54-35
FMG2    42-11   42-33   42-134#
FMG21   42-12   42-151#
FMG22   42-13   42-152#
FMG23   42-22   42-153#
FMG24   42-23   42-154#
FMG3    42-9    42-30   42-39   42-67   42-135#
FMG4    42-46   42-136#
FMG5    42-51   42-54   42-137#
FMG7    42-74   42-138#  60-110
FMG8    42-81   42-139#
FMG9    42-88   42-140#
FMS1    28-75   28-98#
FMS2    28-84   28-99#
FMS3    32-56   32-75#
FMT0    51-58   51-63#
FMT1    53-40   53-198#
FMT11   57-90   57-117#
FMT12   57-93   57-118#
FMT13   57-97   57-119#
FMT14   57-101  57-120#
FMT15   57-105  57-121#
FMT16   57-109  57-122#
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CROSS REFERENCE TABLE (CREF V01-05)

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FMT19   59-76    59-83#
FMT2    53-46    53-199#
FMT25   68-86    68-251   68-262#
FMT3    53-140   53-152   53-200#
FMT4    53-184   53-201#
FMT5    56-88    56-113#
FMT6    56-92    56-114#
FMT7    56-97    56-115#
FMT8    56-101   56-116#
FMT9    56-105   56-117#
FRSPAS  20-47#   45-22*   45-42*
FRSTIM  20-46#   45-19    45-21*
G$CNTO  14-15#
G$DELM  14-15#   28-63    29-49    30-73    41-54
G$DISP  14-15#
G$EXCP  14-15#
G$HILI  14-15#
G$LOLI  14-15#
G$NO    14-15#
G$OFFS  14-15#   75-15    75-16    75-17    76-15
G$OFSI  14-15#   75-15    75-16    75-17    76-15
G$PRMA  14-15#   75-15    75-16
G$PRMD  14-15#   75-17    76-15
G$PRML  14-15#
G$RADA  14-15#
G$RADB  14-15#
G$RADD  14-15#
G$RADL  14-15#
G$RADO  14-15#   75-15    75-16    75-17    76-15
G$XFER  14-15#
G$YES   14-15#   75-15    75-16    75-17    76-15
GETPRM  45-34    45-44#   45-49
HALTC   19-66#   37-34    48-277   65-34    65-62    65-86    65-116   65-143
HDX     19-64#   58-50
HELP    14-3#    14-36    15-13    16-10    22-26
HICRC   20-131#  53-70*   53-111*  53-117   53-118*  53-119*  53-143*  53-144   53-152
HIWORD  20-133#  53-83*   53-87*   53-112*  53-144   53-152
HL1     19-91#   37-20    48-35    48-176   48-228   48-248
HOE     19-8#
I$AU    14-15#
I$AUTO  14-15#   46-8#    46-28#
I$CLN   14-15#   47-9#    47-16#
I$DU    14-15#   49-8#    49-13#
I$HRD   75-13#   75-19#
I$INIT  14-15#   45-8#    45-171#
I$MOD   14-15#   14-18    14-18#   76-30    76-30#
I$MSG   14-15#   42-8#    42-24#   42-27#   42-34#   42-36#   42-61#   42-64#   42-97#   42-101#  42-105#  42-107#  42-111#  42-114#
        42-116#  42-118#  42-120#  42-122#  42-126#  56-85#   56-107#  57-88#   57-111#  59-75#   59-77#   60-109#  60-111#
I$PROT  14-15#   44-8#
I$PTAB  14-15#
I$PWR   14-15#
I$RPT   14-15#
I$SEG   14-15#   51-19    53-32    53-33    53-59    53-162   54-29    56-17    56-18    56-50    57-16    57-17    57-50    58-20
        58-21    58-47    58-63    58-81    59-15    59-17    59-52    60-14    60-15    60-63    61-13    61-14    61-43    61-76
        62-10    64-9     65-15    65-16    65-42    65-70    65-94    65-124   67-11    68-12    70-46    71-46    72-24    73-24
        74-23
I$SETU  14-15#
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CROSS REFERENCE TABLE (CREF V01-05)

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I$SFT   76-13#  76-17#
I$SRV   14-15#  48-9#   48-262#  48-267#  48-362#  48-367#  48-371#  51-50#   51-60#
I$SUB   14-15#  51-19   53-32    53-33    53-33#   53-56    53-56#   53-56#   53-59    53-59#   53-160   53-160#  53-160#  53-162
        53-162# 53-195  53-195#  53-195#  54-29    56-17    56-18    56-18#   56-48    56-48#   56-48#   56-50    56-50#   56-81
        56-81#  56-81#  57-16    57-17    57-17#   57-48    57-48#   57-48#   57-50    57-50#   57-85    57-85#   57-85#   58-20
        58-21   58-21#  58-45    58-45#   58-45#   58-47    58-47#   58-61    58-61#   58-61#   58-63    58-63#   58-79    58-79#
        58-79#  58-81   58-81#   58-103   58-103#  58-103#  59-15    59-17    59-17#   59-50    59-50#   59-50#   59-52    59-52#
        59-69   59-69#  59-69#   60-14    60-15    60-15#   60-61    60-61#   60-61#   60-63    60-63#   60-105   60-105#  60-105#
        61-13   61-14   61-14#   61-41    61-41#   61-41#   61-43    61-43#   61-74    61-74#   61-74#   61-76    61-76#   61-107
        61-107# 61-107# 62-10    64-9     65-15    65-16    65-16#   65-40    65-40#   65-40#   65-42    65-42#   65-68    65-68#
        65-68#  65-70   65-70#   65-92    65-92#   65-92#   65-94    65-94#   65-122   65-122#  65-122#  65-124   65-124#  65-149
        65-149# 65-149# 67-11    68-12    70-46    71-46    72-24    73-24    74-23
I$TST   14-15#  51-19   51-19#   51-47    51-47#   51-47#   53-32    53-32#   53-33    53-59    53-162   53-197   53-197#  53-197#
        54-29   54-29#  54-32    54-41    54-51    54-51#   54-51#   56-17    56-17#   56-18    56-21    56-25    56-50    56-53
        56-58   56-83   56-83#   56-83#   57-16    57-16#   57-17    57-20    57-24    57-27    57-29    57-40    57-42    57-50
        57-53   57-57   57-60    57-69    57-71    57-86    57-86#   57-86#   58-20    58-20#   58-21    58-24    58-27    58-30
        58-40   58-47   58-52    58-63    58-66    58-69    58-72    58-74    58-81    58-85    58-97    58-101   58-107   58-107#
        58-107# 59-15   59-15#   59-17    59-20    59-23    59-33    59-37    59-45    59-52    59-56    59-59    59-71    59-71#
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        60-81   60-85   60-106   60-106#  60-106#  61-13    61-13#   61-14    61-17    61-20    61-22    61-43    61-46    61-49
        61-52   61-76   61-79    61-82    61-85    61-88    61-109   61-109#  61-109#  62-10    62-10#   62-13    62-23    62-26
        62-29   62-36   62-38    62-65    62-65#   62-65#   64-9     64-9#    64-12    64-15    64-18    64-27    64-44    64-44#
        64-44#  65-15   65-15#   65-16    65-28    65-42    65-56    65-70    65-80    65-94    65-97    65-100   65-103   65-110
        65-124  65-127  65-130   65-137   65-151   65-151#  65-151#  67-11    67-11#   67-25    67-37    67-40    67-43    67-47
        67-51   67-134  67-134#  67-134#  68-12    68-12#   68-91    68-104   68-107   68-110   68-128   68-134   68-137   68-258
        68-258# 68-258# 70-46    70-46#   70-60    70-66    70-68    70-83    70-83#   70-83#   71-46    71-46#   71-56    71-68
        71-68#  71-68#  72-24    72-24#   72-35    72-48    72-48#   72-48#   73-24    73-24#   73-36    73-53    73-53#   73-53#
        74-23   74-23#  74-34    74-47    74-47#   74-47#
IBE     19-8#
IDU     19-8#
IECLR   19-47#  41-102  48-162   48-168
IEO     19-54#  41-103  48-89    48-357
IER     19-8#
IESET   19-44#  41-41   41-102   48-185   48-202   48-207   48-213   48-228   48-233   48-248   48-253
INFACE  20-44#  31-65   45-142*  45-145*  48-197
INFLAG  20-106# 41-30*  41-49    48-180   48-256*  48-286
INISR   45-93   48-9#
INRCV   20-91#  41-26*  42-14*   42-18*   42-22    48-110*  48-216   48-220
INTER   19-106# 31-73   48-33    48-193   48-202
INXMIT  20-92#  41-27*  42-15*   42-19*   42-22    48-118*  48-236   48-240
ISP13   19-130# 57-30   57-43    57-90
ISP7    19-129# 56-27   56-60    58-41    58-75
ISR     19-8#
IXE     19-8#
J$JMP   14-15#
L$ACP   15-11#
L$APT   15-11#
L$AUT   15-11#
L$AUTO  15-11   46-8#
L$CCP   15-11#
L$CLEA  15-11   47-9#
L$CO    15-11#
L$DEPO  15-11#
L$DESC  15-11   22-18#
L$DESP  15-11#
L$DEVP  15-11#
L$DISP  15-11   16-8#
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CROSS REFERENCE TABLE (CREF V01-05)

