DX11B

DIAGNOSTIC (MAINTENANCE

MD-11-DZDXA-D

CLOCK #1)

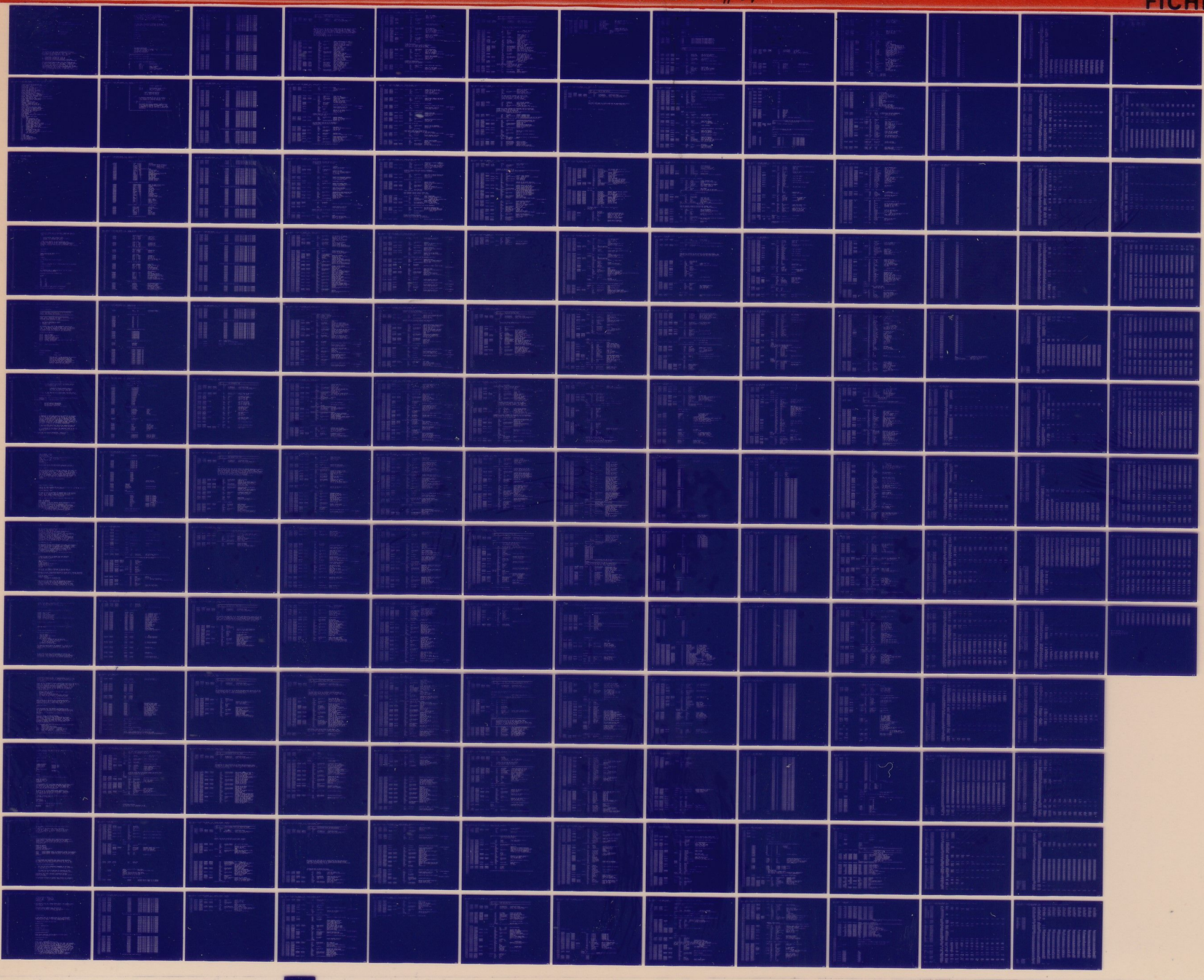
EP-DZDXA-D-DL

FICHE 1 OF 1

JUN 1978

digital

MADE IN USA



```
1
2                                       .REM    :
3
4                                                       IDENTIFICATION
5                                                       **************
6
7
8                                               :
9                                       .REM    :
10                                              PRODUCT CODE:           MAINDEC-11-DZDXA-D-D
11
12                                              PRODUCT NAME:           DX11B DIAGNOSTIC(MAINTENANCE CLOCK #1)
13
14                                              :
15                                      .REM    :
16
17                                              DATE:                   OCTOBER 21, 1974
18
19                                              MAINTAINER:             DIAGNOSTIC GROUP
20
21                                              AUTHOR:                 JOHN FRIEDRICH
22
23
24
25
26
27
28
29                                      COPYRIGHT (c) 1972, 1973, 1974
30                                      DIGITAL EQUIPMENT CORPORATION
31
32
33                                      !
34                                      .REM    !
35
36                                      1.      ABSTRACT
37
38                                              THE FUNCTION OF THE DX11B DIAGNOSTICS IS TO VERIFY
39                                              THAT THE DX11B IMPLEMENTS THE FUNCTIONAL FLOW DIAGRAMS
40                                              ILLUSTRATED IN THE DX11B PRINT SET;  THE DX11
41                                              DIAGNOSTIC PACKAGE CONSISTS OF FOUR TAPES
42
43                                              1,  DZDXA-(REV) MAINTENANCE CLOCK #1
44                                              2,  DXDXF-(REV) MAINTENANCE CLOCK #2
45                                              3,  DZDXS-(REV) DX OFFLINE DIAGNOSTIC EXERCISER
46                                              4,  DZDXH-(REV) DX ONLINE-MAINTENANCE-CABLED EXERCISER
47
48                                              THE DIAGNOSTICS WERE DIVIDED INTO FOUR TAPES BECAUSE
49                                              OF THE 8K WORD MEMORY LIMIT REQUIRED TO SUPPORT MINIMUM
50                                              SYSTEMS AND FOR FUNCTIONAL SAFEGUARDS, IT WAS FELT
51                                              THAT SAFEGUARDS SHOULD BE TAKEN TO INSURE THAT NO ONE
52                                              INADVERTENTLY RAN THE ONLINE-MAINTENANCE-CABLE EXERCISER
53                                              WHILE CONNECTED ONLINE TO IBM.  IT WAS ALSO FELT
54                                              THAT THE FUNCTIONAL SEPARATION OF TESTS WOULD FACILITATE
```

ADAPTION TO ACY11 AND DUP TESTING, THERE ARE ALSO TWO
OTHER MAINDECKS SUPPORTED BY DIAGNOSTICS THAT RUN THE
DX11B1

1, COMMUNICATION TEST PROGRAM (CTP)
2, GENERAL TEST PROGRAM (GTP) WITH DX OVERLAY
3, DEC/X11 WITH DX SOFTWARE MODULE

THESE TESTS OPERATE IN THE MAINTENANCE MODE
AND WERE DESIGNED TO DETECT UNIBUS DEVICE INTERACTION
PROBLEMS, ADDITIONALLY CTP HAS A "RESPONDER" MODE
SO THAT INTERACTION PROBLEMS MAY BE DETECTED WHILE RUNNING
ONLINE,

2. REQUIREMENTS

2.1 EQUIPMENT

PDP11 (MINIMUM 8K WORDS MEMORY)
ASR-33 (OR EQUIVALENT)
DX11B

2.2 STORAGE

ALL PROGRAMS LOAD IN 8K OF MEMORY

2.3 OTHER

A WORKING KNOWLEDGE OF ODT VERSION V8B6A,ODT IS NECESSARY

3, LOADING PROCEDURE

3.1 METHOD

ALL PROGRAMS ARE IN ABSOLUTE FORMAT AND ARE LOADED
USING THE ABSOLUTE LOADER,

ABSOLUTE LOADER START ADDRESS 017B

MEMORY
SIZE

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

3.1.1 LOAD ADDRESS OF ABS LOADER INTO SWITCHES

3.1.2 DEPRESS "LOAD ADDRESS" KEY ON CONSOLE

```
                        5.1.3   DEPRESS "START" KEY ON CONSOLE

                        4.      STARTING PROCEDURE

                                **********************************************************
                                ONLINE DIAGNOSTIC REQUIRES THAT IT BE MAINTENANCE
                                CABLED  -SEE MANUAL FOR DETAILS
                                **********************************************************

                                ************************************************
                                'EVER  NEVER  NEVER RUN THE ONLINE- MAINTENANCE CABLED
                                EXERCISER WHILE CONNECTED TO IBM
                                ************************************************

                                A,  SET SWITCH REGISTER TO @P@28@
                                B,  DEPRESS "LOAD ADDRESS" KEY
                                C,  DEPRESS START

                                THE PROGRAM WILL JUMP TO THE DIAGNOSTIC MONITOR AND
                                TYPE OUT THE OPERATING INSTRUCTIONS,  THIS IS ONCE ONLY
                                CODE,  TO RETYPE THE OPERATING INSTRUCTION THE OPERATOR
                                MAY EITHER RELOAD THE PROGRAM OR LOAD THE ADDRESS
                                "MONITOR" IN THE SWITCH REGISTER AND DEPRESS START;

                        4.1     CONTROL SWITCH SETTINGS

                                SR 15   HALT ON ERROR
                                SR 14   SCOPE ON TEST OR ERROR
                                SR 13   INHIBIT PRINTING
                                SR 12   TYPE SHORT ERROR REPORT
                                SR 11   INHIBIT INTERATIONS
                                SR 10   CONTROL MAINTENANCE CLOCK (MAINT, CLK, TEST ONLY)
                                SR 9    ODT TRAP ON ERROR

                        !
                        .REM !
                                SR 3    ADDRESS UNIQUENESS TEST
                        !
                        .REM    !


                        4.2     STARTING ADDRESSES

                                ADDRESSES               COMMENT

                                @@2@@                   NORMAL START

                                                WITH 2@@ LEFT IN THE SWITCHES THE PROGRAMS
                                                TYPE OUT FULL INSTRUCTIONS ONCE AND
                                                ABBREVIATED INSTRUCTIONS THEREAFTER,
                                                WITH THE SWITCHES ZERO THE PROGRAMS SET
                                                UP EITHER THE DEFAULT OR PREVIOUSLY
                                                SELECTED PARAMETERS AND IMMEDIATELY ASKS
                                                FOR THE DYNAMIC SWITCH SETTINGS
```

```
                        MONITOR         RELOAD TAPE FOR RETYPING OF INSTRUCTIONS

                        @@@@42  IF THIS LOCATION IS CONTAINS THE PROGRAM ASSUMES
                                IT IS RUNNING UNDER ACT11 ON DOS AND USES THE
                                DEFAULT PARAMETERS

                        0,DDT           ENTRANCE TO DDT-11X VERSION V@@@A,OUT
                                        MAY START THE PROGRAM BY TYPE 200$G
                                        <CR>,(MAINTENANCE CLOCK TESTS ONLY)

                        NOTICE! ME WHO USES DDT IN A MEANS OTHER THAN EXPLICITLY
                                DIRECTED BY THIS DOCUMENT DOES SO AT HIS OWN RISK.

                5,      OPERATING PROCEDURE

                        STARTING FROM 200 WITH SR<B7> UP CAUSES THE FOLLOWING GENERAL
                        TYPEOUT!
                MAINDEC-11-D2DXX-X-D  (TEST DESCRIPTION) (APR 74)


                        TYPE!   <D>,FOR DEFAULT PARAMETERS
                                <P>,FOR PREVIOUS PARAMETERS
                                <S>,FOR SELECT PARAMETERS
                                <N>,FOR START WITH THIS TEST NUMBER



                (5, CONT'D)


                        D, P, S, N?

                        IN RESPONSE TO THIS LAST QUESTION THE OPERATOR IS REQUIRED
                        TO TYPE ONE OF THE LETTERS IN THE STRING.  AT AUTO START
                        TIME THE PROGRAM FIRST SETS UP ALL THE DEFAULT PARAMETERS
                        "DEFAULT PARAMETERS" MEANS THE SET OF OPERATING VARIABLES
                        SELECTED AT THE FACTORY.  FOR EXAMPLE, THE DEFAULT ADDRESS
                        IS 176200, THE DEFAULT VECTOR ADDRESS IS 300.  THEREFORE, AT
                        AUTO START TYPING "P" FOR PREVIOUSLY SELECTED PARAMETERS IS
                        EQUIVALENT TO TYPING "D" FOR DEFAULT PARAMETERS.

                        IF ANY CHARACTER OTHER THAN ONE IN THE STRING IS TYPE THE
                        MONITOR WILL REJECT THE CHARACTER AND RETYPE THE STRING.

                        IF, IN RESPONSE TO THE STRING, THE OPERATOR TYPES AN "S" THE
                        SELECTION SEQUENCE IS ENTERED AND THE FOLLOWING DIALOGUE
                        TAKES PLACE.

                NOTE! THESE ARE THE DEFAULT PARAMETERS.  TYPING <U> IS
                      EQUIVALENT TO TYPING THE DEFAULT PARAMETERS.


                        TEST NUMBER! 1
```

```
                                        BASE ADDRESS:  176200
                                        VECTOR ADDRESS:  300
                                        DX PRIORITY LEVEL:  4
                                        TYPE CU ADRS'S IN HEX <CR><LF>; <CR><CR> TERMINATES LIST
                                        ADRS:  12       (THIS IS IN HEX)
                                        DEVICES PER CU:  20     (THIS IS IN OCTAL)
                                        LIST ALL LEGAL COMMANDS
                                        COMMAND:
                                        SET SWITCHES

                                        AT ANY TIME DURING THE "SE"LECTION SEQUENCE A CONTROL C
                                        MAY BE TYPED AND THE MONITOR WILL ASK AGAIN "D,P,S,NT";

                                        "TEST NUMBER:"

                                        HERE THE MONITOR IS ASKING FOR THE NUMBER OF  THE FIRST TEST
                                        IN THE CHAINING SEQUENCE,  THE DEFAULT ANSWER IS "1" ONE,
                                        THE FIRST TEST IN THE CHAIN,  IT MAY BE THAT THE OPERATOR IS
                                        ONLY INTERESTED IN THE LAST FEW TESTS AND THEREFORE WOULD
                                        TYPE 22 OR WHATEVER,  AT THIS WRITING THERE IS NO CHECK TO
                                        SEE IF THE OPERATOR SELECTED A NONEXISTANT TEST NUMBER (E.G.
                                        PI,=2,4 MEG),  SEE TABLE OF CONTENTS IN BEGINNING OF
                                        LISTING.
                                        =TYPING <CR> WILL DEFAULT THIS PARAMETER


                                (5', CONT'D)


                                        "BASE ADDRESS:  176200"

                                        THIS IS THE BASE ADDRESS FOR THE DX11 AND IS ALSO THE ADDRESS OF THE DXDS,
                                        =TYPING <CR> WILL DEFAULT THIS PARAMETER

                                        "VECTOR ADDRESS:  300"

                                        THE DX11 IS CUT TO INTERRUPT TO ADDRESS 300 AT THE FACTORY,
                                        ON SITE THE DX FOLLOWS, DC'S KL'S DP'S, DM'S DN'S, D"BB'S,
                                        DR11'S, DR11A, DR11B, TYPESETTING AND BUS SWITCHES',
                                        =TYPING <CR> WILL DEFAULT THIS PARAMETER

                                        "TYPE CU ADRS'S IN HEX <CR>LF>;<CR><CR> TERMINATES LIST

                                        ADRS:  12 <CR><LF>
                                        ADRS:  2? <CR><CR>
                                        THIS REQUEST IS FOR THE CONTROL UNIT'S HEXIDECIMAL ADDRESS
                                        OR ADDRESSES, CAUTION!!!!!!!!!!!!!!!!!!!!!!!!!!!!
                                        DO NOT EXCEED 16 ENTRIES OF CU ADDRESSES ,,,THE PROGRAM
                                        MAY SELF DESTRUCT,,,,,IF THE SYSTEM REQUIRES THAT THERE BE
                                        MORE THAN 16 CU ADDRESSES THEN THE DIAGNOSTICS MUST BE
                                        RUN AGAIN FOR THOSE EXCEEDING 16        CAUTION!!!!
                                                IN MAINTENANCE CLOCK 1 DIAGNOSTIC THE M900 MUST
                                                NOT BE CUT FOR MORE THAN 16 CU ADDRESSES
```

```
                        THE IBM CONTROL UNITS ADDRESSES ARE SPECIFIED IN HEXADECIMAL,
                        FOR CONTROL UNIT #10(16)  THE
                        RESPONSE TO ADRS: IS 1F(HEX) WHICH IS 00F10000(2),
                        THE DX11 CAN EMULATE UP TO 128(10) CONTROL
                        UNITS WITH 1 DEVICE EACH OR 1 CONTROL UNIT WITH 128(10)
                        DEVICES OR AS IS THE DEFAULT CASE 1 CONTROL UNIT WITH 16(10)
                        DEVICES.  THE ADRS: AND RESPONSE WILL CONTINUE
                        INDEFINITELY AS LONG AS <CR><LF> IS TYPED FOLLOWING THE
                        CU ADDRESS.  THE LIST IS TERMINATED BY TYPING <CR><CR>.
                        NOTE!!!! TYPING <CR><CR> IN RESPONSE TO THE FIRST ADRS:
                        WILL DEFAULT THE CU ADDRESS TO 00 AND WILL ALSO
                        TERMINATE THE LIST.(DEFAULT=10 HEX), THE ACTUAL # MUST BE TYPED IN

                        "DEVICES PER CU:  20"

                        THE RESPONSE TO THIS INPUT REQUEST IS IN OCTAL AND REPRESENTS
                        THE NUMBER OF DEVICES THIS CONTROL UNIT SERVICES.  A DX11
                        EMULATED CONTROL UNIT CAN SERVICE FROM 1 TO 200(8) DEVICES.
                        NOTE!!!! TYPING <CR> IN RESPONSE TO DEVICES PER CU:
                        WILL DEFAULT TO 0, THEREBY CAUSING AN ILLEGAL NUMBER
                        OF DEVICES PER CU MESSAGE!!..THE ACTUAL # MUST
                        BE TYPED IN.(DEFAULT=20 OCTAL)
                        THIS DIAGNOSTIC WILL REJECT  <1 AND >20 DEVICES PER CU

                (5', CONT'D)

                        A CHECK IS MADE HERE TO INSURE THAT THE OPERATOR
                        DID NOT ASSIGN AN IMPOSSIBLE NUMBER OF DEVICES
                        FOR EACH CONTROL UNIT.

                        TYPE CU ADRS'S IN HEX <CR><LF>: <CR><CR> TERMINATES LIST
                        ADRS: F0
                        DEVICES PER CU: A
                        ILLEGAL NUMBER OF DEVICES PER CU
                        DEVICES PER CU: 4
                        LIST ALL LEGAL COMMANDS
                        COMMAND:

                        WHEN A "4" WAS TYPED IN RESPONSE TO DEVICES PER CU:,
                        THE NUMBER WAS ACCEPTED AND THE MONITOR CONTINUED.

            NOTICE: OFFLINE & ONLINE  DIAGNOSTICS REQUIRE AT LEAST TWO CU DEVICE ADDRESSES
                        FOR TESTING MULTIPLEXOR FUNCTIONS!!..THE MUX8 MUST ALSO BE STRAPPED FOR >1

                        "LIST ALL LEGAL COMMANDS"
                        COMMAND: 400<CR>
                        STATUS: ? <CR><LF> TO CONTINUE LIST
                                  <CR><CR> TO TERMINATE LIST

                        THIS FACILITY WAS BUILT INTO THE DIAGNOSTIC TO ENABLE THE
                        OPERATOR TO BUILD HIS OWN DEVICE STATUS TABLE (DST).
                        A <CR> IN RESPONSE TO COMMAND: ASSUMES THE DEFAULT DST!
                        THE FIRST ENTRY MUST BE NONZERO.  THEREFORE IF YOU WISH
                        YOUR FIRST COMMAND TO BE A TIO=0 YOU MUST TYPE IT IN WITH
```

```
                                        PARITY (E.G. 42B).  FOLLOWING THE COMMAND THE MONITOR WILL
                                        ASK FOR THE CORRESPONDING STATUS.
                                        -TYPING <CR> WILL DEFAULT THIS PARAMETER

                                        "SET SWITCHES"


                                        HERE THE MONITOR ASKS FOR THE CONSOLE SWITCH SETTINGS.

                                        SW<15>  HALT ON ERROR
                                        SW<14>  SCOPE LOOP
                                        <SW13>  INHIBIT ERROR PRINTOUT
                                        SW<12>  SHORT ERROR REPORT
                                        SW<11>  INHIBIT ITERATIONS
                                        SW<10>  MAINTENANCE CLOCK CONTROL (MAINTENANCE TESTS ONLY)
                                        SW<9>   ODT TRAP ON ERROR
                                !
                                ,REM !
                                        SW<3>   ADDRESS UNIQUENESS TEST
                                !
                                ,REM !

                                        LOAD THE SWITCH REGISTER WITH THE APPROPRIATE FUNCTION
                                        AND TYPE <CR>.


                                5.2     PROGRAM AND/OR OPERATOR ACTION

                                        THE TYPICAL APPROACH SHOULD BE

                                        1.  HALT ON ERROR
                                            WHEN AN ERROR HALT OCCURS
                                        2.  CLEAR SW<15>
                                        3.  SET SW<14>, SCOPE
                                        4.  TYPE <P> FOR PROCEED IF ODT WAS SELECTED
                                                (SW9=1), OR PRESS CONTINUE ON THE CONSOLE
                                                IF ODT WAS NOT SELECTED SW9=0
                                            IF ERROR IS REPETITIVE;
                                        5.  SET SW<13> AND SCOPE ERROR

                                        THE ERROR PC SHOULD BRING THE OPERATOR TO A POINT IN THE
                                        LISTING WHERE THE ERROR IS DOCUMENTED.  THEN USING THE
                                        PRINTS AND THE FLOWS THE ERROR CAN BE TRACED TO ITS
                                        SOURCE.

                                        !
                                ,REM    !

                                        AT ANY TIME DURING THE INITIALIZATION OR TESTING THE
                                        OPERATOR CAN TYPE CONTROL C AND CONTROL WILL BE RETURNED TO
                                        THE MONITOR.  SOME TESTS ARE 5-10 SECONDS IN DURATION SO
                                        THE RESPONSE TO THE CONTROL C WILL NOT BE INSTANTANEOUS.
                                        !
                                ,REM    !
```

```
379
380                                     THE RESTART ADDRESS IS 200,  IF THIS ADDRESS IS LEFT IN THE
381                                     CONSOLE SWITCH WHEN "START" IS PRESSED THE MONITOR WILL TYPE
382                                     OUT 0,P,S,N?  IF THE SWITCHES ARE ZEROED THE TYPE WILL BE
383                                     "SET SWITCHES",
384
385                                     THERE ARE TWO CALIBRATION TESTS (MAINT CLK1) THAT SHOULD BE RUN IN
386                                     SCOPE MODE(T15 & T16),  IT IS QUITE POSSIBLE THAT USING THE STANDARD
387                                     OPERATIONS PROCEDURE PREVIOUSLY SUGGESTED THAT THE OPERATOR
388                                     WILL FALL NATURALLY INTO THESE CALIBRATION TESTS,  IF THE
389                                     SYSTEM HAS BEEN BROUGHT UP ONCE BEFORE AND THE OPERATOR
390                                     WISHES TO CHECK THE CALIBRATION THE FOLLOWING PROCEDURE
391                                     SHOULD BE FOLLOWED!
392
393                                     1,  EXAMINE TABLE OF CONTENTS FOR THE TEST NUMBER (N) OF
394                                         CALIBRATION ROUTINES,
395                                     2,  TYPE N IN RESPONSE TO O,P,S,N?
396                                     3,  PUT SW<14> UP IN RESPONSE TO "SWITCH SETTINGS"
397                                     4,  TYPE <CR> IF ERROR TYPE OUT OCCURS SET SW<13>,
398
399                             5.2.1   MAINTENANCE CLOCK CONTROL (MAINTENANCE CLK1 & CLK2 DIAG. ONLY)
400
401                                     WHEN SWITCH 10 IS SELECTED AND A MAINTENANCE CLOCK
402                                     PROGRAM IS BEING RUN THE EXECUTION OF THE JSR PC, CLK
403                                     SUBROUTINE WILL CAUSE A BREAK POINT TRAP TO ODT AND A
404                                     TYPEOUT OF THE FOLLOWING FORMAT WILL OCCUR!
405
406                                     AAAAAA BP!NNNNNN
407                                     @
408
409                                     THIS INDICATES THAT THE PROGRAM HAS TRAPPED TO ODT
410                                     AND IS AWAITING THE COMMAND TO "P"ROCEED BEFORE EXECUTING
411                                     THE NUMBER OF MAINTENANCE CLOCK PULSES SPECIFIED BY JSR PC,
412                                     CLK N,
413                                     UPON TYPING "P" THE PROGRAM WILL CONTINUE FROM LOCATION
414                                     AAAAAA,
415
416                                     THIS IS A USEFUL FEATURE IN SEVERAL
417                                     RESPECTS ,  FIRST, IT ALLOWS THE OPERATOR TO SINGLE
418                                     STEP THROUGH THE FLOWS,  THE LISTING AIDS WERE ALSO IN
419                                     THAT IT HIGHLIGHTS THE PHASE AND STATE,  IN ADDITION
420                                     TO WALKING THROUGH THE FLOWS THIS FEATURE ALSO ALLOWS THE
421                                     OPERATOR TO EXAMINE DONE DISPLAYED DX REGISTERS AND
422                                     KEY MEMORY LOCATIONS,
423
424                                     IT IS REQUIRED THAT ONLY THE FOLLOWING ODT COMMANDS BE USED
425                                     N/      OPENS WORD N
426                                     P       PROCEED FROM BREAK POINT
427                                     NJG     GOES TO WORD N AND STARTS PROGRAM
428                                     <CR>    CLOSES OPEN LOCATION     (CARRIAGE RETURN)
429                                     <LF>    OPENS NEXT LOCATION      (LINE FEED)
430                                     ^C      CONTROL C, RETURN TO DIAGNOSTIC MONITOR
431
432                                     ANY OTHER COMMANDS ARE USED AT THE OPERATORS OWN RISK,
```

```
                                    IF OTHER COMMANDS ARE USED THE DX AND THEREFORE THE DIAG-
                                    *OSTIC MAY BEHAVE STRANGELY,  PLEASE RELOAD.

                                    A TYPICAL SEQUENCE

                                    SET SWITCHES

                                    @35536 B*!R17B44
                                    @P                          PROCEE*

                                    @B5648 B*!R17B44
                                    @P                          PROCEE*

                                    @B6B32 B*!R17B44
                                    @176204/@B85@B              EXAMINE DXCS
                                    176206 /@B20@B              EXAMINE DXDS
                                    176210 /@B30*               EXAMINE DXBA
                                    @P                          PROCEED
                                    @B6584 B*!R17B44
                                    @                           CONTROL C
                                    D,P,S,N?                    MONITOR MODE


                             6.     ERRORS

                                    TYPICALLY ERROR REPORTS TAKE THE FOLLOWING FORMAT,

                                    ERROR PC! 817274
                                    ERROR IN TEST!  17
                                    CUADRS/MD! B*@B20
                                    @@1@28742

                                    THIS INDICATES THAT WHILE EXECUTING TEST #17 ON ERROR STATE
                                    WAS DETECTED AND IS DOCUMENTED AT PROGRAM COUNT #17274,
                                    THE CONTRL UNIT UNDER TEST OF THE TIME OF ERROR WAS
                                    28(8) AND THE IB* COMMAND WAS A NOP,  IN SEVERAL CASES
                                    THE COMMAND IS OF NO SIGNIFICANCE,

                                    IF SWITCH 9 IS  UP THE ERROR REPORT GENERATOR WILL
                                    BREAK TO ODT AS INDICATED BY "@@!NNNNNN",  HERE AGAI*
                                    THE POWER OF ODT MAY BE USED TO COLLECT ADDITIONAL
                                    DATA CONCERNING THE FAULT,

                                    A TYPICAL AP*ROACH MIGHT BE (AFTER COLLECTING DATA)!
                                    TYPE CONTROL C, RESULTS!

                                    D,P,S,N? N
                                    TEST NUMBER!  17
                                    SET SWITCHES

                                    IN RESPONSE TO SWITCHES SET THE FOLLOWING

                                    SR<15>=@        HALT ON ERROR
                                    SR<14>=1        SCOPE
```

```
                        TYPE <CR>

                        IF THE ERROR IS REPEATABLE SET SR<13>, INHIBIT PRINT
                        AND GO AT IT,
                NOTICE: A TYPE OUT OF THE FORMAT BE:NNNNNN INDICATES
                        A BREAK POINT ERROR AT NNNNNN, THIS IS AN ODT ERROR
                        AND CAN BE CAUSED BY 1, PLAYING GAMES WITH ODT OR
                        2, AN ILLEGAL BREAK TRAP I,E, T BIT SET OR EXECUTE
                        A 000003,



                (6, CONT'D)

                        DURING MAINTENANCE CLOCK TESTS THERE EXISTS A SUBROUTINE
                        CALLED CHKREG, THIS ROUTINE EXAMINES ALL THE DX11
                        REGISTERS AND VERIFIES THAT THEY ARE IN THE EXPECTED STATE,
                        CHKREG HAS A SPECIAL ERROR TRAP THAT RESULTS IN THE
                        FOLLOWING TEXT:

                        ERROR PC: 017446
                        ERROR IN TEST: 17
                        CUADRS/MD: 000020
                        ORIGIN OF MAP ERROR 017602
                        REGISTER-CONTENTS-MAP

                        DXMI:      176777 000400 (DXMI IS UNREADABLE IGNORE THIS COMPARE)
                        DXCB:      074000 000000 (PHASE AND STATE FLOPS ARE NOT TRACED)
                        DXES:      000014 000010 (ERROR CONDITION IS THAT BIT2 IS SET)
                        00:020742
                        *

                        D,P,S,N?

                        IN THIS REPORT THE REGISTERS ARE NAMED (UNDER REGISTER)
                        AND THERE CONTENTS DUMPED (UNDER CONTENTS) SO THAT IT MAY
                        BE COMPARED WITH THE EXPECTED STATE IN THE MAP (UNDER MAP),

                        THERE ARE TWO ANOMALIES HERE:

                        1,  THE DXMI IS OFTEN UNREADABLE THEREFORE IF THE DXMI
                            IS ALL ONES OR ALMOST ALL ONES DISREGARD THE COMPARISON
                            IT WAS NOT MADE,

                        2,  THE PHASE AND STATES FLOPS ARE NOT COMPARED SO THAT
                            CHKREG CAN BE USED IN ROUTINE WITH FREE RUNNING CLOCKS,

                        THIS MEANS THAT THERE MUST BE A DIFFERENCE BETWEEN
                        CONTENTS AND MAP IN A REGISTER OTHER THAN THE DXMI OR BITS
                        OTHER THAN 074000,

                        THE EXERCISER PROGRAMS DO TUMBLE TABLE TRACING ON INTERRUPT,
                        IN THE EVENT OF A TRACE ERROR THE PROGRAM WILL TYPE OUT:
```

```
                                        ?? TRACE ERROR IN TEST?  N1
                                        ORIGIN OF LAST ?? UPDATE?  N?
                                        ?? ENTRY WAS?      "WHATEVER"
                                        EXPECTED ENTRY?    "WHATEVER +1"
                                        ?? POINTER         N3

                                        THEN PROCEED WITH THE NORMAL ERROR REPORT, THE ADDRESS XXXXXX
                                        SPECIFIES THE LOCATION WHERE THE EXPECTED ?? ENTRIES WERE
                                        LAST UPDATED.

                                        EXERCISER ERROR REPORTS ALSO INDICATE THE
                                        ?X MODE WHEN THE ERROR OCCURRED!  MULTIPLEXOR OR BUSYEN
                                        (DX ONLINE AND DX OFFLINE EXERCISERS ONLY)


                                6.2     ERROR RECOVERY

                                        IN THE EVENT THAT THE DX GETS STUCK IN AN UNRECOVERABLE
                                        PHASE AND STATE WHILE MAINTENANCE CLOCK ENABLE IS SET,
                                        DEPRESS HALT AND START,  THEN LOAD ADDRESS 200 AND START,

                                        ON BREAK POINT ERRORS RELOAD TAPE

                                7,      RESTRICTIONS

                                7.1     STARTING RESTRICTIONS

                                        SEE SECTION 4.2

                                7.2     OPERATING RESTRICTIONS

                                        ********************

                                        NEVER NEVER NEVER RUN THE ONLINE-MAINTENANCE-CABLED
                                        EXERCISER WHILE CONNECTED TO IBM

                                        ********************

                                8,      MISCELLANEOUS

                                        MAINT, CLK1  DIAGNOSTIC ONLY!!!!!!!!!
                                        AT THE END OF THE PROGRAM IT WILL TYPE "END TEST  SET SW3=1?",
                                        THIS IS TO SIGNIFY THAT SW3 MUST BE SET AT LEAST ONCE DURING THE
                                        USE OF THIS DIAGNOSTIC,IT IS NOT NECESSARY TO LEAVE SW3=1
                                        AS IT CONSUMES TOO MUCH DIAGNOSTIC TIME,BASICALLY THIS OPENS
                                        THE TEST THAT CHECKS THAT YOU HAVE CORRECTLY ANSWERED ALL THE
                                        CU ADDRESSES & DEVICES/CU QUESTIONS CORRECTLY,;,,IF YOU LIED
                                        IT WILL CATCH IT, IE, IF YOU ANSWERED  TWE DEVICES PER  CU
                                        WITH 10(8) AND IN ACTUALITY THE DEVICES PER CU ARE CUT TO
                                        4 ON THE M98?, THIS TEST WILL CATCH THE ERROR,
                                                WHEN SW3=1 PROGRAM RUN TIME IS GREATLY INCREASED
                                        AS IT CHECKS ALL OTHER ADDRESSES FOR ADRECC & ADRECD,
```

```
                                        ;X ONLINE & ;X OFFLINE EXER.ISFMS!!!!!!!!
                                        ;THESE PROGRAMS WILL DEFAULT TO AUTOMATICALLY SETTING
                                        ;SW!01 & SW?01 , HOWEVER, TO EXECUTE THEIR FUNCTINS EARLY IN
                                        ;THE PROGRAM RUN TIME. SET THEM BEFORE STRIKING <CR> WHEN
                                        ;THE MONITOR ASKS  "SET SWITCHES"
                                        ;NOTE! AT LEAST 2 DEVICES/C! MUST BE STRAPPED ON "979

                                6.1     EXECUTION TIME

                                        THE EXECUTION TIME OF EACH PROGRAM IS VARIABLE AND IS A
                                        FUNCTION OF THE PROGRAM LENGTH AND THE CONTROL UNIT
                                        ADDRESS STRUCTURE,  IN GENERAL THEY RUN 10 TO 20 MINUTES,

                                9.      PROGRAM DESCRIPTION

                                        CONTAINED WITHIN LISTING,

                                10;     LISTING

                                        FOLLOWING

                                11;     FLOW CHARTS

                                        SEE PRINT SET

                                        !
                                        .LIST   "D


                        .REM    *

                                "AINDEC-11-DFUXA-D-D
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                                146 MAIN ST, MAYNARD, MA, 01754
                                "AINTAINER! DIAGNOSTICS
                                AUTHOR! JOHN FRIEDRICH
                        *
                        ;********************* MOD APR 74 *********************************
                        ;*
                        ;*      REVISED! BY J, ARMSTRONG

                        .SBTTL  DYNAMIC SWITCH SETTINGS (SWR #1)


                        ;*      DYNAMIC SWITCH REGISTER SETTINGS
                        ;*
                        ;*              SWR#            SIGNIFICANCE!
                        ;*              SET = ONE
                        ;*              SWR 15          "HALT ON ERROR"
                        ;*              SWR 14          "SCOPE LOOP"
                        ;*              SWR 13          "INHIBIT ERROR REPORT"
                        ;*              SWR 12          "SHORT ERROR REPORT"
```