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L$DTYP  15-11#
L$DU    15-11    49-8#
L$DUT   15-11#
L$DVTY  15-11    22-13#
L$EF    15-11#
L$ENVI  15-11#
L$ETP   15-11#
L$EXP1  15-11#
L$EXP4  15-11#
L$EXP5  15-11#
L$HARD  15-11    75-13    75-13#
L$HIME  15-11#   40-44    68-29    68-215
L$HPCP  15-11#
L$HPTP  15-11#
L$HW    15-11    17-10    17-10#
L$ICP   15-11#
L$INIT  15-11    45-8#
L$LADP  15-11#
L$LAST  15-11    76-32#
L$LOAD  15-11#
L$LUN   15-11#
L$MREV  15-11#
L$NAME  15-11#
L$PRIO  15-11#
L$PROT  15-11    44-8#
L$PRT   15-11#
L$REPP  15-11#
L$REV   15-11#
L$SOFT  15-11    76-13    76-13#
L$SPC   15-11#
L$SPCP  15-11#
L$SPTP  15-11#
L$STA   15-11#
L$SW    15-11    18-8     18-8#
L$TEST  15-11#   35-43    41-104
L$TIML  15-11#
L$UNIT  15-11#   45-46
L10000  17-10    17-24#
L10001  18-8     18-12#
L10002  42-24#
L10003  42-34#
L10004  42-61#
L10005  42-97#
L10006  42-105#
L10007  42-111#
L10010  42-116#
L10011  42-120#
L10012  42-126#
L10014  45-171#
L10015  46-28#
L10016  47-16#
L10017  48-262#
L10020  48-362#
L10021  48-371#
L10022  49-13#
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CROSS REFERENCE TABLE (CREF V01-05)

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L10025  53-197#
L10026  53-56#
L10027  53-160#
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L10031  54-32   54-41   54-51#
L10032  56-21   56-25   56-53   56-58   56-83#
L10033  56-48#
L10034  56-81#
L10035  56-107#
L10036  57-20   57-24   57-27   57-29   57-40   57-42   57-53   57-57   57-60   57-69   57-71   57-86#
L10037  57-48#
L10040  57-85#
L10041  57-111#
L10042  58-24   58-27   58-30   58-40   58-52   58-66   58-69   58-72   58-74   58-85   58-97   58-101  58-107#
L10043  58-45#
L10044  58-61#
L10045  58-79#
L10046  58-103#
L10047  59-20   59-23   59-33   59-37   59-45   59-56   59-59   59-71#
L10050  59-50#
L10051  59-69#
L10052  59-77#
L10053  60-18   60-21   60-24   60-33   60-39   60-57   60-66   60-69   60-72   60-81   60-85   60-106#
L10054  60-61#
L10055  60-105#
L10056  60-111#
L10057  61-17   61-20   61-22   61-46   61-49   61-52   61-79   61-82   61-85   61-88   61-109#
L10060  61-41#
L10061  61-74#
L10062  61-107#
L10063  62-13   62-23   62-26   62-29   62-36   62-38   62-65#
L10064  64-12   64-15   64-18   64-27   64-44#
L10065  65-28   65-56   65-80   65-97   65-100  65-103  65-110  65-127  65-130  65-137  65-151#
L10066  65-40#
L10067  65-68#
L10070  65-92#
L10071  65-122#
L10072  65-149#
L10073  67-25   67-37   67-40   67-43   67-47   67-51   67-134#
L10074  68-91   68-104  68-107  68-110  68-128  68-134  68-137  68-258#
L10075  70-60   70-66   70-68   70-83#
L10076  71-56   71-68#
L10077  72-35   72-48#
L10100  73-36   73-53#
L10101  74-34   74-47#
L10102  75-13   75-19#
L10103  76-13   76-17#
LAST    20-117# 48-154* 48-176  48-191  48-193
LF      19-144# 75-23   75-24   75-25   75-27   75-27   75-29   75-30   75-32   75-34   75-34   75-35   76-19
LLOOP   19-141# 39-29   48-54
LOCATE  51-21   51-50#
LOCRC   20-130# 53-68*  53-100* 53-106  53-107* 53-108* 53-130* 53-131  53-140
LOE     19-8#
LOGDEV  20-120# 45-41*  45-45*  45-46   45-48   46-24   49-11   51-41   53-40
LOT     19-8#
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CROSS REFERENCE TABLE (CREF V01-05)

CROSS REFERENCE TABLE (CREF V01-05)

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RCVBUF  20-192# 40-95*  40-128* 40-129* 40-164  40-172  40-173  41-34   41-36   41-65
RDI     19-43#  28-57   29-44   48-14
RDO     19-53#  28-55   31-70   32-69   37-38   48-269  48-360  60-42   60-55   60-58   61-39   61-72   61-105  65-38
        65-66   65-90   65-120  65-147  67-121  68-202
RES     19-59#  31-58   48-92   57-36   58-48   61-27
RESFLG  20-111# 48-93*  48-222  48-231* 48-242  48-251*
RESUME  20-53#  45-14*  48-178  48-218  48-238  48-291  70-52*  71-48*  72-27*  73-28*  74-26*
RETURN  19-135#
REV1    53-43*  53-46   53-208#
REV2    53-44*  53-46   53-209#
RFLAG   20-176# 67-22*  67-85   67-90*  67-122  68-113* 68-162  68-167* 68-203  68-218*
RLOOP   19-142#
RMODEM  19-107# 58-32   58-53   59-35   59-57
ROMADR  20-134# 38-19   38-28   53-39*  53-52*  53-65*  53-84*  53-90*  53-165* 53-192*
ROMI    19-40#  38-20   38-26   38-29   38-35
ROMLOC  53-184  53-206#
ROMO    19-39#  38-36
RQI     19-46#  29-31   31-40   31-73   32-37   33-44   37-20   41-41   48-163  48-185  48-202  48-207  48-213  48-228
        48-233  48-248  48-253  58-32   58-53   59-35   59-57   60-36   60-82   61-57   61-59   61-86   61-93   62-34
        64-19   64-24   65-77   65-101  65-107  65-134  67-45   67-49   68-125  68-131
RRAM    19-105#
RSEL4   68-117* 68-126# 68-168  68-225*
RSEL6   68-118* 68-127# 68-173  68-226*
RUN     19-34#  30-68   42-42
S$LSYM  14-15#  17-24#  18-12#  42-24#  42-34#  42-61#  42-97#  42-105# 42-111# 42-116# 42-120# 42-126# 45-171# 46-28#
        47-16#  48-262# 48-362# 48-371# 49-13#  51-47#  51-60#  53-56#  53-160# 53-195# 53-197# 54-51#  56-48#  56-81#
        56-83#  56-107# 57-48#  57-85#  57-86#  57-111# 58-45#  58-61#  58-79#  58-103# 58-107# 59-50#  59-69#  59-71#
        59-77#  60-61#  60-105# 60-106# 60-111# 61-41#  61-74#  61-107# 61-109# 62-65#  64-44#  65-40#  65-68#  65-92#
        65-122# 65-149# 65-151# 67-134# 68-258# 70-83#  71-68#  72-48#  73-53#  74-47#  75-19#  76-17#
S1      76-15   76-19#
SAVE    20-99#  33-41*  33-54   33-75*
SECN    19-62#
SEL0    20-19#  28-57   29-31*  29-44   30-51*  30-54*  30-68   31-47*  31-70   33-44*  37-20*  38-18*  38-20*  38-25*
        38-26*  38-29*  38-33*  38-35*  38-36*  41-102* 42-10   42-32   42-41   42-42   47-13*  48-12   48-14   48-99*
        48-102* 48-162* 48-163* 48-168* 48-185* 51-32   57-89   58-32*  58-53*  59-35*  59-57*
SEL2    20-16#  20-22   28-55   28-76   32-59   32-69*  37-21*  37-29   37-38*  38-19*  41-103* 42-10   42-32   42-41
        45-60*  45-61*  48-89*  48-269  48-275  48-328  48-357* 48-360* 51-34   57-89   60-42*  60-45   60-55*  60-58*
        60-86   61-30   61-39*  61-62   61-72*  61-96   61-105* 62-53   64-28   65-29   65-38*  65-57   65-66*  65-81
        65-90*  65-111  65-120* 65-138  65-147* 67-56   67-61   67-121* 68-139  68-144  68-202*
SEL4    20-17#  20-24   31-49*  33-56*  34-40*  42-11   42-33   42-103  42-109  45-64*  45-65*  48-78*  48-111* 48-119*
        48-128  48-129* 48-136* 48-142* 48-146* 48-307  48-309* 48-313* 48-318* 48-323* 48-326* 48-331  48-343  51-36
        58-34   58-55   67-72   67-91   68-152  68-168
SEL6    20-18#  20-26   31-51*  31-58   32-44*  32-46   32-64   33-59*  33-64*  33-66*  34-42*  37-34   38-21*  38-30*
        42-11   42-33   42-103  42-109  45-68*  45-69*  48-56*  48-57*  48-60*  48-61*  48-69*  48-72*  48-82*  48-85*
        48-92*  48-112* 48-120* 48-125* 48-277  48-279  48-299  48-306* 48-337  48-349  51-38   60-50   60-91   61-35
        61-67   61-101  62-58   64-33   65-34   65-62   65-86   65-116  65-143  67-77   67-96   68-157  68-173
SFLAG   20-101# 68-114* 68-177  68-211  68-214*
SFPTBL  18-8#
SKIP    20-102#
SPEED   18-10#  45-100
STARES  20-48#  45-38*  45-43*  45-161  53-34
STARST  45-28   45-30   45-37#
START   20-52#  41-32*  48-87   48-199  48-210  48-212*
STLU    19-37#
STREC   19-72#
STUP    19-41#  38-25   38-26   38-33   38-35
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                                                                            D 16
CZDMICO DMR-11 FUNCTIONAL TESTS MACRO V03.01 30-JUL-80 11:38:40 PAGE S-13                                        SEQ  198
CROSS REFERENCE TABLE (CREF V01-05 )