A2

```
649                                     ;*              SWR 11          "INHIBIT ITERATIONS"
650                                     ;*
651                                     ;*              SWR 10          "MAINTAINENCE CLOCK CONTROL"
652                                     ;*              SWR 9           "ODT TRAP ON ERROR"
653                                     ;*              SWR 8           "ADDRESS UNIQUENESS TEST"
654                                     ;*
655                                     ;*                      "USER CHANGE INFORMATION"
656                                     ;*                      "DUE TO REVISION APR 74"
657                                     ;*                      "PLEASE READ INFO BELOW"
658                                     ;*
659                                     ;*      NOTE:
660                                     ;*              AN OPERATOR RESPONSE OF "0" TO THE PROGRAM
661                                     ;*              "TTY" REQUEST FOR "DEVICES PER CU:" IS NO
662                                     ;*              LONGER DEFAULTED TO 20 (16 DECIMAL), I.E.
663                                     ;*
664                                     ;*      DEVICES PER CU: 0  "=ILLEGAL ?"
665                                     ;*
666                                     ;*              THE HEADER "CU CHANNEL ADDRES:" USED ON ERRO"
667                                     ;*              OUTPUT HAS BEEN CHANGED TO "CUADRS/MO:", I.E.
668                                     ;*              IT SIGNIF.ES EITHER THE CONTENTS OF THE "DXMO"
669                                     ;*              REGISTER OR THE CONTROL UNIT BASE ADDRESS WHERE
670                                     ;*              MEANINGFULL.
671                                     ;*
672                                     ;********************* "DD APR 74 **********************************
```

```
                                ;DXDS, DX DEVICE STATUS BITS

100000          PARER =100000           ;ERRORS
040000          NXM   = 40000           ;NONEXISTANT MEMORY REFERENCE
020000          SELRST= 20000           ;(PM RESETS) SELECTIVE RESET
010000          SYSRST= 10000           ;            SYSTEM RESET
004000          INFDSC= 4000            ;            INTERFACE DISCONNECT
034000          IBMRST= SELRST!SYSRST!INFDSC
002000          UCHKS = 2000            ;STATUS FLAGS
001000          CHENDS= 1000            ;CHANNEL END SENT
000400          BSYS  =  400            ;BUSY SENT
000200          CHIS  =  200            ;CHANNEL INITIATED SELECTION
000100          ESEND =  100            ;ENQING STATUS END
000040          CHDEND=   40            ;CH DATA END
000020          CUDEND=   20            ;CU DATA END
000010          ISSREJ=   10            ;ISS REJECT
000004          CMDCHN=    4            ;COMMAND CHAINING
000002          STKSTB=    2            ;STACKED STATUS B
000001          CMDREJ=    1            ;COMMAND REJECT

                                ;DXCS,DX CONTROL UNIT STATUS BITS

100000          PARSTP=100000           ;STOP ON BUSO PARITY ERROR
040000          CUFBM = 40000           ;SELECT FORCED BURST
020000          ENDEN = 20000           ;'CUEND'
010000          CS12  = 10000           ;NOT USED
004000          BSYEN =  4000           ;ENABLE SET 'CUBSY'
002000          CS10  =  2000           ;NOT USED
001000          ONLINA=  1000           ;ONLINE A
000400          CUBSY =   400           ;CU BUSY
000200          DONE  =   200           ;FUNCTION DONE
000100          INTEN =   100           ;INTERRUPT
000040          STKSTA=    40           ;STACKED STATUS
000030          XBA   =    30           ;EXTENDED BASE ADDRESS
000006          FCTN  =     6
000001          DXFRS =     1           ;FCTN = 00
000003          DXFI  =     3           ;READ (INPUT)
000005          DXFO  =     5           ;WRITE (OUTPUT)
000007          DXFST =     7           ;STATUS
000001          GO    =     1           ;BEGIN FUNCTION

                        ;DXOS DX OFFSET (CUOR) AND STATUS (CUSR) BITS

200200          ATTEN =200              ;ATTENTION
100100          STAMOD=100              ;STATUS MODIFIER
000040          CUEND =  40             ;CU END
000020          BSY   =  20             ;BUSY
000010          CHEND =  10             ;CH END
000004          DEVEND=   4             ;DEVICE END
000002          UCHECK=   2             ;UNIT CHECK
000001          UEXCEP=   1             ;UNIT EXCEPT

                                ;DXMO DX MAINTENANCE-OUT BITS
```

c2

```
                                        ;SELECTION CONTROL LINES
                        OPLO  =1?8??    ;OPERATIONAL OUT
                        HLDO  = 4???    ;HOLD OUT
                        SELO  = 2???    ;SELECT OUT
                        SUPO  = 1???    ;SUPPRESS OUT

                                        ;TAG LINES
                        ADRO  =  4??    ;ADDRESS OUT
                        CMDO  =  2??    ;COMMAND OUT
                        SRVO  =  1??    ;SERVICE OUT
                        PARO  =   4?    ;PARITY OF/FOR BUS OUT
                ;DXMI DX MAINTENANCE-IN BITS

                        ;SELECTION CONTROL LINES
                        OPLI  =1????    ;OPERATIONAL IN
                        SELI  = 4???    ;SELECT IN
                        REQI  = 2???    ;REQUEST IN

                        ;TAG LINES
                        ADRI  = 1???    ;ADDRESS IN
                        STAI  =  4??    ;STATUS IN
                        SRVI  =  2??    ;SERVICE IN
                        CLKO  =  1??    ;OK TO GO ONLINE (RB)
                        PARI  =   4?    ;BUS PARITY (RB)

                ;DXCR DX CONTROL BITS

                        LOCKO =1?????   ;LOCK OUT
                        PHS   =?74???   ;PHASE = STATE BITS
                        FASTCU=  2???   ;FAST CU
                        SYNC  =  1??    ;SYNCHRONIZATION
                        CUDX  =   4?    ;CU DATA CONTROL
                        IOD   =   2?    ;INPUT OUTPUT DONE

                                        ;NPR CONTROLS
                        BYPAS =   1?    ;BYPASS
                        NPRX  =    4    ;NPR CONTROL SWITCH
                        NPRT  =    2    ;NPR TRANSFER DIRECTION
                        BALF  =    1    ;BUFFERED ALTERNATOR FLOP
                        ONLINB=     4   ;ON LINE TO IBM
                        ADRECC=     2   ;ADDRESS RECOGNITION (CU)
                        ADRECD=     1   ;ADDRESS RECOGNITION (DEVICE)

                ;DXES DX EXTRA SIGNALS

                        MCLKP=1         ;MAINTENANCE CLOCK PULSE
                        MCLKEN=2        ;MAINT. CLK ENABLE
                        SOSIEN=4        ;SRVO-SRVI ENABLE
                        TIMDIS=1?       ;TIMER(5 SEC) DISABLE
                        DXTO=2?         ;DX TIMEOUT (5 SEC)
                        NPRTO=4?        ;NPR TIMEOUT (8 MICROSEC)
                        INTREQ=2?0      ;INTERRUPT REQUEST
```

```
                                ;DXES1 DX EXTRA EXTRA SIGNALS

000001                                  IRS     =1              ;IBM RESET STORED
000002                                  DSCRSP  =2              ;DISCONNECT RESPONSE

                                ;DEFINE REGISTER MAP INDICES

000000                                  DS=     0
000002                                  CA=     2
000004                                  CS=     4
000006                                  DS=     6
000010                                  RA=     10
000012                                  RC=     12
000014                                  MO=     14
000016                                  MI=     16
000020                                  CB=     20
000022                                  WD=     22
000024                                  ES=     24

                                ;PHASE CONTROL FLOPS OF DXCB

000000                                  PHASE0=0^D0
010000                                  PHASE1=1^D0
020000                                  PHASE2=2^D0
030000                                  PHASE3=3^D0
040000                                  PHASE4=4^D0
050000                                  PHASE5=5^D0
060000                                  PHASE6=6^D0
070000                                  PHASE7=7^D0

                                ;TIME STATE FLOP AND STATE DEFINATIO

004000                                  TS0F=4000
004000                                  TS1=4000
000000                                  TS2=0000

                                ;PHASE AND STATE DEFINITIONS

004000                          PHS01=  PHASE0! TS1
000000                          PHS02=  PHASE0! TS2
014000                          PHS11=  PHASE1! TS1
010000                          PHS12=  PHASE1! TS2
024000                          PHS21=  PHASE2! TS1
020000                          PHS22=  PHASE2! TS2
034000                          PHS31=  PHASE3! TS1
030000                          PHS32=  PHASE3! TS2
044000                          PHS41=  PHASE4! TS1
040000                          PHS42=  PHASE4! TS2
054000                          PHS51=  PHASE5! TS1
050000                          PHS52=  PHASE5! TS2
064000                          PHS61=  PHASE6! TS1
060000                          PHS62=  PHASE6! TS2
074000                          PHS71=  PHASE7! TS1
```

```
                        .SBTTL  MISCELLANEOUS DEFINITIONS

                SCOPE=TRAP                      ;SCOPE LOOP TRAP

                        BIT15=100000
                        BIT14=40000
                        BIT13=20000
                        BIT12=10000
                        BIT11=4000
                        BIT10=2000
                        BIT9=1000
                        BIT8=400
                        BIT7=200
                        BIT6=100
                        BIT5=40
                        BIT4=20
                        BIT3=10
                        BIT2=4
                        BIT1=2
                        BIT0=1
                        HERE=0

                ;CHANNEL COMMANDS WITH PARITY

                        TIOC=420                ;TEST I/O
                        WRITEC=401              ;WRITE
                        READC=402               ;READ
                        NOPC=403                ;NOP
                        SENSEC=4                ;SENSE
                        ILLC=405                ;ILLEGAL COMMAND

                ;UTILITY FLAGS

                        INTOK=100000
                        DOFLIN=2                ;SPN BIT FOR NO DST !

                ;CHANNEL STATUS

                        CE=10                   ;CH END
                        DE=4                    ;DEVICE END
                        UC=2                    ;UNIT CHECK
                        ATTN=200                ;ATTENTION
                        SM=1F0                  ;STATUS MODIFIER
                        CUE=40                  ;CU END
                        BSY=20                  ;BUSY

                ;SWITCH DEFINITIONS

                        HLTSW=BIT15             ;HALT ON ERROR
                        LOPSW=BIT14             ;LOOP ON ERROR
                        INHSW=BIT13             ;INHIBIT PRINT
                        SESW=BIT12              ;SHORT ERROR SWITCH
```

```
                        000300          IISW=BIT11              ;INHIBIT ITERATIONS
                        002000          MCCSW=BIT10             ;MAINTENANCE CLOCK CONTROL

                                ;PROCESSOR PRIORITY LEVELS

                        000000          LEVEL0= 00
                        000040          LEVEL1= 40
                        000100          LEVEL2= 100
                        000140          LEVEL3= 140
                        000200          LEVEL4= 200
                        000240          LEVEL5= 240
                        000300          LEVEL6= 300
                        000340          LEVEL7= 340

                                ;REGISTER DEFINITIONS

                        000000          R0=%0
                        000001          R1=%1
                        000002          R2=%2
                        000003          R3=%3
                        000004          R4=%4
                        000005          R5=%5
                        000005          TTY=%5
                        000006          R6=%6
                        000006          SP=%6                   ;STACK POINTER
                        000007          PC=%7                   ;PROGRAM COUNTER

                                TYPE=IOT
                        000240          NOP=240
                        177776          PS=177776               ;PROCESSOR STATUS
                        177570          SWR=177570
                        177570          SR=177570               ;SWITCH REGISTER

                        000000          E=0
                        022220          EMTABLE=EMTAG

                                ;EMT DEFINITIONS

  001074  104000                       ERROR                   ;TRAPS TO T,ERROR
  001076  104001                       MAPERR                  ;TRAPS TO T,MAPERR
  001100  104002                       TRACER                  ;TRAPS TO T,TRACER
  001102  104003                       SAVRG                   ;TRAPS TO T,SAVRG
  001104  104004                       RSTRG                   ;TRAPS TO T,RSTRG
  001106  104005                       ACCEPTO                 ;TRAPS TO T,ACCEPTO
  001110  104006                       KEY,TO,RP                       ;TRAPS TO T,KEY,TO',RP
  001112  104007                       PARITY                  ;TRAPS TO T,PARITY
  001114  104010                       PCH1                    ;TRAPS TO T,PCH1
  001116  104011                       PCH2                    ;TRAPS TO T,PCH2
  001120  104012                       PCH3                    ;TRAPS TO T,PCH3

                                .SBTTL  TRAP DEFINITIONS

                                ;TRAP INITIALIZATION
```

```
                        ;*****************************  MOD APR 74 *****************************
                        ;*                          11/40,11/45 TRACE TRAP
```

H2

```
                                                        JMP     @#MON1,#
                                                RGN21   MOV     #BEGIN,SP
                                                        MOV     #LEVEL7,PS
                                                        JMP     @#MON1?         ;USE PREVIOUS PARAMETERS

                        .SBTTL  DX REGISTERS

                        DXBASE= 176?70
                        DXIV=   30?                     ;DX INTERRUPT VECTOR ADRS
                        DXIS=   302                     ;DX INTERRUPT STATUS
                        DXPRT=  LEVEL4                  ;INT PRIORITY ADRS
                        LESS1=  LEVEL3                  ;DX PRIORITY MINUS ONE
                        DXDS=   176?00                  ;DEVICE STATUS =>TT
                        DXCA=   176?02                  ;COMMAND AND ADDRESS =>TT
                        DXCS=   176?04                  ;CONTROL UNIT STATUS
                        DXOS=   176?06                  ;OFFSET AND STATUS
                        DXBA=   176210                  ;BUS ADDRESS FOR NPR'S
                        DXBC=   176212                  ;BYTE COUNT
                        DXMO=   176214                  ;MAINTENANCE OUT
                        DXMI=   176216                  ;MAINTENANCE IN
                        DXCB=   176220                  ;CONTROL BITS
                        DXND=   176222                  ;NPR DATA
                        DXES=   176224                  ;EXTRA SIGNALS
                        DXMOB=  176226                  ;MAINTENANCE OUT BUFFERED
                        DXESB=  176230                  ;EXTRA EXTRA SIGNALS

                        ;BYTE REGISTERS

                        ;DXCA

                        CUAR=   176?02                  ;CU ADDRESS REGISTER
                        CUCR=   176?03                  ;CU COMMAND REGISTER

                        ;DXOS

                        CUSR=   176?06                  ;CU STATUS REGISTER
                        CUOR=   176?07                  ;CU OFFSET REGISTER

                        ;DXMO

                        BUSO=   176214                  ;IBM BUS OUT
                        CONO=   176215                  ;CONTROL LINES OUT

                        ;DXMI

                        BUSI=   176216                  ;IBM BUS IN
                        CONI=   176217                  ;CONTROL LINES IN

                        ;DXES
                        MISC=   176224                  ;MISCELLANEOUS BITS
                        TTYDX=  176225                  ;TUMBLE TABLE INDEX REG

                        ;DXMOB
```

```
1251
1252  "01352  176226          RUSO"1  176226          ;BUS OUT BUFFERE"
1253  "01354  176227          CONO"1  176227          ;CONTROL OUT BUFFERED
1254
1255                          ;REGISTER" ADDRESSES
1256
1257  "01356  177770          REG21   177770
1258  "01360  177771          REG11   177771
1259  "01362  177772          REG21   177772
1260  "01364  177773          REG31   177773
1261  "01366  177774          REG41   177774
1262  "01370  177775          REG51   177775
1263  "01372  177776          REG61   177776
1264  "01374  177777          REG71   177777
1265
1266                          ;TTY ADDRESSES
1267
1268  "01376  177560          TKS1    177560
1269  "01400  177562          TKB1    177562
1270  "01402  177564          TPS1    177564
1271  "01404  177566          TPB1    177566
1272
1273                          ;REGISTER "RACE TABLE
1274
1275  000406                  REGTT1                  ;REGISTER TRACE TABLE
1276  "01406  "00000          TDXDS1  0               ;DEVICE STATUS TRACE
1277  "01410  "00000          TDXCA1  0               ;COMMAND AND ADDRESS TRACE
1278  "01412  000000          TDXCS1  0               ;CU STATUS TRACE
1279  "01414  "00000          TDXOS1  0               ;OFFSET AND STATUS TRACE
1280  "01416  000000          TDXBA1  0               ;BUS ADDRESS TRACE
1281  "01420  "00000          TDXMO1  0               ;MAINTENANCE.OUT TRACE
1282  "01422  000000          TDXMI1  0               ;MAINTENANCE.IN TRACE
1283  "01424  "00000          TDXCB1  0               ;CONTROL BIT TRACE
1284  "01426  "00000          TDXND1  0               ;NPR DATA TRACE
1285  "01430  "00000          TDXES1  0               ;EXTRA SIGNAL TRACE
1286  "01432  "00000          TDXES11 0               ;EXTRA SIGNAL TRACE 1
1287  "01434  "00000          TTYNDX1 0               ;TTYNDX TRACE
1288
1289
1290                          ;STATUS POINTER "ORD ADDRESS
1291
1292  "01436  "02000          SPW1    2000
1293
1294                          ;TUMBLE TABLE ADDRESS
1295
1296  "01440  "03000          TT1     3000
1297
1298                          ;DEVICE STATUS TABLE ADDRESS
1299
1300  "01442  "37470          DST1    DSTADRS         ;DST MUST BE MOD(400)
1301
1302                          .SBTTL  LEGAL ADDRESS RESOLUTION SUBROUTINE LARS
1303                          ;********************** MOD APR 74 ******************************
1304                          ;*      THIS ROUTINE VERIFIES THAT THE CONTENTS OF THE "0XMO"
```

```
1105                                        ;*      AND THE "CJAR" REGISTERS SATISFY THE "M9900" MODULE
1106                                        ;*      SELECTION REQUIREMENTS FOR THE SETTING OF THE "DXCB"
1107                                        ;*      BITS 1 AND 0 "ADRECC + ADRECC",
1108                                        ;*
1109  001444  005037  021696          LARS:  CLR     CBMAPS          ;INITAILIZE VERIFICATION CONTROL
1110  001450  010027                         MOV     R0,(PC)+                ;SAVE R0
1111  001452  000000                  XXS1:  .
1112  001454  012700  025034                 MOV     #LEGAL,ADRS,R0  ;FETCH TABLE SCAN BASE
1113  001460  117727  177624                 MOVB    @DXMD,(PC)+
1114  001464  000000                  LOCMD: .                       ;RECORDED DXMD CONTENTS
1115  001466  142737  000017  001464         BICB    #17,LOCMD
1116  001474  012027                  WLS:   MOV     (R0)+,(PC)+
1117  001476  000000                  ZXX:   .                       ;RECORDED SCAN ENTRY
1118  001502  042737  000017  001476         BIC     #17,ZXX
1119  001506  123737  001464  001476         CMPB    LOCMD,ZXX       ;CHECK "DXMD" RANGE COMPARE
1120  001514  001474                         BEQ     RANGE           ;(YES) BRANCHES
1121  001516  022710  177777                 CMP     #-1,(R0)        ;CHECK SCAN COMPLETED
1122  001522  001364                         BNE     #1$             ;(NO) BRANCHES
1123  001524  000446                         BR      OUTSS           ;(YES) EXIT
1124                                        ;*
1125                                        ;*      ENTRY AT RANGE BELOW SIGNIFIES "DXMD" IS WITHIN "M9900"
1126                                        ;*      SELECTION RANGE AND IS CAPABLE OF GENERATING EITHER
1127                                        ;*      ADRECC OR ADRECD + ADRECC,
1128                                        ;*
1129  001526  117727  177574          RANGE: MOVB    @CJAR,(PC)+
1130  001532  000000                  LOCAR: .                       ;RECORDED CJAR CONTENTS
1131  001534  143737  024222  001532         BICB    @DXX,LOCAR
1132  001542  127777  177960  177940         CMPB    @CJAR,@DXMD     ;TEST FOR ADRECC + ADRECD
1133  001550  001003                         BNE     2$              ;(NO) BRANCHES
1134                                        ;*      ADRECC+ADRECD COMPARE SET DXCB BITS 1 + 0
1135  001552  052737  000003  021696         BIS     #3,CBMAPS
1136  001560  117737  177524  001464  2$:    MOVB    @DXMD,LOCMD
1137  001566  143737  024222  001464         BICB    @DXX,LOCMD
1138  001574  042737  000360  001464         BIC     #360,LOCMD
1139  001602  042737  000360  001532         BIC     #360,LOCAR
1140  001610  123737  001464  001532         CMPB    LOCMD,LOCAR     ;TEST FOR ADRECC
1141  001616  001003                         BNE     OUTSS           ;(NO) BRANCHES
1142                                        ;*      ADDRESS COMPARE SET DXCB BIT 1
1143  001620  052737  000002  021696         BIS     #2,CBMAPS       ;(YES) SET DXCB BIT 1
1144  001626  013700  001452          OUTSS: MOV     XXS1,R0         ;RESTORE R0
1145  001632  000207                         RTS     PC
1146                                        ;********************** MOD APR 74 **********************************
1147
1148
1149
1150
1151
1152                                        .SBTTL  POWER FAIL
1153
1154
1155                                        ;POWER FAIL ROUTINE
1156                                        ;IF SELECTED VERIFY STATUS-IN IS UP
1157                                        ;AND CE AND DE ARE PRESENTED AS STATUS
1158
```

```
1159  ?01634  104033                  PFAIL:  SAVRG
1160  ?01636  ?1?637  ?26?68                  MOV     R0,SAVR0
1161  ?01642  ?12737  ?01728  000024          MOV     #PWRJP,24
1162  ?01650  ?32777  ?20?20  177432          BIT     #SEL?,@UXM?
1163  ?01656  ?01417                          BE?     1$
1164  ?01660  ?32777  100020  177424          BIT     #UPL:,@UXM:
1165  ?01666  ?01?01                          BNE     .+4                     ;BRA\CH IF NO ERROR CONDITION
1166  ?01670  104000                          ERROR                           ;
1167  ?01672  ?32777  ?04000  177412          BIT     #STA:,@UXM:
1168  ?01700  ?01?01                          BNE     .+4                     ;BRA\CH IF NO ERROR CONDITION
1169  ?01?02  104000                          ERROR                           ;
1170  ?01?04  122777  000014  177430          CMPB    #CE;DE,@RUS:
1171  ?01712  ?01?01                          BE?     .+4                     ;BRANCH IF NO ERROR CONDITION
1172  ?01714  104000                          ERROR                           ;
1173  ?01716  ?00?00                  1$:     HALT
1174
1175                                  ;POWER UP ROUTINE
1176
1177  ?01720  ?00240                  PWRJP:  NOP                     ;PATCH A'YONE?
1178  ?01722  ?13?06  ?26?68                  MOV     SAVR0,R0
1179  ?01726  104004                          RSTRG
1180  ?01730  ?12737  ?01634  000024          MOV     #PFAIL,24               ;RE$TORE POWER FAIL VECTOH
1181  ?01736  ?13777  ?01430  177336          MOV     SPW,@UXOS               ;RE$TORE OFFSET REG
1182  ?01744  ?04737  ?26420                  JSR     PC,RESRES               ;RE$ET AND RESTORE
1183  ?01750  005027                          CLR     (PC)+                   ;STALL FOR MECHANICS
1184  ?01752  000000                          P
1185  ?01754  ?05337  ?01?92                  DEC     .-2
1186  ?01760  ?01375                          BNE     .-4
1187  ?01762  ?0?224  ?26?62                  TYPE    ,PPL?                   ;POWER FAILED
1188
1189
1190
1191
1192
1193
1194  ?01766  ?12637  177776                  MOV     (SP)+,PS
1195  ?01772  ?00177  ?20422                  JMP     @RETJMN
1196
1197
1198
1199
1200
1201                                  .SBTTL  STATUS POINTER WORD TABLE
1202          ?01776                  ENDSTR=.                        ;DEFINE END OF START CODE
1203          ?02000                  .=2000
1204                                  ;DEFAULT STATUS POINTER WORD (SPW)
1205                                  ;DEFAULT EMULATION IS OF ONE CONTROL UNIT
1206                                  ;WITH CAPACITY OF 16 DEVICES
1207          ?00?00                  @R0
1208
1209                                  ;STATUS POINTER WORDS FOR CU 0
1210
1211  ?02000  ?27?20                          ERRDST                  ;DEVICE STATUS TABLE IS AT ERRDST
1212  ?02002  ?27?00                          ERRDST                  ;DEVICE STATUS TABLE IS AT ERRDST
```

```
1213  002004  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1214  002006  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1215  002010  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1216  002012  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1217  002014  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1218  002016  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1219  002020  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1220  002022  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1221  002024  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1222  002026  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1223  002030  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1224  002032  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1225  002034  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1226  002036  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1227
1228                          ;STATUS POINTER WORDS FOR CU 1
1229
1230  002040  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1231  002042  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1232  002044  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1233  002046  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1234  002050  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1235  002052  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1236  002054  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1237  002056  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1238  002060  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1239  002062  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1240  002064  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1241  002066  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1242  002070  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1243  002072  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1244  002074  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1245  002076  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1246
1247                          ;STATUS POINTER WORDS FOR CU 2
1248
1249  002100  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1250  002102  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1251  002104  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1252  002106  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1253  002110  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1254  002112  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1255  002114  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1256  002116  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1257  002120  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1258  002122  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1259  002124  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1260  002126  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1261  002130  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1262  002132  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1263  002134  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1264  002136  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1265
1266                          ;STATUS POINTER WORDS FOR CU 3
```

```
1267
1268  "J2140  '27J"3          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1269  "J2142  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1270  "J2144  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1271  "J2146  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1272  "J2150  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1273  "J2152  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1274  "J2154  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1275  "J2156  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1276  "J2160  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1277  "J2162  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1278  "J2164  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1279  "J2166  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1280  "J2170  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1281  "J2172  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1282  "J2174  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1283  "J2176  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1284
1285                  ;STATUS POINTER WORDS FOR CU 4
1286
1287  "J2200  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1288  "J2202  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1289  "J2204  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1290  "J2206  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1291  "J2210  '27J"2          ERRDST          ;DEVICE STAT S TABLE IS AT ERRDST
1292  "J2212  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1293  "J2214  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1294  "J2216  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1295  "J2220  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1296  "J2222  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1297  "J2224  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1298  "J2226  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1299  "J2230  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1300  "J2232  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1301  "J2234  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1302  "J2236  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1303
1304                  ;STATUS POINTER WORDS FOR CU 5
1305
1306  "J2240  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1307  "J2242  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1308  "J2244  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1309  "J2246  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1310  "J2250  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1311  "J2252  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1312  "J2254  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1313  "J2256  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1314  "J2260  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1315  "J2262  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1316  "J2264  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1317  "J2266  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1318  "J2270  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1319  "J2272  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1320  "J2274  '27J"2          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
```

```
1321  002276  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1322
1323                                  ;STATUS POINTER WORDS FOR CU 6
1324
1325  002300  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1326  002302  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1327  002304  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1328  002306  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1329  002310  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1330  002312  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1331  002314  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1332  002316  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1333  002320  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1334  002322  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1335  002324  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1336  002326  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1337  002330  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1338  002332  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1339  002334  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1340  002336  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1341
1342                                  ;STATUS POINTER WORDS FOR CU 7
1343
1344  002340  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1345  002342  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1346  002344  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1347  002346  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1348  002350  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1349  002352  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1350  002354  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1351  002356  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1352  002360  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1353  002362  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1354  002364  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1355  002366  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1356  002370  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1357  002372  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1358  002374  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1359  002376  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1360
1361                                  ;STATUS POINTER WORDS FOR CU 10
1362
1363  002400  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1364  002402  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1365  002404  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1366  002406  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1367  002410  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1368  002412  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1369  002414  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1370  002416  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1371  002420  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1372  002422  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1373  002424  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1374  002426  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
```