SUBRPC  20-122#  28-42*   28-43*   28-88*   29-34*   29-35*   29-57*   30-37*   30-38*   30-80*   31-37*   31-38*   31-81*   32-35*
        32-36*   32-72*   33-38*   33-39*   33-73*   34-30*   34-31*   34-48*   35-28*   35-29*   35-58*   37-18*   37-19*   37-40*
        39-27*   39-28*   39-48*   40-35*   40-36*   40-205*  41-23*   41-24*   41-119*  42-9     42-28    42-30    42-37    42-39
        42-65    42-67    45-12*
SVCGBL  14-15#   14-26#   15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11
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        15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    16-8     17-10
        17-10    18-8     18-8     22-13    22-18    42-8     42-27    42-36    42-64    42-101   42-107   42-114   42-118   42-122
        44-8     45-8     46-8     47-9     48-9     48-267   48-367   49-8     51-50    56-85    57-88    59-75    60-109   75-13
        76-13    76-32    76-32    76-32    76-32#
SVCINS  14-15#   14-23#   15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11
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        15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11
        15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11    15-11
        15-11    15-11    15-11    16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8
        16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8
        16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8     16-8
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        16-8     16-8     16-8     16-8     16-8     16-8     16-8     17-10    17-10    17-10    18-8     18-8     18-8     22-13
        22-13    22-13    22-13    22-13    22-13    22-18    22-18    22-18    22-18    22-18    22-18    28-59    28-59    28-59
        28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63
        28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-63    28-67    28-67    28-67    28-67
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CROSS REFERENCE TABLE (CREF V01-05)

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	59-52	60-15	60-63	61-14	61-43	61-76	65-16	65-42	65-70	65-94	65-124			
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	46-28	47-16	48-262	48-362	48-371	49-13	51-47	51-60	53-56	53-160	53-195	53-197	54-51	56-48
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CROSS REFERENCE TABLE (CREF V01-05)

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SW02    19-27#
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SW08    19-21#
SW09    19-20#
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SW13    19-16#
SW14    19-15#
SW15    19-14#
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T$$CLE  47-9#   47-16
T$$DU   49-8#   49-13
T$$HAR  75-13   75-13#  75-19
T$$HW   17-10   17-10#  17-24
T$$INI  45-8#   45-171
T$$MSG  42-8#   42-24   42-27#  42-34   42-36#  42-61   42-64#  42-97   42-101# 42-105  42-107# 42-111  42-114# 42-116
        42-118# 42-120  42-122# 42-126  56-85#  56-107  57-88#  57-111  59-75#  59-77   60-109# 60-111
T$$PRO  44-8#
T$$SOF  76-13   76-13#  76-17
T$$SRV  48-9#   48-262  48-267# 48-362  48-367# 48-371  51-50#  51-60
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T$$SW   18-8    18-8#   18-12
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	59-71	59-77	60-61	60-105	60-106	60-111	61-41	61-74	61-107	61-109	62-65	64-44	65-40	65-68
	65-92	65-122	65-149	65-151	67-134	68-258	70-83	71-68	72-48	73-53	74-47	75-19	76-17	
T$LTNO	76-32#													
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	42-120	42-120	42-120	42-120#	42-122	42-122	42-122#	42-126	42-126	42-126	42-126#	44-8	44-8	44-8#
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	48-371	48-371	48-371	48-371#	49-8	49-8	49-8#	49-13	49-13	49-13	49-13#	51-19	51-19	51-19#
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	65-124	65-124	65-124#	65-149	65-149	65-149	65-149#	65-151	65-151	65-151	65-151#	67-11	67-11	67-11#
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	70-83	70-83	70-83	70-83#	71-46	71-46	71-46#	71-68	71-68	71-68	71-68#	72-24	72-24	72-24#
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	74-47	74-47	74-47	74-47#	75-13	75-13	75-13#	75-19	75-19	75-19	75-19#	76-13	76-13	76-13#
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	47-9#	47-16	48-9#	48-262	48-267#	48-362	48-367#	48-371	49-8#	49-13	51-19#	51-47	51-50#	51-60
	53-32#	53-197	54-29#	54-51	56-17#	56-83	56-85#	56-107	57-16#	57-86	57-88#	57-111	58-20#	58-107
	59-15#	59-71	59-75#	59-77	60-14#	60-106	60-109#	60-111	61-13#	61-109	62-10#	62-65	64-9#	64-44
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	74-23#	74-47	75-13#	75-19	76-13#	76-17								
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	60-63#	60-105	61-14#	61-41	61-43#	61-74	61-76#	61-107	65-16#	65-40	65-42#	65-68	65-70#	65-92
	65-94#	65-122	65-124#	65-149										
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T$SAVL	14-15#													
T$SEGL	14-15#													
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CROSS REFERENCE TABLE (CREF V01-05)

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CROSS REFERENCE TABLE (CREF V01-05)