R3

```
1375  ?02430  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1376  ?02432  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1377  ?02434  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1378  ?02436  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1379
1380                                ;STATUS POINTER WORDS FOR CU 11
1381
1382  ?02440  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1383  ?02442  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1384  ?02444  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1385  ?02446  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1386  ?02450  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1387  ?02452  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1388  ?02454  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1389  ?02456  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1390  ?02460  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1391  ?02462  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1392  ?02464  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1393  ?02466  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1394  ?02470  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1395  ?02472  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1396  ?02474  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1397  ?02476  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1398
1399                                ;STATUS POINTER WORDS FOR CU 12
1400
1401  ?02500  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1402  ?02502  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1403  ?02504  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1404  ?02506  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1405  ?02510  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1406  ?02512  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1407  ?02514  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1408  ?02516  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1409  ?02520  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1410  ?02522  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1411  ?02524  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1412  ?02526  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1413  ?02530  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1414  ?02532  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1415  ?02534  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1416  ?02536  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1417
1418                                ;STATUS POINTER WORDS FOR CU 13
1419
1420  ?02540  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1421  ?02542  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1422  ?02544  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1423  ?02546  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1424  ?02550  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1425  ?02552  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1426  ?02554  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1427  ?02556  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1428  ?02560  ?27?00                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
```

```
1429  002562  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1430  002564  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1431  002566  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1432  002570  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1433  002572  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1434  002574  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1435  002576  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1436
1437                                  ;STATUS POINTER WORDS FOR CU 14
1438
1439  002600  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1440  002602  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1441  002604  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1442  002606  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1443  002610  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1444  002612  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1445  002614  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1446  002616  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1447  002620  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1448  002622  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1449  002624  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1450  002626  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1451  002630  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1452  002632  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1453  002634  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1454  002636  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1455
1456                                  ;STATUS POINTER WORDS FOR CU 15
1457
1458  002640  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1459  002642  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1460  002644  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1461  002646  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1462  002650  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1463  002652  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1464  002654  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1465  002656  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1466  002660  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1467  002662  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1468  002664  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1469  002666  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1470  002670  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1471  002672  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1472  002674  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1473  002676  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1474
1475                                  ;STATUS POINTER WORDS FOR CU 16
1476
1477  002700  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1478  002702  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1479  002704  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1480  002706  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1481  002710  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1482  002712  027000                          ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
```

```
1483  002714  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1484  002716  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1485  002720  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1486  002722  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1487  002724  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1488  002726  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1489  002730  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1490  002732  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1491  002734  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1492  002736  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1493
1494                                ;STATUS POINTER WORDS FOR CU 17
1495
1496  002740  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1497  002742  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1498  002744  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1499  002746  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1500  002750  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1501  002752  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1502  002754  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1503  002756  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1504  002760  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1505  002762  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1506  002764  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1507  002766  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1508  002770  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1509  002772  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1510  002774  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1511  002776  027000                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1512
1513                                .SBTTL  TUMBLE TABLE
1514          003000                .=.     ;START OF  TUMBLE TABLE
1515
1516  003000  000400                .BLKW   256.    ;RESERVE 265. WORDS FOR TT
1517
1518          004000                ENDTT=.
1519
1520
1521
```

```
1522                                    ; **********************************************************
1523                                    ;TEST   1       BYTE REFERENCE TEST
1524                                    ; **********************************************************
1525  004000  104420                   TST11:  SCOPE
1526  004002  012737  000001  022414           MOV     #1,@#ICOUNT     ;ITERATION COUNT
1527  004010  012737  000001  023442           MOV     #1,@#LSTSTN     ;SAVE TEST # FOR ERROR REPORT
1528  004016  012737  004024  022420           MOV     #SCP1,@#RETURN  ;SCOPE LOOP RETURN ADRS
1529  004024                            SCP11:
1530
1531
1532  004024  012737  004124  000004           MOV     #RFR3,4 ;POINT TIMEOUT TRAP TO REF ERROR
1533  004032  012737  000340  000006           MOV     #LEVEL7,6       ;TIMEOUT AT LEVEL 7
1534
1535  004040  013701  001326                   MOV     CUAM,R1         ;LOW BYTE OF CUCA
1536  004044  105711                           TSTB    @R1             ;REF CUADRS REGISTER
1537  004046  005201                           INC     R1              ;INC TO CMD REG
1538  004050  105711                           TSTB    @R1             ;REF CU CMD REG
1539
1540  004052  013701  001330                   MOV     CUCM,R1         ;LOW BYTE OF DXOS
1541  004056  105711                           TSTB    @R1             ;REF CU STATUS REG
1542  004060  005201                           INC     R1              ;INC TO OFFSET REG
1543  004062  105711                           TSTB    @R1             ;REF CU OFFSET REGISTER
1544
1545  004064  013701  001336                   MOV     BUS0,R1         ;LOW BYTE OF DXM0
1546  004070  105711                           TSTB    @R1             ;REFERENCE BUS0
1547  004072  005201                           INC     R1              ;INC TO CON0
1548  004074  105711                           TSTB    @R1             ;REFERENCE CON0
1549
1550  004076  013701  001342                   MOV     BUS1,R1         ;LOW BYTE OF DXM1
1551  004102  105711                           TSTB    @R1             ;REF BUS1
1552  004104  005201                           INC     R1              ;INC TO CON1
1553  004106  105711                           TSTB    @R1             ;REF CON1
1554
1555  004110  013701  001346                   MOV     MISC,R1         ;LOW BYTE OF DXES
1556  004114  105711                           TSTB    @R1             ;REF MISCELLANEOUS BITS
1557  004116  005201                           INC     R1              ;INC TO VTNDX
1558
1559  004120  105711                           TSTB    @R1             ;REF TUPLE TABLE INDEX
1560  004122  000472                           BR      RR6
1561
1562  004124  104000                   RFR31:  ERROR                   ;MEMORY REFERENCE ERROR
1563  004126  000002                           RTI
1564  004130  012737  000000  000024   RR61:   MOV     #0,4            ;LOAD TIMEOUT TRAP WITH
1565  004136  012737  000000  000006           MOV     #0,6            ;,#2, HALT
1566
1567
```

```
1568                                    ; ********************************************************************
1569                                    ;TEST   2       BUSO BINARY COUNT TEST
1570                                    ; ********************************************************************
1571  ^04144  104420                    TST21   SCOPE
1572  ^04146  ^12737  ^00018  022414            ^OV     #18,@#ICOUNT    ;ITERATION COUNT
1573  ^04154  ^12737  ^00002  023442            ^OV     #2,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
1574  ^04162  ^12737  204170  022420            ^OV     #SCP2,@#RETURN  ;SCOPE LOOP RETURN ADRS
1575  ^04170                            SCP21
1576
1577
1578                                    ,REM    .
1579
1580                                    THE FUNCTION OF THIS TEST IS TO VERIFY THE CORRECT OPERATION OF BUS-OUT,
1581                                    THIS IS ACCOMPLISHED BY DRIVING A BINARY COUNT THROUGH BUSO,  THE
1582                                    SOURCE OF THE BINARY COUNT RESIDES IN THE HIGH BYTE OF A MEMORY SCRATCH
1583                                    PAD LOCATION SRCCNT,  THIS ALSO VERIFIES THAT THE BYTE SELECTION LOGIC
1584                                    OF THE DXMO WORKS CORRECTLY (I.E, HIGH BYTE DATA DOES NOT GET LOADED INTO
1585                                    THE HIGH BYTE IF ONLY THE LOW BYTE IS SELECTED),
1586                                    ALSO THE DX RESET FUNCTION IS PARTIALLY CHECKED OUT HERE,
1587
1588                                            .
1589
1590  ^04170  ^52777  ^00001  175102            BIS     #DXFBS,@#DXCS   ;ISSUE DX RESET
1591  ^04176  ^22777  100000  175104            CMP     #OPLD,@#DXMO    ;VERIFY MO
1592  ^04204  ^01421                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1593  ^04206  104000                            ERROR                   ;DXMO-DX RESET MALFUNCTION
1594  ^04210  ^12737  ^00420  023022            ^OV     #420,SRCCNT     ;START BIN COUNT IN HIGH BYTE
1595  ^04216  ^12737  100001  023024            ^OV     #OPLD+1,DSTCNT  ;COMPARE ON WORD
1596
1597  ^04224  113777  ^25023  175104  ROT11    ^OVB    SRCCNT+1,@#BUSO ;MOVE HIGH BYTE TO LOW BYTE
1598  ^04232  ^27737  175052  023024            CMP     @#DXMO,DSTCNT   ;COMPARE WORD
1599  ^04240  ^01421                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1600  ^04242  104000                            ERROR                   ;BUSO DID NOT LOAD CORRECTLY
1601
1602  ^04244  ^62737  ^00400  023022            ADD     #400,SRCCNT     ;INCREMENT SOURCE DATA
1603  ^04252  105237  023024                    INCB    DSTCNT          ;INC DESTINATION DATA
1604  ^04256  ^01362                            BNE     ROT1            ;BRANCH IF NOT END
1605
1606  ^04260  105077  175052                    CLRB    @#BUSO
1607  ^04264  105777  175046                    TSTB    @#BUSO          ;TEST BUSO
1608  ^04270  ^01421                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1609  ^04272  104000                            ERROR                   ;BUSO DID NOT CLEAR
1610
1611                                    ;VERIFY DX RESET CLEARS
1612
1613  ^04274  112777  177777  175034            ^OVB    #-1,@#BUSO      ;LOAD BUS-OUT
1614  ^04302  122777  177777  175026            CMPB    #-1,@#BUSO      ;VERIFY LOAD
1615  ^04310  ^01421                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1616  ^04312  104000                            ERROR                   ;BUSO LOAD ERROR
1617  ^04314  ^52777  ^00001  174756            BIS     #DXFBS,@#DXCS   ;DX RESET
1618  ^04322  105777  175010                    TSTB    @#BUSO          ;VERIFY BUSO 0
1619  ^04326  ^01421                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1620  ^04330  104000                            ERROR                   ;DX RESET DID NOT CLEAR BUSO
1621
```

```
1622                                    ;************************** MOD APR 74 ******************************
1623                                    ;*                          PHS82 LOCK0 HUNG RESET
1624
1625  ?04332  ?12777  ?10000  174750            MOV     #SJP?,@DXM0     ;CLEAR OPLO & SET SUP0 SO THAT
1626                                                                    ;IT INHIBITS A SYSTEM RESET
1627  ?04340  ?12777  ?77777  174742            MOV     #77777,@DXM0    ;LOAD DXM0
1628  ?04346  ?22777  ?77777  174734            CMP     #77777,@DXM0    ;VERIFY LOAD
1629  ?04354  ?01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1630  ?04356  104000                            ERROR                   ;DXM0 LOAD ERROR
1631  ?04360  ?42777  ?00200  174712            BIC     #DSYNC,@DXCS    ;RESET LOCK0
1632                                    ;************************** MOD APR 74 ******************************
1633
1634  ?04366  ?52777  ?00001  174704            BIS     #DXFRS,@DXCS    ;ISSUE DX RESET
1635  ?04374  ?22777  100000  174726            CMP     #OPLO,@DXM0     ;VERIFY DX RESET
1636  ?04402  ?01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1637  ?04404  104000                            ERROR                   ;DXM0-DX RESET MALFUNCTION
1638
1639
```

```
1640                                    ; ********************************************************************
1641                                    ;TEST   3       DX BYTE COUNT  REG TEST
1642                                    ; ********************************************************************
1643  004476  124470                    TST3:   SCOPE
1644  004412  012737  000001  022414            MOV     #1,@#ICOUNT     ;ITERATION COUNT
1645  004416  012737  000003  023442            MOV     #3,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
1646  004424  012737  004432  022420            MOV     #SCP3,@#RETURN  ;SCOPE LOOP RETURN ADRS
1647  004432                            SCP3:
1648
1649                                    ,REM    *
1650
1651                                    THE FUNCTION OF THIS TEST IS TO VERIFY THE READ/WRITE CAPABILITY OF THE
1652                                    DX BYTE COUNT REGISTER AND THAT A DX RESET HAS THE CAPACITY TO ZERO THE
1653                                    DXBC.  THIS IS ACCOMPLISHED BY DRIVING A SIMPLE BINARY COUNT THROUGH THE
1654                                    DXBC FROM A SCRATCH-PAD LOCATION (SWCCNT) IN MEMORY.  THE TEST ALSO
1655                                    VERIFIES THAT THE DXBC CAN ALSO BE CLEARED BY A CLEAR INSTRUCTION.
1656
1657                                            *
1658
1659
1660  004432  005037  025022                    CLR     SWCCNT
1661  004436  013777  025022  174642   BCBC1:   MOV     SWCCNT,@DXBC
1662  004444  023777  025022  174634            CMP     SWCCNT,@DXBC
1663  004452  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1664  004454  104000                            ERROR                   ;DXBC DID NOT LOAD CORRECTLY
1665  004456  005237  025022                    INC     SWCCNT
1666  004462  022737  177777  025022           CMP     #-1,SWCCNT      ;END OF TEST COUNT?
1667  004470  001362                            BNE     BCBC
1668  004472  005077  174610                    CLR     @DXBC           ;CLEAR HIGH BYTE
1669  004476  005777  174604                    TST     @DXBC           ;VERIFY 0
1670  004502  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1671  004504  104000                            ERROR                   ;DXBC CLEAR MALFUNCTION
1672  004506  012777  177777  174572            MOV     #-1,@DXBC       ;LOAD DX BYTE COUNT
1673  004514  022777  177777  174564            CMP     #-1,@DXBC       ;VERIFY LOAD
1674  004522  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1675  004524  104000                            ERROR                   ;DXBC LOAD ERROR
1676  004526  052777  000001  174544            BIS     @DXFUN,@DXCS    ;ISSUE DX RESET
1677  004534  005777  174546                    TST     @DXBC           ;VERIFY DXBC=0
1678  004540  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1679  004542  104000                            ERROR                   ;DXBC=DX RESET MALFUNCTION
1680
1681
```

```
                                        ; ***************************************************************
                                        ;TEST   4       DX BASE ADRS REG TEST
                                        ; ***************************************************************
?04544  104420                          TST4:   SCOPE
?04546  ?12737  ?00?21  022414                  MOV     #1,@#ICOUNT     ;ITERATION COUNT.
?04554  ?12737  ?00004  023442                  MOV     #4,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
?04562  ?12737  ?04570  022420                  MOV     #SCP4,@#RETURN  ;SCOPE LOOP RETURN ADRS
?04570                                  SCP41:
                                        ;REM    .
                                        ;THE FUNCTION OF THIS TEST IS TO VERIFY THE READ/WRITE CAPIBILITY OF THE
                                        ;DX BUS ADDRESS REGISTER,  THIS IS ACCOMPLISHED BY DRIVING A BINARY COUNT
                                        ;THROUGH THE DXBA FROM A MEMORY SCRATCH-PAD LOCATION CALLED SRCCNT,  THE
                                        ;DX RESET FUNCTION IS ALSO VERIFIED AT THIS POINT.
                                                .
?04570  ?05037  023022                          CLR     SRCCNT
?04574  ?13777  023022  174502  9ABC1:         MOV     SRCCNT,@DXBA
?04602  ?23777  023022  174474                  CMP     SRCCNT,@DXBA
?04610  ?01421                                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
?04612  104000                                  ERROR                   ;DXBA LOAD ERROR
?04614  ?62737  ?00002  023022                  ADD     #2,SRCCNT       ;ONLY WORD BOUNDARIES
?04622  ?01364                                  BNE     9ABC
?04624  ?05077  174454                          CLR     @DXBA
?04633  ?01401                                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
?04632  104000                                  ERROR                   ;DXBA DID NOT CLEAR
?04634  ?12777  177777  174442                  MOV     #-1,@DXBA       ;LOAD DXBA
?04642  ?22777  177776  174434                  CMP     #-2,@DXBA       ;WORD BOUNDARIES ONLY
?04650  ?01421                                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
?04652  104000                                  ERROR                   ;DXBA LOAD ERROR
?04654  ?52777  ?00001  174416                  BIS     #DXFRS,@DXCS    ;ISSUE DX RESET
?04662  ?05777  174410                          TST     @DXBA           ;VERIFY DX RESET DXBA
?04666  ?01421                                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
?04670  104000                                  ERROR                   ;DX RESET & DXBA MALFUNCTION
```

```
1722                                    ; ********************************************************************
1723                                    ;TEST   5       MAINTENANCE CLOCK INIT CHECK
1724                                    ; ********************************************************************
1725  004672  104420                    TST5:   SCOPE
1726  004674  012737  000002  022414            MOV     #2,@#ICOUNT     ;ITERATION COUNT
1727  004702  012737  000005  023442            MOV     #5,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
1728  004710  012737  004716  022420            MOV     #SCP5,@#RETURN  ;SCOPE LOOP RETURN ADRS
1729  004716                                    SCP5:
1730
1731
1732                                    ,REM    *
1733
1734                                    THE FUNCTION OF THIS EXERCISE IS TO CHECK THE MAINTENANCE CLOCK
1735                                    FEATURES AND TO ENSURE THAT THE DX11 IS IN PHASE 0 TIME STATE 1.
1736                                    THIS TEST ALSO VERIFIES THAT DX RESET CLEARS TIMER DISABLE AND
1737                                    MAINTENANCE CLOCK ENABLE.
1738
1739                                            *
1740
1741  004716  052777  000010  174374          BIS     #TIMDIS,@DXES   ;SET TIMER DISABLE (9 SEC OPL1)
1742  004724  032777  000010  174366          BIT     #TIMDIS,@DXES   ;VERIFY TIMER DISABLE SET
1743  004732  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1744  004734  104000                          ERROR                   ;TIMDIS DID NOT SET
1745  004736  032777  000002  174354          BIT     #MCLKEN,@DXES   ;IS MAINTENANCE CLOCK ENABLE STUCK
1746  004744  001421                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1747  004746  104000                          ERROR                   ;MCLKEN IS NOT CLEAR
1748  004750  052777  000002  174342          BIS     #MCLKEN,@DXES   ;SET MAIN CLK ENABLE
1749  004756  032777  000002  174334          BIT     #MCLKEN,@DXES   ;VERIFY MCKLEN SET
1750  004764  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1751  004766  104000                          ERROR                   ;MCLKEN IS NOT SET
1752  004770  042777  000002  174322          BIC     #MCLKEN,@DXES   ;DOES MCLKEN CLEAR
1753  004776  032777  000002  174314          BIT     #MCLKEN,@DXES   ;
1754  005004  001421                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1755  005006  104000                          ERROR                   ;MCLKEN STUCK HIGH
1756  005010  052777  000002  174302          BIS     #MCLKEN,@DXES   ;SET MAINT. CLOCK
1757  005016  032777  000002  174274          BIT     #MCLKEN,@DXES   ;VERIFY SET
1758  005024  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1759  005026  104000                          ERROR                   ;MCLKLEN NOT SET
1760  005030  000005                          RESET                   ;ISSUE RESET
1761  005032  032777  000002  174260          BIT     #MCLKEN,@DXES   ;VERIFY DX RESET CLEARED SAME
1762  005040  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1763  005042  104000                          ERROR                   ;DX RESET DID NOT CLEAR MCLKEN
1764  005044  032777  000010  174246          BIT     #TIMDIS,@DXES   ;VERIFY TIMER.DISABLE CLEARED
1765  005052  105777  174242                  TSTB    @DXES           ;VERIFY ALL MISC, CLEARED
1766  005056  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1767  005060  104000                          ERROR                   ;MISC BITS OF ES NOT CLEARED
1768  005062  005777  174232                  TST     @DXES           ;VERIFY ENTIRE DXES 0
1769  005066  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1770  005070  104000                          ERROR                   ;TTNDX NOT ZERO
1771
1772
```