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	68-86	68-86	68-86	68-86	68-86	68-86	68-86	68-86	68-91	68-91	68-91	68-91	68-91	68-91
	68-104	68-104	68-104	68-104	68-104	68-104	68-107	68-107	68-107	68-107	68-107	68-107	68-110	68-110
	68-110	68-110	68-110	68-110	68-128	68-128	68-128	68-128	68-128	68-128	68-134	68-134	68-134	68-134
	68-134	68-134	68-137	68-137	68-137	68-137	68-137	68-137	68-141	68-141	68-141	68-141	68-141	68-141
	68-141	68-141	68-141	68-141	68-141	68-141	68-148	68-148	68-148	68-148	68-148	68-148	68-148	68-148
	68-148	68-148	68-148	68-148	68-154	68-154	68-154	68-154	68-154	68-154	68-154	68-154	68-154	68-154
	68-154	68-154	68-159	68-159	68-159	68-159	68-159	68-159	68-159	68-159	68-159	68-159	68-159	68-159
	68-164	68-164	68-164	68-164	68-164	68-164	68-164	68-164	68-164	68-164	68-164	68-164	68-170	68-170
	68-170	68-170	68-170	68-170	68-170	68-170	68-170	68-170	68-170	68-170	68-175	68-175	68-175	68-175
	68-175	68-175	68-175	68-175	68-175	68-175	68-175	68-175	68-198	68-198	68-198	68-198	68-198	68-198
	68-198	68-198	68-198	68-198	68-198	68-198	68-235	68-235	68-235	68-235	68-235	68-235	68-235	68-235
	68-235	68-235	68-235	68-235	68-235	68-235	68-235	68-235	68-235	68-235	68-245	68-245	68-245	68-245
	68-245	68-245	68-250	68-250	68-250	68-250	68-250	68-250	68-250	68-250	68-250	68-250	68-250	68-250
	68-251	68-251	68-251	68-251	68-251	68-251	68-251	68-251	68-251	68-251	68-251	68-251	68-251	68-251
	68-251	68-251	68-251	68-251	68-258	68-258	68-258	70-60	70-60	70-60	70-60	70-60	70-60	70-66
	70-66	70-66	70-66	70-66	70-66	70-68	70-68	70-68	70-68	70-68	70-68	70-83	70-83	70-83
	71-56	71-56	71-56	71-56	71-56	71-56	71-68	71-68	71-68	72-35	72-35	72-35	72-35	72-35
	72-35	72-48	72-48	72-48	73-36	73-36	73-36	73-36	73-36	73-36	73-53	73-53	73-53	74-34
	74-34	74-34	74-34	74-34	74-34	74-47	74-47	74-47	75-13	75-13	75-13	75-15	75-15	75-15
	75-15	75-15	75-15	75-15	75-15	75-15	75-15	75-15	75-15	75-16	75-16	75-16	75-16	75-16
	75-16	75-16	75-16	75-16	75-16	75-16	75-16	75-17	75-17	75-17	75-17	75-17	75-17	75-17
	75-17	75-17	75-17	75-17	75-17	75-17	75-17	75-17	75-19	75-19	75-19	76-13	76-13	76-13
	76-15	76-15	76-15	76-15	76-15	76-15	76-15	76-15	76-15	76-15	76-15	76-15	76-15	76-15
	76-15	76-17	76-17	76-17	76-32	76-32	76-32	76-32	76-32	76-32	76-32	76-32	76-32	
SVCSUB	14-16#	14-26#	53-33	53-59	53-162	56-18	56-50	57-17	57-50	58-21	58-46	58-62	58-80	59-17
	59-52	60-15	60-63	61-14	61-43	61-76	65-16	65-42	65-70	65-94	65-124			
SVCTAG	14-16#	14-28#	17-24	18-12	42-24	42-34	42-65	42-101	42-109	42-115	42-120	42-124	42-130	45-171
	46-28	47-16	48-262	48-362	48-371	49-13	51-47	51-60	53-56	53-160	53-195	53-197	54-51	56-48
	56-81	56-83	56-107	57-48	57-85	57-86	57-111	58-44	58-60	58-78	58-102	58-106	59-50	59-69

CROSS REFERENCE TABLE (CREF V01-05)

	59-71	59-77	60-61	60-105	60-106	60-111	61-41	61-74	61-107	61-109	62-48	64-44	65-40	65-68
	65-92	65-122	65-149	65-151	67-134	68-258	70-83	71-68	72-48	73-53	74-47	75-19	76-17	
SVCTST	14-16#	14-25#	51-19	53-32	54-29	56-17	57-16	58-20	59-15	60-14	61-13	62-8	64-9	65-15
	67-11	68-12	70-46	71-46	72-24	73-24	74-23							
SW00	19-29#													
SW01	19-28#													
SW02	19-27#													
SW03	19-26#													
SW04	19-25#													
SW05	19-24#													
SW06	19-23#													
SW07	19-22#													
SW08	19-21#													
SW09	19-20#													
SW10	19-19#													
SW11	19-18#													
SW12	19-17#													
SW13	19-16#													
SW14	19-15#													
SW15	19-14#													
T	19-122#	56-41	56-74	56-99	56-101									
T$$AUT	46-8#	46-28												
T$$CLE	47-9#	47-16												
T$$DU	49-8#	49-13												
T$$HAR	75-13	75-13#	75-19											
T$$HW	17-10	17-10#	17-24											
T$$INI	45-8#	45-171												
T$$MSG	42-8#	42-24	42-27#	42-34	42-36#	42-65	42-68#	42-101	42-105#	42-109	42-111#	42-115	42-118#	42-120
	42-122#	42-124	42-126#	42-130	56-85#	56-107	57-88#	57-111	59-75#	59-77	60-109#	60-111		
T$$PRO	44-8#													
T$$SOF	76-13	76-13#	76-17											
T$$SRV	48-9#	48-262	48-267#	48-362	48-367#	48-371	51-50#	51-60						
T$$SUB	53-33#	53-56	53-59#	53-160	53-162#	53-195	56-18#	56-48	56-50#	56-81	57-17#	57-48	57-50#	57-85
	58-21#	58-44	58-46#	58-60	58-62#	58-78	58-80#	58-102	59-17#	59-50	59-52#	59-69	60-15#	60-61
	60-63#	60-105	61-14#	61-41	61-43#	61-74	61-76#	61-107	65-16#	65-40	65-42#	65-68	65-70#	65-92
	65-94#	65-122	65-124#	65-149										
T$$SW	18-8	18-8#	18-12											
T$$TES	51-19#	51-47	53-32#	53-197	54-29#	54-32	54-41	54-51	56-17#	56-21	56-25	56-53	56-58	56-83
	57-16#	57-20	57-24	57-27	57-29	57-40	57-42	57-53	57-57	57-60	57-69	57-71	57-86	58-20#
	58-24	58-27	58-30	58-39	58-51	58-65	58-68	58-71	58-73	58-84	58-96	58-100	58-106	59-15#
	59-20	59-23	59-33	59-37	59-45	59-56	59-59	59-71	60-14#	60-18	60-21	60-24	60-33	60-39
	60-57	60-66	60-69	60-72	60-81	60-85	60-106	61-13#	61-17	61-20	61-22	61-46	61-49	61-52
	61-79	61-82	61-85	61-88	61-109	62-8#	62-11	62-21	62-24	62-27	62-34	62-36	62-48	64-9#
	64-12	64-15	64-18	64-27	64-44	65-15#	65-28	65-56	65-80	65-97	65-100	65-103	65-110	65-127
	65-130	65-137	65-151	67-11#	67-25	67-37	67-40	67-43	67-47	67-51	67-134	68-12#	68-91	68-104
	68-107	68-110	68-128	68-134	68-137	68-258	70-46#	70-60	70-66	70-68	70-83	71-46#	71-56	71-68
	72-24#	72-35	72-48	73-24#	73-36	73-53	74-23#	74-34	74-47					
T$ARGC	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11	15-11#	15-11#	15-11#
	15-11#	15-11#	15-11#	28-73	28-73	28-73#	28-82	28-82	28-82#	32-56	32-56	32-56#	42-9	42-9
	42-9	42-9#	42-9#	42-10	42-10	42-10	42-10	42-10#	42-10#	42-10#	42-11	42-11	42-11	42-11
	42-11#	42-11#	42-11#	42-12	42-12	42-12	42-12#	42-12#	42-13	42-13	42-13	42-13#	42-13#	42-22
	42-22	42-22	42-22	42-22#	42-22#	42-22#	42-23	42-23	42-23	42-23	42-23#	42-23#	42-23#	42-30
	42-30	42-30	42-30#	42-30#	42-32	42-32	42-32	42-32	42-32#	42-32#	42-32#	42-33	42-33	42-33
	42-33	42-33#	42-33#	42-33#	42-39	42-39	42-39	42-39#	42-39#	42-41	42-41	42-41	42-41	42-41#
	42-41#	42-41#	42-46	42-46	42-46#	42-51	42-51	42-51#	42-54	42-54	42-54#	42-59	42-59	42-59#
	42-63	42-63	42-63#	42-71	42-71	42-71	42-71#	42-71#	42-78	42-78	42-78	42-78	42-78#	42-78#
	42-78#	42-85	42-85	42-85	42-85	42-85#	42-85#	42-85#	42-92	42-92	42-92	42-92	42-92#	42-92#