K3

```
1773                                    ;*****************************************************************
1774                                    ;TEST   6       VERIFY PHASE, STATE AND MAINT CLK PULSE
1775                                    ;*****************************************************************
1776  ?05072  104470                    TST6:   SCOPE
1777  ?05074  ?12737  ?00020  022414            MOV     #20,@#ICOUNT    ;ITERATION COUNT
1778  ?05102  ?12737  ?00006  023442            MOV     #6,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
1779  ?05110  ?12737  ?05116  022420            MOV     #SCP6,@#RETURN  ;SCOPE LOOP RETURN ADRS
1780  ?05116                            SCP61:
1781
1782
1783                                    .REM    *
1784
1785                                    VERIFY THAT MCLK? MAINTENACE CLOCK PULSE, CHANGES
1786                                    STATE OF TSSF FLIP-FLOP AND DX REMAINS IN PHASE 0
1787
1788                                            *
1789
1790  ?05116  ?52777  ?00002  174174            BIS     #MCLKEN,@DXES   ;SET MAINT CLK ENABLE
1791  ?05124  ?32777  ?00002  174166            BIT     #MCLKEN,@DXES   ;
1792  ?05132  ?01001                            BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1793  ?05134  104030                            ERROR                   ;MCLKEN NOT SET
1794  ?05136  ?17727  174152                    MOV     @DXCS,(PC)+     ;SAVE CONTROL BITS
1795  ?05142  ?00000                    SCRTCH: ?                       ;HERE
1796  ?05144  ?42737  107777  005142            BIC     #107777,@#SCRTCH;CLEAR ALL BUT CONTROL FLOPS
1797  ?05152  ?05737  ?05142                   TST     @#SCRTCH        ;CHECK FOR PHASE 0
1798  ?05156  ?01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1799  ?05160  104000                            ERROR                   ;DX NOT IN PHASE ZERO
1800
1801
1802                                    ;TRACE TSSF
1803
1804
1805
1806
1807  ?05162  ?17737  174120  005142            MOV     @DXCS,@#SCRTCH  ;SAVE CONTROL BITS
1808  ?05170  ?42737  173777  005142            BIC     #173777,@#SCRTCH        ;CLEAR ALL BUT TSSF BIT
1809  ?05176  ?13737  ?05142  023030            MOV     @#SCRTCH,@#TSSFT;SAVE TSSF IN TSSF TRACE
1810  ?05204  ?32777  ?00001  174106            BIT     #MCLKP,@DXES    ;IS MCLKP STUCK HIGH
1811  ?05212  ?01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1812  ?05214  104000                            ERROR                   ;MCLKP STUCK HIGH
1813  ?05216  ?52777  ?00001  174074            BIS     #MCLKP,@DXES    ;SET MAINT CLK
1814  ?05224  ?33777  ?23030  174062            BIT     TSSFT,@DXCR     ;WAS TSSF COMPLIMENTED
1815  ?05232  ?01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1816  ?05234  104000                            ERROR                   ;TSSF DID NOT COMPLIMENT
1817  ?05236  ?32777  ?00001  174054            BIT     #MCLKP,@DXES    ;IS MCLKP STUCK HIGH
1818  ?05244  ?01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1819  ?05246  104000                            ERROR                   ;MCLKP STUCK HIGH
1820  ?05250  ?52777  ?00001  174042            BIS     #MCLKP,@DXES    ;TRY IT AGAIN
1821  ?05256  005137  ?23030                    COM     @#TSSFT
1822  ?05262  ?42737  173777  023030            BIC     #173777,@#TSSFT ;CLEAR ALL BUT TSSFT
1823  ?05270  033777  ?23030  174016            BIT     TSSFT,@DXCR     ;VERIFY TSSF COMPLIMENTED
1824  ?05276  ?01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1825  ?05300  104000                            ERROR                   ;TSSF DID NOT COMPLIMENT
1826                                    ;LEAVE DX IN PHASE 0 TS1
```

```
1627
1628  ?05302  ?32777  ?04?P8  174004  VPS11   BIT     #TSSF,@UXCS     ;CHECK TIME STATE
1629  ?05310  ?01?10                          BNE     VPS2            ;BRANCH IF TS1
1630  ?05312  ?52777  ?0F8F1  174000          BIS     #MCLKP,@UXES    ;ADVANCE TO TS1
1631  ?05320  ?32777  ?04?P8  173706          BIT     #TSSF,@UXCS     ;TS1?
1632  ?05326  ?01?01                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1633  ?05330  104?P8                          ERROR                   ;WRONG TIME STATE
1634  ?05332  ?17737  173706  000142  VPS21   MOV     @UXCS,@#SCRTCH  ;SAVE CONTROL BITS
1635  ?05340  ?42737  107777  000142          BIC     #107777,@#SCRTCH;CLEAR ALL BUT PHASE CONTROL BITS
1636  ?05346  ?01?01                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1637  ?05350  104?P8                          ERROR                   ;PHASE ERROR
1638  ?05352  ?42777  100002  173740          BIC     #MCLKEN,@UXES   ;CLEAR MAINT CLK ENABLE
1639
1640
```

```
1641                                    ; ********************************************************************
1642                                    ;TEST   7       SYSTEM RESET AND TT ENTRY
1643                                    ; ********************************************************************
1644   005360  104416                   TST7    SCOPE
1645   005362  012737  000020  022414           MOV     #20,@#ICOUNT    ;ITERATION COUNT
1646   005370  012737  000007  023442           MOV     #7,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
1647   005376  012737  005404  022420           MOV     #SCP7,@#RETURN  ;SCOPE LOOP RETURN ADRS
1648   005404                           SCP71
1649
1650   005404  004737  021662                   JSR     PC,DXRES
1651
1652                                    ;REM    *
1653
1654                                    THE FUNCTION OF THIS TEST IS TO VERIFY THAT THE DX11 CAN DO A SYSTEM
1655                                    RESET AND RECORD THE OCCURANCE OF THIS EVENT IN THE TUMBLE TABLE.
1656                                    A SYSTEM RESET OCCURS WHEN OPERATION-OUT CONTROL LINE DROPS,  WHEN
1657                                    THIS HAPPENS THE DX IS REQUIRED TO DESELECT WITHIN SIX MICRO-SECONDS
1658                                    AND RECORD THE EVENT BY STORING THE CONTENTS OF THE DXCA AND DXDS
1659                                    IN THE TUMBLE TABLE.
1660                                    THIS TEST IS EXECUTED IN THE MAINTENANCE CLOCK MODE IN ORDER THAT
1661                                    KEY TRANSIENTS MAY BE CHECKED.
1662
1663                                            *
1664
1665
1666   005412  022777  100020  173672           CMP     #OPLO,@DXMD     ;CHECK MAINTENANCE OUT REQ
1667   005416  001401                           BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1668   005420  104000                           ERROR                   ;ILLEGAL MD BIT SET
1669   005422  105777  173700                   TSTB    @CJAR           ;VERIFY CU ADRS REG ZERO
1670   005426  001401                           BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1671   005430  104000                           ERROR                   ;CJAR NOT ZERO
1672   005432  112777  177777  173666           MOVB    #-1,@CJAR       ;FILL CJAR WITH ONES
1673   005440  122777  177777  173660           CMPB    #-1,@CJAR       ;AND VERIFY LOAD
1674   005446  001401                           BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1675   005452  104000                           ERROR                   ;CJAR LOAD ERROR
1676   005452  117737  173650  021434           MOVB    @CJAR,@#CAMAP   ;UPDATE MAP
1677   005460  032777  010000  173626           BIT     #SYSRST,@DXDS   ;CHECK SYSRST NOT SET
1678   005466  001401                           BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1679   005472  104000                           ERROR                   ;PREMATURE SYSRST
1680   005472  032777  001000  173606           BIT     #SYNC,@DXBC     ;PHASE-STATE SYNC SHOULD BE P
1681   005500  001401                           BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1682   005502  104000                           ERROR                   ;SYNC FLOP NOT ZERO
1683   005504  032777  000200  173606           BIT     #DONE,@DXCS     ;DONE SHOULD BE ZERO
1684   005512  001401                           BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1685   005514  104000                           ERROR                   ;DONE NOT ZERO
1686   005516  012777  007050  173540           MOV     #SRTTC,@DXIV    ;SET UP INTERRUPT VECTOR
1687   005524  013777  001270  173534           MOV     DXPRT,@DXIS     ;SET UP INTERRUPT STATUS
1688   005532  012737  000340  177776           MOV     #LEVEL7,PS      ;LOCK OUT INTERRUPTS
1689   005540  052777  000100  173532           BIS     #INTEN,@DXCS    ;SET INTERRUPT ENABLE
1690   005546  032777  000100  173524           BIT     #INTEN,@DXCS    ;VERIFY INTEN SET
1691   005554  001001                           BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1692   005556  104000                           ERROR                   ;INTEN NOT SET
1693   005560  017737  173514  021416           MOV     @DXCS,@#CSMAP   ;UPDATE MAP
1694   005566  052777  000012  173524           BIS     #MCLKEN!TIMDIS,@DXCS    ;SET MCLKEN
```

```
1895  005574  022777  000012  173516          CMP     @#MCLKENITIMDIS,@DXES   ;
1896  005602  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITIO
1897  005604  104000                          ERROR                           ;ILLEGAL ES BIT SET
1898  005606  052737  000012  021504          BIS     #MCLKENITIMDIS,@#ESMAP
1899
1900
1901                                  ;ENTER PHASE ZERO, TIMESTATE ONE
1902
1903  005614  032777  004000  173472          BIT     #TSSF,@DXCB             ;TEST FOR TS1
1904  005622  001003                          BNE     VPSX                    ;BRANCH IF TIMESTATE ONE
1905  005624  052777  000001  173466          BIS     #MCLKP,@DXES            ;ISSUE CLOCK PULSE
1906  005632  022777  004000  173454  VPSX1   CMP     #TSSF,@DXCB             ;VERIFY TS1
1907  005640  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
1908  005642  104000                          ERROR                           ;ILLEGAL CB BIT SET
1909  005644  042777  100000  173436          BIC     #OPLO,@DXMD             ;OPLO=0,CAUSES SYSRST
1910  005652  004737  021366                  JSR     PC,CHKREG
1911  005656  004537  021074                  JSR     R5,@#CLK                ;ROUTINE TO ISSUE CLOCK PULSES
1912  005662  000001                          1                               ;                                1 CLOCK PULSE(S)
1913  005664  004737  020744                  JSR     PC,PHST                 ;CHECK CONTROL BITS FOR
1914  005670  000000                          PHS02                           ;THIS PHASE AND STATE                   PHS02
1915  005672  005777  173412                  TST     @DXMD
1916  005676  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
1917  005700  104000                          ERROR                           ;OPLO DID NOT CLEAR
1918  005702  005037  021466                  CLR     @#MDMAP                 ;UPDATE MD MAP
1919
1920                                  ;SYSTEM RESET BIT MUST BE SET FOR ENTRY
1921                                  ;INTO THE TUMBLE TABLE
1922
1923  005706  032777  010000  173360          BIT     #SYSRST,@DXDS           ;SYSTEM RESET=1
1924  005714  001001                          BNE     .+4                     ;BRANCH IF NO ERROR CONDITION
1925  005716  104000                          ERROR                           ;SYSRST DID NOT SET
1926  005720  052737  010000  021372          BIS     #SYSRST,@#DSMAP         ;UPDATE MAP
1927
1928                                  ;IN THE EVENT THAT THE DX IS PROCESSING A
1929                                  ;READ OR WRITE COMMAND IOD IS SET FOR
1930                                  ;IMMEDIATE EXIT
1931
1932  005726  032777  000200  173360          BIT     #IOD,@DXCB              ;I/O DONE = 1
1933  005734  001001                          BNE     .+4                     ;BRANCH IF NO ERROR CONDITION
1934  005736  104000                          ERROR                           ;IOD NOT SET
1935  005740  052737  000200  021344          BIS     #IOD,@#CBMAP            ;UPDATE MAP
1936  005746  004737  021366                  JSR     PC,CHKREG
1937
1938  005752  052777  100000  173330          BIS     #OPLO,@DXMD             ;RESTORE OPLO
1939  005760  004537  021074                  JSR     R5,@#CLK                ;ROUTINE TO ISSUE CLOCK PULSES
1940  005764  000001                          1                               ;                                1 CLOCK PULSE(S)
1941  005766  004737  020744                  JSR     PC,PHST                 ;CHECK CONTROL BITS FOR
1942  005772  044000                          PHS41                           ;THIS PHASE AND STATE                   PHS41
1943  005774  022777  100000  173326          CMP     #OPLO,@DXMD             ;VERIFY OPLO SET
1944  006002  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
1945  006004  104000                          ERROR                           ;OPLO DID NOT SET
1946  006006  012737  100000  021466          MOV     #OPLO,@#MDMAP           ;UPDATE MAP
1947
1948                                  ;IN THE EVENT THAT IBM DOES AN IMMEDIATE
```

```
1949                                    ;SELECT BEFORE THE DX11 HAS HAD A CHANCE
1950                                    ;TO RECORD THE SYSTEM RESET CU BUSY
1951                                    ;IS PRESENTED
1952
1953  006014  032777  000400  173296          BIT     #CUBSY,@DXCS    ;CUBSY=1
1954  006022  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1955  006024  104000                          ERROR                   ;CUBSY DID NOT SET
1956  006026  052737  000400  021416          BIS     #CUBSY,@#CSMAP
1957  006034  023777  001440  173242          CMP     TT,@DXBA        ;VERIFY BA LOAD
1958  006042  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1959  006044  104000                          ERROR                   ;TT TO DXBA TRANSFER ERROR
1960  006046  013737  001440  021442          MOV     TT,@#BAMAP      ;UPDATE MAP
1961
1962
1963  006054  105777  173278                  TSTB    @TTNDX          ;CHECK FOR PREMATURE INCREMENT
1964  006060  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1965  006062  104000                          ERROR                   ;TTNDX INCREMENT ERROR
1966
1967  006064  004737  021332                  JSR     @C,TTZERO       ;PREMATURE TT ENTRY
1968
1969  006070  022777  010000  173176          CMP     #SYSRST,@DXDS   ;CHECK FOR SYSTEM RESET
1970  006076  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1971  006100  104000                          ERROR                   ;ILLEGAL DXDS STATUS
1972
1973  006102  032777  000040  173284          BIT     #NPRX,@DXCS     ;NPRX SHOULD BE ZERO
1974  006110  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1975  006112  104000                          ERROR                   ;NPRX NOT ZERO
1976
1977  006114  032777  001000  173172          BIT     #SYNC,@DXCS     ;PHASE-STATE SYNC SHOULD BE ZERO
1978  006122  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1979  006124  104000                          ERROR                   ;SYNC NOT ZERO
1980  006126  032777  100000  173160          BIT     #LOCKO,@DXCS    ;CHECK FOR LOCKO
1981  006134  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1982  006136  104000                          ERROR                   ;LOCKO NOT SET
1983  006140  052737  100000  021544          BIS     #LOCKO,@#CSMAP  ;UPDATE MAP
1984
1985                                    ;ADVANCE TO PHASE 4 - TIME STATE 2
1986
1987  006146  004737  021366                  JSR     @C,CHKREG
1988  006152  004537  021074                  JSR     @5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1989  006156  000001                          1                       ;                               1 CLOCK PULSE(S)
1990
1991  006160  004737  020744                  JSR     @C,PHST         ;CHECK CONTROL BITS FOR
1992  006164  040000                          PHS42                   ;THIS PHASE AND STATE                   PHS42
1993
1994                                    ;VERIFY THAT THE EVENTS SETUP DURING PHS41 DID OCCUR ON
1995                                    ;THE CLOCK TICK,
1996
1997  006166  017727  173112                  MOV     @DXBA,(PC)+     ;SAVE DX BUS ADDRESS
1998
1999  006172  000000                  SBA11:  .                       ;HERE
2000  006174  032737  000001  000172          BIT     #BIT0,@#SBA1    ;BUS ADRS MUST BE EVEN
2001  006202  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2002  006204  104000                          ERROR                   ;DXBA ADRS ERROR
```

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2053  000276  032737  001000  000172          BIT     #BIT9,@#SBA1    ;TT IS OFFSET BY 1000(8)
2054  000214  001401                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2055  000216  104000                          ERROR                   ;DXBA(09) NOT SET
2056  000220  042737  000777  000172          BIC     #777,@#SBA1     ;CLEAR ALL BUT CUOR BITS
2057  000226  017727  173090                  MOV     @DXOS,(PC)+     ;SAVE OFFSET AND STATUS
2058  000232  000000                  SOS1:   .                       ;HERE
2059  000234  042737  000777  000232          BIC     #777,@#SOS1     ;CLEAR ALL BUT OFFSET
2060  000242  052737  001000  000232          BIS     #BIT9,SOS1      ;SET TT INDEX BIT
2061  000250  023737  000172  000232          CMP     @#SBA1,@#SOS1   ;CHECK OFFSET TRANSFER
2062  000256  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2063  000260  104000                          ERROR                   ;DXOS TO DXBA TRANSFER ERROR
2064
2065                                  ;VERIFY TTNDX INCREMENT
2066
2067  000262  122777  000001  173000          CMPB    #1,@TTNDX       ;TTNDX SHOULD BE 1
2068  000270  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO
2069  000272  104000                          ERROR                   ;TTNDX INCREMENT ERROR
2070  000274  117737  173050  021565          MOVB    @TTNDX,@#SMAP+1
2071  000302  017737  172776  000172          MOV     @DXBA,@#SBA1    ;SAVE BUS ADDRESS
2072  000310  042737  177001  000172          BIC     #177001,@#SBA1  ;CLEAR ALL BUT TTNDX BITS
2073  000316  006237  000172                  ASR     @#SBA1          ;DIVIDE BY TWO
2074  000322  122737  000000  000172          CMPB    #0,@#SBA1       ;VERIFY DXBA=TTNDX
2075  000330  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO
2076  000332  104000                          ERROR                   ;TTNDX TO DXBA TRANSFER ERROR
2077  000334  022777  010000  172794          CMP     #SYSRST,@DXND   ;VERIFY NPR DATA
2078  000342  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2079  000344  104000                          ERROR                   ;DXOS TO DXND TRANSFER ERROR
2080  000346  052737  010000  021606          BIS     #SYSRST,@#NDMAP
2081  000354  032777  001000  172732          BIT     #SYNC,@DXCS     ;PHASE + STATE SYNC=1
2082  000362  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITIO
2083  000364  104000                          ERROR                   ;SYNC NOT SET
2084  000366  052737  001000  021544          BIS     #SYNC,@#CBMAP   ;UPDATE MAP
2085  000374  022777  010000  173036          CMP     #SYSRST,@TT     ;VERIFY TT ENTRY
2086  000402  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2087  000404  104000                          ERROR                   ;DXND TO TT TRANSFER ERROR
2088  000406  032777  000200  172664          BIT     #DONE,@DXCS     ;DONE MUST BE ZERO
2089  000414  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2090  000416  104000                          ERROR                   ;DONE NOT CLEAR
2091  000420  032777  000100  172666          BIT     #BYPAS,@DXCB    ;BYPAS MUST BE ZERO
2092  000426  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2093  000430  104000                          ERROR                   ;BYPAS NOT ZERO
2094  000432  032777  100000  172694          BIT     #LOCKO,@DXCB    ;LOCKOUT MUST BE SET
2095  000440  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITIO
2096  000442  104000                          ERROR                   ;LOCKO NOT SET
2097  000444  032777  000001  172692          BIT     #IRS,@DXES1     ;"IBM RESET STORED" SET?
2098  000452  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2099  000454  104000                          ERROR                   ;IBM-RESET-STORED NOT SET
2100  000456  032777  000040  172638          BIT     #NPRX,@DXCS     ;NPRX=1
2101  000464  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITIO
2102  000466  104000                          ERROR                   ;NPRX NOT SET
2103  000470  052737  000040  021544          BIS     #NPRX,@#CBMAP
2104  000476  032777  000020  172610          BIT     #NPMT,@DXCB     ;NPMT=1
2105  000504  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITIO
2106  000506  104000                          ERROR                   ;NPMT NOT SET
```

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2057  006510  052737  000020  021544          BIS     #NPRT,@#CSRMAP  ;UPDATE MAP
2058
2059
2060
2061                                  ;LOCKOUT SHOULD WRITE PROTECT
2062                                  ;       DXCA = COMMAND + ADDRESS
2063                                  ;       DXCS = CONTROL + STATUS (EXCEPT DONE + INTEN)
2064                                  ;       DXOS = OFFSET + STATUS
2065                                  ;       DXBA = BUS ADDRESS
2066
2067  006516  017727  172554                MOV     @DXCA,(PC)+     ;SAVE DXCA
2070  006522  000000          SCA21:  .       .                       ;HERE
2071  006524  012777  177777  172544        MOV     #-1,@DXCA       ;ATTEMPT TO WRITE DXCA
2072  006532  027737  172540  000522        CMP     @DXCA,@#SCA2    ;CHECK FOR WRITE PROTECTION
2073  006540  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2074  006542  104000                        ERROR                   ;WRITE PROTECT ERROR
2075  006544  017727  172530                MOV     @DXCS,(PC)+     ;SAVE CONTROL AND STATUS BITS
2076  006552  000000          SCS21:  .       .                       ;HERE
2077  006552  012777  177477  172520        MOV     #177477,@DXCS   ;ATTEMPT TO WRITE ALL BUT DONE + INTEN
2078  006560  027737  172514  000550        CMP     @DXCS,@#SCS2    ;CHECK FOR WRITE PROTECTION
2079  006566  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2080  006570  104000                        ERROR                   ;DXCS WRITE PROTECT ERROR
2081  006572  017727  172506                MOV     @DXBA,(PC)+     ;SAVE BUS ADDRESS
2084  006576  000000          SBA21:  .       .                       ;HERE
2085  006600  012777  177777  172476        MOV     #-1,@DXBA       ;ATTEMPT TO WRITE ALL ONES
2086  006606  027737  172472  000576        CMP     @DXBA,@#SBA2    ;CHECK WRITE PROTECTION
2087  006614  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2088  006616  104000                        ERROR                   ;DXBA WRITE PROTECT ERROR
2089
2090
2091  006620  004737  021366                JSR     PC,CHKREG
2092  006624  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2093  006630  000001                        1                       ;                       1 CLOCK PULSE(S)
2094  006632  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2095  006636  044000                        PHS41                   ;THIS PHASE AND STATE           PHS41
2096
2097  006640  032777  000040  172446        BIT     #NPRX,@DXCR     ;NPRX READY FOR NEXT NPR
2100  006646  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2101  006650  104000                        ERROR                   ;NPRX SET
2102  006652  042737  000040  021544        BIC     #NPRX,@#CSRMAP  ;UPDATE MAP
2103  006660  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2104  006664  000001                        1                       ;                       1 CLOCK PULSE(S)
2105  006666  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2106  006672  040000                        PHS42                   ;THIS PHASE AND STATE           PHS42
2107  006674  022777  003002  172472        CMP     #3002,@DXBA     ;VERIFY BA LOAD
2110  006702  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2111  006704  104000                        ERROR                   ;DXBA INCREMENT ERROR
2112  006706  017737  172372  021442        MOV     @DXBA,@#BAMAP
2113  006714  004737  021366                JSR     PC,CHKREG
2114
2115  006720  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2116  006724  000001                        1                       ;                       1 CLOCK PULSE(S)
2117  006726  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2120  006732  074000                        PHS71                   ;THIS PHASE AND STATE           PHS71
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2111
2112  007734  032777  000200  172336          BIT     #DONE,@DXCS     ;VERIFY DONE SET
2113  007742  001071                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2114  007744  104000                          ERROR                   ;DONE NOT SET
2115  007746  052737  000200  021416          BIS     #DONE,@#CSMAP   ;UPDATE MAP
2116  007754  032777  000200  172342          BIT     #INTREQ,@DXES1  ;TEST INTERRUPT REQUEST SET
2117  007762  001071                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2118  007764  104000                          ERROR                   ;INTREQ NOT SET
2119                                  ;+++++++++++++++++++++++++++++++++++++ C.B.
2120  007766  012777  007040  172270          MOV     #ILLEGI,@DXIV   ;TEMPORILY SET FALSE VECTOR
2121  007774  013737  001272  177776          MOV     DXPRT,PS        ;SET PRIORITY SO AS NOT TO INTERRUPT
2122  008002  000240                          NOP     ;WAIT FOR INTERRUPT,,IF ONE WERE TO OCCUR
2123  008004  000240                          NOP     ;DITTO
2124  008006  012777  007056  172250          MOV     #SRTTC,@DXIV    ;RESTORE
2125                                  ;+++++++++++++++++++++++++++++++++++
2126  007014  013737  001272  177776          MOV     @#LESS1,PS      ;ALLOW INTERRUPTS(SHOULD CLEAR INTREQ)
2127  007022  005027                          CLR     (PC)+
2128  007024  000000                  1$1:    0
2129  007026  005337  007024                  DEC     1$              ;WAIT FOR INTERRUPT
2130  007032  001375                          BNE     2$
2131  007034  104000                          ERROR                   ;DX FAILED TO INTERRUPT
2132  007036  000424                          BR      OVRISR
2133                                  ;+++++++++++++++++++++++++++++++++++++ C.B.
2134  007040  104000                  ILLEGI: ERROR   ;DX SHOULD NOT INTERRUPT,,CHECK PRIORITY CHIP
2135  007042  012716  007110                  MOV     #OVRISR,(SP)    ;RTI RETURN ADDRESS
2136  007046  012777  007056  172210          MOV     #SRTTC,@DXIV    ;RESTORE
2137  007054  000002                          RTI
2138                                  ;+++++++++++++++++++++++++++++++++++++
2139  007056  032777  000200  172214  SRTTC:  BIT     #DONE,@DXCS     ;TEST FOR VALID INTERRUPT
2140  007064  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2141  007066  104000                          ERROR                   ;WEIRD INTERRUPT
2142  007070  032777  000200  172222          BIT     #INTREQ,@DXES   ;VERIFY INTERRUPT GRANT CLEARED INTREQ
2143  007076  001431                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2144  007100  104000                          ERROR                   ;INTREQ NOT ZERO
2145  007102  012716  007110                  MOV     #OVRISR,(SP)    ;RTI RETURN ADDRESS
2146  007106  000002                          RTI
2147  007110                          OVRISR:
2148
2149
2150
2151                                  ;VERIFY DXND=DXCA
2152
2153  007110  027777  172162  172200          CMP     @DXCA,@DXND     ;COMPARE 2ND TT ENTRY
2154  007116  001431                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2155  007120  104000                          ERROR                   ;CA TO NO TRANSFER ERROR
2156  007122  013727  001440                  MOV     TT,(PC)+        ;SAVE TT BASE ADRS
2157  007126  000000                  STT2:   0
2158  007130  062737  000002  007126          ADD     #2,STT2         ;INCREMENT TO 2ND ENTRY
2159  007136  027777  177764  172132          CMP     @STT2,@DXCA     ;VALIDATE ENTRY
2160  007144  001431                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2161  007146  104000                          ERROR                   ;NO INTO TT TRANSFER ERROR
2162
2163                                  ;VERIFY PHASE AND STATE SYNC FLOP IS CLEARED
2164
```