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        42-92#  42-99   42-99   42-99   42-99   42-99#  42-99#  42-99#  42-106  42-106  42-106#  42-107  42-107  42-107
        42-107  42-107# 42-107# 42-107# 42-108  42-108  42-108  42-108# 42-108# 42-112  42-112   42-112# 42-113  42-113
        42-113  42-113  42-113# 42-113# 42-113# 42-114  42-114  42-114  42-114  42-114# 42-114#  42-114# 42-119  42-119
        42-119  42-119  42-119# 42-119# 42-119# 42-123  42-123  42-123  42-123  42-123# 42-123#  42-123# 42-129  42-129
        42-129  42-129  42-129# 42-129# 42-129# 45-55   45-55   45-55   45-55   45-55#  45-55#   45-55#  45-76   45-76
        45-76   45-76   45-76#  45-76#  45-76#  45-163  45-163  45-163# 49-11   49-11   49-11    49-11#  49-11#  51-58
        51-58   51-58   51-58   51-58#  51-58#  51-58#  53-40   53-40   53-40   53-40#  53-40#   53-46   53-46   53-46
        53-46   53-46   53-46   53-46#  53-46#  53-46#  53-46#  53-46#  53-140  53-140  53-140   53-140  53-140  53-140#
        53-140# 53-140# 53-140# 53-152  53-152  53-152  53-152  53-152  53-152# 53-152# 53-152#  53-152# 53-184  53-184
        53-184  53-184  53-184  53-184# 53-184# 53-184# 53-184# 54-35   54-35   54-35#  56-88    56-88   56-88   56-88#
        56-88#  56-92   56-92   56-92   56-92#  56-92#  56-97   56-97   56-97   56-97#  56-97#   56-101  56-101  56-101
        56-101# 56-101# 56-105  56-105  56-105  56-105# 56-105# 57-89   57-89   57-89   57-89    57-89#  57-89#  57-89#
        57-90   57-90   57-90   57-90#  57-90#  57-93   57-93   57-93   57-93#  57-93#  57-97    57-97   57-97   57-97#
        57-97#  57-101  57-101  57-101  57-101# 57-101# 57-105  57-105  57-105  57-105# 57-105#  57-109  57-109  57-109
        57-109# 57-109# 59-76   59-76   59-76   59-76   59-76#  59-76#  59-76#  60-110  60-110   60-110  60-110  60-110#
        60-110# 60-110# 68-86   68-86   68-86   68-86#  68-86#  68-251  68-251  68-251  68-251#  68-251#
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        75-17   75-17#  75-17#  75-17#  76-15   76-15   76-15   76-15#  76-15#  76-15#
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        35-54#  37-31   37-31#  37-36   37-36#  41-59   41-59#  41-81   41-81#  41-96   41-96#   48-37   48-37#  48-272
        48-272# 48-283  48-283# 48-294  48-294# 48-303  48-303# 48-334  48-334# 48-339  48-339#  48-345  48-345# 51-55
        51-55#  53-138  53-138# 53-150  53-150# 53-182  53-182# 54-49   54-49#  56-31   56-31#   56-46   56-46#  56-64
        56-64#  56-79   56-79#  57-33   57-33#  57-46   57-46#  57-83   57-83#  58-35   58-35#   58-42   58-42#  58-56
        58-56#  58-76   58-76#  59-42   59-42#  59-64   59-64#  60-47   60-47#  60-52   60-52#   60-88   60-88#  60-93
        60-93#  60-102  60-102# 61-32   61-32#  61-37   61-37#  61-64   61-64#  61-69   61-69#   61-98   61-98#  61-103
        61-103# 62-39   62-39#  62-44   62-44#  64-30   64-30#  64-36   64-36#  65-31   65-31#   65-36   65-36#  65-59
        65-59#  65-64   65-64#  65-83   65-83#  65-88   65-88#  65-113  65-113# 65-118  65-118#  65-140  65-140# 65-145
        65-145# 67-58   67-58#  67-68   67-68#  67-74   67-74#  67-79   67-79#  67-87   67-87#   67-93   67-93#  67-98
        67-98#  67-112  67-112# 67-115  67-115# 68-85   68-85#  68-141  68-141# 68-148  68-148#  68-154  68-154# 68-159
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        56-53#  56-58   56-58#  56-58#  57-20   57-20#  57-20#  57-24   57-24#  57-24#  57-27    57-27#  57-27#  57-29
        57-29#  57-29#  57-40   57-40#  57-40#  57-42   57-42#  57-42#  57-53   57-53#  57-53#   57-57   57-57#  57-57#
        57-60   57-60#  57-60#  57-69   57-69#  57-69#  57-71   57-71#  57-71#  58-24   58-24#   58-24#  58-27   58-27#
        58-27#  58-30   58-30#  58-30#  58-39   58-39#  58-39#  58-51   58-51#  58-51#  58-65    58-65#  58-65#  58-68
        58-68#  58-68#  58-71   58-71#  58-71#  58-73   58-73#  58-73#  58-84   58-84#  58-84#   58-96   58-96#  58-96#
        58-100  58-100# 58-100# 59-20   59-20#  59-20#  59-23   59-23#  59-23#  59-33   59-33#   59-33#  59-37   59-37#
        59-37#  59-45   59-45#  59-45#  59-56   59-56#  59-56#  59-59   59-59#  59-59#  60-18    60-18#  60-18#  60-21
        60-21#  60-21#  60-24   60-24#  60-24#  60-33   60-33#  60-33#  60-39   60-39#  60-39#   60-57   60-57#  60-57#
        60-66   60-66#  60-66#  60-69   60-69#  60-69#  60-72   60-72#  60-72#  60-81   60-81#   60-81#  60-85   60-85#
        60-85#  61-17   61-17#  61-17#  61-20   61-20#  61-20#  61-22   61-22#  61-22#  61-46    61-46#  61-46#  61-49
        61-49#  61-49#  61-52   61-52#  61-52#  61-79   61-79#  61-79#  61-82   61-82#  61-82#   61-85   61-85#  61-85#
        61-88   61-88#  61-88#  62-11   62-11#  62-11#  62-21   62-21#  62-21#  62-24   62-24#   62-24#  62-27   62-27#
        62-27#  62-34   62-34#  62-34#  62-36   62-36#  62-36#  64-12   64-12#  64-12#  64-15    64-15#  64-15#  64-18
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        65-127# 65-130  65-130# 65-130# 65-137  65-137# 65-137# 67-25   67-25#  67-25#  67-37    67-37#  67-37#  67-40
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        68-134# 68-137  68-137# 68-137# 70-60   70-60#  70-60#  70-66   70-66#  70-66#  70-68    70-68#  70-68#  71-56
        71-56#  71-56#  72-35   72-35#  72-35#  73-36   73-36#  73-36#  74-34   74-34#  74-34#
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T$HILI  75-15   75-15#  75-16   75-16#  75-17   75-17#  76-15   76-15#
T$LAST  14-16#  76-32#
T$LOLI  75-15   75-15#  75-16   75-16#  75-17   75-17#  76-15   76-15#
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	56-81	56-83	56-107	57-48	57-85	57-86	57-111	58-44	58-60	5ɔ-78	58-102	58-106	59-50	59-69
	59-71	59-77	60-61	60-105	60-106	60-111	61-41	61-74	61-107	61-109	62-48	64-44	65-40	65-68
	65-92	65-122	65-149	65-151	67-134	68-258	70-83	71-68	72-48	73-53	74-47	75-19	76-17	
T$LTNO	76-32#													
T$NEST	14-16#	14-19	14-19	14-19#	17-10	17-10	17-10#	17-24	17-24	17-24	17-24#	18-8	18-8	18-8#
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	42-34	42-34	42-34	42-34#	42-36	42-36	42-36#	42-65	42-65	42-65	42-65#	42-68	42-68	42-68#
	42-101	42-101	42-101	42-101#	42-105	42-105	42-105#	42-109	42-109	42-109	42-109#	42-111	42-111	42-111#
	42-115	42-115	42-115	42-115#	42-118	42-118	42-118#	42-120	42-120	42-120	42-120#	42-122	42-122	42-122#
	42-124	42-124	42-124	42-124#	42-126	42-126	42-126#	42-130	42-130	42-130	42-130#	44-8	44-8	44-8#
	44-14	44-14	44-14	44-14#	45-8	45-8	45-8#	45-171	45-171	45-171	45-171#	46-8	46-8	46-8#
	46-28	46-28	46-28	46-28#	47-9	47-9	47-9#	47-16	47-16	47-16	47-16#	48-9	48-9	48-9#
	48-262	48-262	48-262	48-262#	48-267	48-267	48-267#	48-362	48-362	48-362	48-362#	48-367	48-367	48-367#
	48-371	48-371	48-371	48-371#	49-8	49-8	49-8#	49-13	49-13	49-13	49-13#	51-19	51-19	51-19#
	51-47	51-47	51-47	51-47#	51-50	51-50	51-50#	51-60	51-60	51-60	51-60#	53-32	53-32	53-32#
	53-33	53-33	53-33#	53-56	53-56	53-56	53-56#	53-59	53-59	53-59#	53-160	53-160	53-160	53-160#
	53-162	53-162	53-162#	53-195	53-195	53-195	53-195#	53-197	53-197	53-197	53-197#	54-29	54-29	54-29#
	54-51	54-51	54-51	54-51#	56-17	56-17	56-17#	56-18	56-18	56-18#	56-48	56-48	56-48	56-48#
	56-50	56-50	56-50#	56-81	56-81	56-81	56-81#	56-83	56-83	56-83	56-83#	56-85	56-85	56-85#
	56-107	56-107	56-107	56-107#	57-16	57-16	57-16#	57-17	57-17	57-17#	57-48	57-48	57-48	57-48#
	57-50	57-50	57-50#	57-85	57-85	57-85	57-85#	57-86	57-86	57-86	57-86#	57-88	57-88	57-88#
	57-111	57-111	57-111	57-111#	58-20	58-20	58-20#	58-21	58-21	58-21#	58-44	58-44	58-44	58-44#
	58-46	58-46	58-46#	58-60	58-60	58-60	58-60#	58-62	58-62	58-62#	58-78	58-78	58-78	58-78#
	58-80	58-80	58-80#	58-102	58-102	58-102	58-102#	58-106	58-106	58-106	58-106#	59-15	59-15	59-15#
	59-17	59-17	59-17#	59-50	59-50	59-50	59-50#	59-52	59-52	59-52#	59-69	59-69	59-69	59-69#
	59-71	59-71	59-71	59-71#	59-75	59-75	59-75#	59-77	59-77	59-77	59-77#	60-14	60-14	60-14#
	60-15	60-15	60-15#	60-61	60-61	60-61	60-61#	60-63	60-63	60-63#	60-105	60-105	60-105	60-105#
	60-106	60-106	60-106	60-106#	60-109	60-109	60-109#	60-111	60-111	60-111	60-111#	61-13	61-13	61-13#
	61-14	61-14	61-14#	61-41	61-41	61-41	61-41#	61-43	61-43	61-43#	61-74	61-74	61-74	61-74#
	61-76	61-76	61-76#	61-107	61-107	61-107	61-107#	61-109	61-109	61-109	61-109#	62-8	62-8	62-8#
	62-48	62-48	62-48	62-48#	64-9	64-9	64-9#	64-44	64-44	64-44	64-44#	65-15	65-15	65-15#
	65-16	65-16	65-16#	65-40	65-40	65-40	65-40#	65-42	65-42	65-42#	65-68	65-68	65-68	65-68#
	65-70	65-70	65-70#	65-92	65-92	65-92	65-92#	65-94	65-94	65-94#	65-122	65-122	65-122	65-122#
	65-124	65-124	65-124#	65-149	65-149	65-149	65-149#	65-151	65-151	65-151	65-151#	67-11	67-11	67-11#
	67-134	67-134	67-134	67-134#	68-12	68-12	68-12#	68-258	68-258	68-258	68-258#	70-46	70-46	70-46#
	70-83	70-83	70-83	70-83#	71-46	71-46	71-46#	71-68	71-68	71-68	71-68#	72-24	72-24	72-24#
	72-48	72-48	72-48	72-48#	73-24	73-24	73-24#	73-53	73-53	73-53	73-53#	74-23	74-23	74-23#
	74-47	74-47	74-47	74-47#	75-13	75-13	75-13#	75-19	75-19	75-19	75-19#	76-13	76-13	76-13#
	76-17	76-17	76-17	76-17#	76-30	76-30	76-30	76-30#						
T$NS0	14-19#	76-30												
T$NS1	17-10#	17-24	18-8#	18-12	42-8#	42-24	42-27#	42-34	42-36#	42-65	42-68#	42-101	42-105#	42-109
	42-111#	42-115	42-118#	42-120	42-122#	42-124	42-126#	42-130	44-8#	44-14	45-8#	45-171	46-8#	46-28
	47-9#	47-16	48-9#	48-262	48-267#	48-362	48-367#	48-371	49-8#	49-13	51-19#	51-47	51-50#	51-60
	53-32#	53-197	54-29#	54-51	56-17#	56-83	56-85#	56-107	57-16#	57-86	57-88#	57-111	58-20#	58-106
	59-15#	59-71	59-75#	59-77	60-14#	60-106	60-109#	60-111	61-13#	61-109	62-8#	62-48	64-9#	64-44
	65-15#	65-151	67-11#	67-134	68-12#	68-258	70-46#	70-83	71-46#	71-68	72-24#	72-48	73-24#	73-53
	74-23#	74-47	75-13#	75-19	76-13#	76-17								
T$NS2	53-33#	53-56	53-59#	53-160	53-162#	53-195	56-18#	56-48	56-50#	56-81	57-17#	57-48	57-50#	57-85
	58-21#	58-44	58-46#	58-60	58-62#	58-78	58-80#	58-102	59-17#	59-50	59-52#	59-69	60-15#	60-61
	60-63#	60-105	61-14#	61-41	61-43#	61-74	61-76#	61-107	65-16#	65-40	65-42#	65-68	65-70#	65-92
	65-94#	65-122	65-124#	65-149										
T$PTNU	14-16#													
T$SAVL	14-16#													
T$SEGL	14-16#													
T$SUBN	14-16#	51-19#	53-32#	53-33	53-33	53-33#	53-59	53-59	53-59#	53-162	53-162	53-162#	54-29#	56-17#
	56-18	56-18	56-18#	56-50	56-50	56-50#	57-16#	57-17	57-17	57-17#	57-50	57-50	57-50#	58-20#

CROSS REFERENCE TABLE (CREF V01-05)

T$TSTM	14-16#	28-58	28-65	28-73	28-76	28-82	29-46	29-52	30-70	30-76	32-56	32-61	32-66	35-54
	37-31	37-36	40-38	40-48	40-113	40-114	41-38	41-45	41-59	41-81	41-96	41-117	42-9	42-10
	42-11	42-12	42-13	42-22	42-23	42-24	42-30	42-32	42-33	42-34	42-39	42-41	42-46	42-51
	42-54	42-59	42-63	42-65	42-71	42-78	42-85	42-92	42-99	42-101	42-106	42-107	42-108	42-109
	42-112	42-113	42-114	42-115	42-119	42-120	42-123	42-124	42-129	42-130	45-10	45-25	45-27	45-29
	45-31	45-33	45-48	45-55	45-76	45-93	45-94	45-163	45-171	46-10	46-21	46-24	46-25	46-28
	47-16	48-37	48-272	48-283	48-294	48-303	48-334	48-339	48-345	49-10	49-11	49-13	51-21	51-41
	51-42	51-45	51-47	51-55	51-58	53-33	53-40	53-46	53-56	53-59	53-138	53-140	53-150	53-152
	53-160	53-162	53-182	53-184	53-195	53-197	54-32	54-35	54-41	54-49	54-51	56-18	56-21	56-25
	56-31	56-46	56-48	56-50	56-53	56-58	56-64	56-79	56-81	56-83	56-88	56-92	56-97	56-101
	56-105	56-107	57-17	57-20	57-24	57-27	57-29	57-33	57-40	57-42	57-46	57-48	57-50	57-53
	57-57	57-60	57-69	57-71	57-83	57-85	57-86	57-89	57-90	57-93	57-97	57-101	57-105	57-109
	57-111	58-21	58-24	58-27	58-30	58-35	58-39	58-42	58-44	58-46	58-51	58-56	58-60	58-62
	58-65	58-68	58-71	58-73	58-76	58-78	58-80	58-84	58-96	58-100	58-102	58-106	59-17	59-20
	59-23	59-33	59-37	59-42	59-45	59-50	59-52	59-56	59-59	59-64	59-69	59-71	59-76	59-77
	60-15	60-18	60-21	60-24	60-33	60-39	60-47	60-52	60-57	60-61	60-63	60-66	60-69	60-72
	60-81	60-85	60-88	60-93	60-102	60-105	60-106	60-110	60-111	61-14	61-17	61-20	61-22	61-32
	61-37	61-41	61-43	61-46	61-49	61-52	61-64	61-69	61-74	61-76	61-79	61-82	61-85	61-88
	61-98	61-103	61-107	61-109	62-11	62-21	62-24	62-27	62-34	62-36	62-39	62-44	62-48	64-12
	64-15	64-18	64-27	64-30	64-36	64-44	65-16	65-28	65-31	65-36	65-40	65-42	65-56	65-59
	65-64	65-68	65-70	65-80	65-83	65-88	65-92	65-94	65-97	65-100	65-103	65-110	65-113	65-118
	65-122	65-124	65-127	65-130	65-137	65-140	65-145	65-149	65-151	67-25	67-37	67-40	67-43	67-47
	67-51	67-58	67-68	67-74	67-79	67-87	67-93	67-98	67-112	67-115	67-134	68-15	68-18	68-33
	68-58	68-82	68-85	68-86	68-91	68-104	68-107	68-110	68-128	68-134	68-137	68-141	68-148	68-154
	68-159	68-164	68-170	68-175	68-198	68-235	68-245	68-250	68-251	68-258	70-60	70-66	70-68	70-83
	71-56	71-68	72-35	72-48	73-36	73-53	74-34	74-47						
T$TSTS	14-16#	51-19#	53-32#	54-29#	56-17#	57-16#	58-20#	59-15#	60-14#	61-13#	62-8#	64-9#	65-15#	67-11#
	68-12#	70-46#	71-46#	72-24#	73-24#	74-23#								
T1	16-8	51-19#												
T10	16-8	62-8#												
T11	16-8	64-9#												
T12	16-8	65-15#												
T12.1	65-16#													
T12.2	65-42#													
T12.3	65-70#													
T12.4	65-94#													
T12.5	65-124#													
T13	16-8	67-11#												
T14	16-8	68-12#												
T15	16-8	70-46#												
T16	16-8	71-46#												
T17	16-8	72-24#												
T18	16-8	73-24#												
T19	16-8	74-23#												
T2	16-8	53-32#												
T2.1	53-33#													
T2.2	53-59#													
T2.3	53-162#													
T3	16-8	54-29#												
T4	16-8	56-17#												
T4.1	56-18#													
T4.2	56-50#													
T5	16-8	57-16#												
T5.1	57-17#													
T5.2	57-50#													
T6	16-8	58-20#												
T6.1	58-21#													

CROSS REFERENCE TABLE (CREF V01-05)

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T6.2    58-46#
T6.3    58-62#
T6.4    58-80#
T7      16-8    59-15#
T7.1    59-17#
T7.2    59-52#
T8      16-8    60-14#
T8.1    60-15#
T8.2    60-63#
T9      16-8    61-13#
T9.1    61-14#
T9.2    61-43#
T9.3    61-76#
TBUF    20-168# 60-36   60-82   61-59   62-32   64-24   65-107  67-49   67-72   67-102
TCOUNT  20-167# 60-36   60-82   61-59   62-32   64-24   67-49   67-77
TEMP    20-98#  28-44*  28-69   28-80
TFLAG   20-166# 67-21*  67-66   67-71*  67-126  68-112* 68-146  68-151* 68-207  68-217*
TH1L    19-125# 57-76   57-95   57-97
TH2L    19-126# 57-78   57-99   57-101
TH3L    19-127# 57-74   57-103  57-105
TH4L    19-128# 57-80   57-107  57-109
THRESH  19-100# 57-67   60-31   60-79   62-19
TIMER   19-99#  57-58   62-22
TOLONG  19-76#  64-33
TOUT    19-81#  62-42
TSEL4   68-120* 68-132# 68-152  68-228*
TSEL6   68-121* 68-133# 68-157  68-229*
UAM     19-8#
UPDATE  19-98#  41-111
WAIT1   20-81#  28-49   45-113*
WAIT2   20-83#  29-39   30-63   45-116*
WAIT3   20-85#  41-40   45-118*
WAIT4   20-86#  41-40*  41-57*
WMAINT  20-67#  39-25   45-166* 45-169* 48-205  70-47
WMODEM  19-94#  33-54   39-42   48-31   48-207  59-30   59-54   62-30
WTYPE   20-32#  45-50*
X       19-123# 56-43   56-76   56-103  56-105
XSALWA  14-16#
XSFALS  14-16#
XSOFFS  14-16#
XSTRUE  14-16#
XMTBUF  20-189# 40-94*  40-120* 40-125* 40-128  40-152  40-183  40-184  41-35   41-37   41-66
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CROSS REFERENCE TABLE (CREF V01-05)

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BACCIR  26-6#   61-57   61-86   64-19   65-77   65-101  65-134  67-45
BACCIT  26-32#  60-36   60-82   61-59   61-93   62-32   64-24   65-107  67-49
BASEIN  24-6#   56-23   56-56   57-22   57-36   57-55   58-25   58-47   58-66   59-21   60-19   60-67   61-18   61-27
        61-47   61-80   62-12   64-13   65-20   65-25   65-98   65-128  70-64
BCOMPL   1-15#  14-16#  45-28   45-30   45-32
BERROR   1-19#  14-16#  31-55   31-75   37-24   37-26   37-28   67-55
BGNAU    1-23#  14-16#
BGNAUT   1-31#  14-16#  46-8
BGNCLN   1-39#  14-16#  47-9
BGNDU    1-47#  14-16#  49-8
BGNHRD   1-55#  14-16#  75-13
BGNHW    1-66#  14-16#  17-10
BGNINI   1-77#  14-16#  45-8
BGNMOD   1-85#  14-16#  14-19
BGNMSG   1-98#  14-16#  42-8   42-27   42-36   42-68   42-105  42-111  42-118  42-122  42-126  56-85   57-88   59-75
        60-109
BGNPRO   1-106# 14-16#  44-8
BGNPTA   1-114# 14-16#
BGNRPT   1-144# 14-16#
BGNSEG   1-152# 14-16#
BGNSET   1-161# 14-16#
BGNSFT   1-182# 14-16#  76-13
BGNSRV   1-193# 14-16#  48-9   48-267  48-367  51-50
BGNSUB   1-201# 14-16#  53-33   53-59   53-162  56-18   56-50   57-17   57-50   58-21   58-46   58-62   58-80   59-17
        59-52   60-15   60-63   61-14   61-43   61-76   65-16   65-42   65-70   65-94   65-124
BGNSW    1-225# 14-16#  18-8
BGNTST   1-236# 14-16#  51-19   53-32   54-29   56-17   57-16   58-20   59-15   60-14   61-13   62-8    64-9    65-15
        67-11   68-12   70-46   71-46   72-24   73-24   74-23
BNCOMP   1-266# 14-16#  45-34   45-49
BNERRO   1-270# 14-16#  31-43   32-40   32-55   33-50   34-36
BREAK    1-274# 14-16#  28-58   29-46   30-70   41-45
BRESET   1-278# 14-16#  49-10
CALL    23-24#  39-41   48-169  53-42   53-81   53-85   53-167  58-92   58-97   67-33   67-39   67-132  68-100  68-106
        68-124  68-130  68-254  70-56   70-74   71-52   71-58   72-31   72-37   72-45   73-32   73-38   73-46   74-30
        74-36   74-44
CKLOOP   1-282# 14-16#
CLEAR   23-68#  54-30   54-39   56-19   56-51   57-18   57-51   58-22   58-63   58-82   59-18   60-16   60-64   61-15
        61-44   61-77   62-9    64-10   65-18   65-44   65-72   65-95   65-125  67-23   68-89   70-58   71-54   72-33
        73-34   74-32
CLOCK    1-286# 14-16#
CLOSE    1-292# 14-16#
CLRVEC   1-296# 14-16#  40-113  45-25   46-21   51-45   68-18   68-82   68-245
CNTRIN  24-34#  58-28   58-49   58-69   58-101  60-22   60-70   61-50   61-83   62-25   64-16   65-53   67-42   68-109
COMMEN   1-301# 14-16#
DELAY    1-322# 14-16#  28-61   29-49   30-73   41-54
DESCRI   1-317# 14-16#  22-18
DEVTYP   1-341# 14-16#  22-13
DISPAT   1-346# 14-16#  16-8
DISPLA   1-360# 14-16#
DMRIN   25-5#   41-111  57-25   57-38   57-58   57-67   59-54   60-31   60-79   62-19   62-22   62-30
DOCLN    1-376# 14-16#  46-25   51-42
DODU     1-380# 14-16#  46-24   51-41
DORPT    1-385# 14-16#
ENDAU    1-389# 14-16#
ENDAUT   1-401# 14-16#  46-28
ENDCLN   1-413# 14-16#  47-16
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CROSS REFERENCE TABLE (CREF V01-05)

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LASTAD   1-:47#  14-16#  76-32
MSBYTE   1-D00#  14-16#  15-11   15-11   15-11   15-11#
MSCHEC   1-E18#  14-16#
MSCNTO   1-E82#  14-16#  75-15   75-15#  75-16   75-16#  75-17   75-17#  76-15   76-15#
MSCOUN   1-D66#  14-16#  28-73   28-73#  28-82   28-82#  32-56   32-56#  42-9    42-9#   42-10   42-10   42-10#  42-11
         42-11   42-11#  42-12   42-12#  42-13   42-13#  42-22   42-22   42-22#  42-23   42-23   42-23#  42-30   42-30#
         42-32   42-32   42-32#  42-33   42-33   42-33#  42-39   42-39#  42-41   42-41   42-41#  42-46   42-46#  42-51
         42-51#  42-54   42-54#  42-59   42-59#  42-63   42-63#  42-71   42-71#  42-78   42-78   42-78#  42-85   42-85
         42-85#  42-92   42-92   42-92#  42-99   42-99   42-99#  42-106  42-106#  42-107  42-107  42-107#  42-108  42-108#
         42-112  42-112#  42-113  42-113  42-113#  42-114  42-114  42-114#  42-119  42-119  42-119#  42-123  42-123  42-123#
         42-129  42-129  42-129#  45-55   45-55   45-55#  45-76   45-76   45-76#  45-163  45-163#  49-11   49-11#  51-58
         51-58   51-58#  53-40   53-40#  53-46   53-46   53-46   53-46   53-46#  53-140  53-140  53-140  53-140#  53-152
         53-152  53-152  53-152#  53-184  53-184  53-184  53-184#  54-35   54-35#  56-88   56-88#  56-92   56-92#  56-97
         56-97#  56-101  56-101#  56-105  56-105#  57-89   57-89   57-89#  57-90   57-90#  57-93   57-93#  57-97   57-97#
         57-101  57-101#  57-105  57-105#  57-109  57-109#  59-76   59-76   59-76#  60-110  60-110  60-110#  68-86   68-86#
         68-251  68-251#
MSDATA   1-B67#  14-16#  15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11
         15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11   15-11
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         22-13#  22-18   22-18#
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CROSS REFERENCE TABLE (CREF V01-05)

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	40-38	40-38	40-38	40-38#	40-38#	40-38#	40-38#	40-38#	40-38#	40-48	40-48	40-48#	40-48#	40-113
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	42-54	42-54	42-54#	42-54#	42-54#	42-54#	42-59	42-59	42-59	42-59	42-59	42-59#	42-59#	42-59#
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	67-115#	67-115#	67-115#	67-115#	67-134	67-134#	68-15	68-15	68-15	68-15	68-15	68-15	68-15#	68-15#
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	68-58	68-58	68-58	68-58	68-58#	68-58#	68-58#	68-58#	68-58#	68-58#	68-82	68-82	68-82#	68-82#
	68-85	68-85	68-85	68-85	68-85#	68-85#	68-85#	68-85#	68-85#	68-86	68-86	68-86	68-86	68-86
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	68-134#	68-134#	68-137	68-137	68-137#	68-137#	68-141	68-141	68-141	68-141	68-141#	68-141#	68-141#	68-141#
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	68-154#	68-154#	68-154#	68-154#	68-154#	68-159	68-159	68-159	68-159	68-159#	68-159#	68-159#	68-159#	68-159#
	68-164	68-164	68-164	68-164	68-164#	68-164#	68-164#	68-164#	68-164#	68-170	68-170	68-170	68-170	68-170#
	68-170#	68-170#	68-170#	68-170#	68-175	68-175	68-175	68-175	68-175#	68-175#	68-175#	68-175#	68-175#	68-198
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	68-235#	68-235#	68-235#	68-235#	68-235#	68-235#	68-245	68-245	68-245#	68-245#	68-250	68-250	68-250	68-250
	68-250#	68-250#	68-250#	68-250#	68-250#	68-251	68-251	68-251	68-251	68-251	68-251	68-251#	68-251#	68-251#
	68-251#	68-251#	68-258	68-258#	70-60	70-60	70-60#	70-60#	70-66	70-66	70-66#	70-66#	70-68	70-68
	70-68#	70-68#	70-83	70-83#	71-56	71-56	71-56#	71-56#	71-68	71-68#	72-35	72-35	72-35#	72-35#
	72-48	72-48#	73-36	73-36	73-36#	73-36#	73-53	73-53#	74-34	74-34	74-34#	74-34#	74-47	74-47#
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	75-17	75-17	75-17	75-17#	75-19	75-19#	76-13	76-13#	76-15	76-15	76-15	76-15	76-15	76-15#
	76-17	76-17#	76-32	76-32	76-32	76-32#	76-32#	76-32#						
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	65-70	65-70#	65-94	65-94#	65-124	65-124#								
MSGNTA	1-B90#	14-16#	17-24	17-24#	18-12	18-12#	42-24	42-24#	42-34	42-34#	42-65	42-65#	42-101	42-101#
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	53-56	53-56#	53-160	53-160#	53-195	53-195#	53-197	53-197#	54-51	54-51#	56-48	56-48#	56-81	56-81#
	56-83	56-83#	56-107	56-107#	57-48	57-48#	57-85	57-85#	57-86	57-86#	57-111	57-111#	58-44	58-44#
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	59-77	59-77#	60-61	60-61#	60-105	60-105#	60-106	60-106#	60-111	60-111#	61-41	61-41#	61-74	61-74#
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	65-122	65-122#	65-149	65-149#	65-151	65-151#	67-134	67-134#	68-258	68-258#	70-83	70-83#	71-68	71-68#
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MSHNAP	1-B24#	14-16#	15-11	15-11#										
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	42-130#	44-8	44-8	44-8#	44-8#	45-8	45-8	45-8#	45-8#	45-10#	45-25#	45-27#	45-29#	45-31#
	45-33#	45-48#	45-55#	45-76#	45-93#	45-94#	45-163#	45-171#	46-8	46-8	46-8#	46-8#	46-10#	46-21#
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	48-267	48-267#	48-267#	48-272#	48-283#	48-294#	48-303#	48-334#	48-339#	48-345#	48-367	48-367	48-367#	48-367#
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	53-59#	53-59#	53-59#	53-138#	53-140#	53-150#	53-152#	53-160#	53-162	53-162	53-162	53-162#	53-162#	53-162#
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	73-24	73-24#	73-24#	73-24#	73-36#	73-53#	74-23	74-23	74-23	74-23#	74-23#	74-23#	74-34#	74-47#
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	45-27	45-27#	45-29	45-29#	45-31	45-31#	45-33	45-33#	45-48	45-48#	46-21	46-21#	46-24	46-24#
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MSMSK1	1-a77#	14-16#												
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	59-71	59-71#	59-77	59-77#	60-61	60-61#	60-105	60-105#	60-106	60-106#	60-111	60-111#	61-41	61-41#
	61-74	61-74#	61-107	61-107#	61-109	61-109#	62-48	62-48#	64-44	64-44#	65-40	65-40#	65-68	65-68#
	65-92	65-92#	65-122	65-122#	65-149	65-149#	65-151	65-151#	67-134	67-134#	68-258	68-258#	70-83	70-83#
	71-68	71-68#	72-48	72-48#	73-53	73-53#	74-47	74-47#	75-19	75-19#	76-17	76-17#	76-30	76-30#
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	42-71	42-71#	42-78	42-78#	42-85	42-85#	42-92	42-92#	42-99	42-99#	42-106	42-106#	42-107	42-107#