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2165  007150  032777  021000  172136          BIT     @SYNC,@DXCS     ;TEST SYNC FLOP
2166  007156  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2167  007160  104000                          ERROR                   ;SYNC NOT ZERO
2168  007162  052737  021000  021944          BIS     @SYNC,@#CBMAP   ;UPDATE MAP
2169
2170                                  ;VERIFY TTNDX INCREMENTING
2171
2172  007170  122777  000002  172102          CMPB    #2,@TTNDX       ;READY FOR 3RD ENTRY
2173  007176  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2174  007200  104000                          ERROR                   ;TTNDX INCREMENT ERROR
2175  007202  117737  172142  021966          MOVB    @TTNDX,@#ESMAP+1
2176
2177                                  ;VERIFY DXBA(15:10)+DXDN(15:10)
2178  007210  032777  001000  172006          BIT     #BIT9,@DXBA     ;VERIFY TT OFFSET TO SPH
2179  007216  001401                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2180  007220  104000                          ERROR                   ;DXBA(09) NOT SET
2181  007222  017727  172004                  MOV     @DXDS,(PC)+     ;SAVE OFFSET + STATUS
2182  007226  000000          SOS3I   0       ;HERE
2183  007230  042737  001777  007226          BIC     #1777,@#SOS3    ;CLEAR ALL BUT OFFSET
2184  007236  017727  172042                  MOV     @DXBA,(PC)+     ;SAVE BUS ADRS
2185  007242  000000          SBA3I   0       ;HERE
2186  007244  042737  001777  007242          BIC     #1777,@#SBA3    ;CLEAR ALL BUT OFFSET
2187  007252  023737  007226  007242          CMP     @#SOS3,@#SBA3   ;COMPARE BA + OS
2188  007260  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2189  007262  104000                          ERROR                   ;OS TO DXBA TRANSFER ERROR
2190
2191
2192  007264  032777  000001  172012          BIT     #BIT0,@DXBA
2193  007272  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2194  007274  104000                          ERROR                   ;DXBA ADRS ODD
2195
2196
2197                                  ;VERIFY SIG14 (PHS71)
2198
2199  007276  032777  000040  171774          BIT     #STKSTA,@DXCS   ;STACKED STATUS A
2200  007304  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2201  007306  104000                          ERROR                   ;STACKED STATUS SET
2202  007310  032777  020000  171772          BIT     #SELO,@DXMO     ;SELECT-OUT
2203  007316  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2204  007320  104000                          ERROR                   ;SELECT-OUT SET
2205  007322  032777  000040  171764          BIT     #NPRX,@DXCS     ;NPR TRANSFER READY
2206  007330  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2207  007332  104000                          ERROR                   ;NPRX NOT SET
2208  007334  052737  000040  021944          BIS     #NPRX,@#CBMAP
2209  007342  032777  001000  171744          BIT     #SYNC,@DXCS     ;PHASE + STATE SYNC
2210  007350  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2211  007352  104000                          ERROR                   ;SYNC NOT ZERO
2212  007354  042737  001000  021944          BIC     #SYNC,@#CBMAP
2213  007362  004737  021366                  JSR     PC,CHKREG
2214  007366  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2215  007372  000001                          1                       ;                       1 CLOCK PULSE(S)
2216  007374  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2217  007400  000000                          PHS72                   ;THIS PHASE AND STATE           PHS72
2218
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2219  007472  032777  000040  171724          BIT     #NPRX,@DXCB     ;NPR TRANSFER
2220  007476  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2221  007502  104000                          ERROR                   ;NPRX NOT ZERO
2222  007504  042737  000040  021544          BIC     #NPRX,@#CBMAP   ;UPDATE MAP
2223  007512  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2224  007516  000000                          PHS72                   ;THIS PHASE AND STATE                   PHS72
2225
2226
2227
2228
2229                                  ;CHECK IRSCLR
2230
2231  007532  004737  021366                  JSR     PC,CHKREC
2232  007536  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2233  007542  000001                          1                       ;                               1 CLOCK PULSE(S)
2234  007544  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2235  007550  000000                          PHS71                   ;THIS PHASE AND STATE                   PHS71
2236
2237  007554  032777  000200  171636          BIT     #IOD,@DXCB      ;TEST FOR I/O DONE
2238  007560  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2239  007562  104000                          ERROR                   ;IOD NOT SET
2240  007564  032777  000020  171624          BIT     #NPRT,@DXCB     ;NPR TRANSFER?
2241  007572  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2242  007574  104000                          ERROR                   ;
2243  007576  032777  010000  171572          BIT     #SYSRST,@DXDS   ;SYSTEM RESET?
2244  007604  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2245  007606  104000                          ERROR                   ;SYSRST NOT SET
2246  007610  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2247  007614  000001                          1                       ;                               1 CLOCK PULSE(S)
2248  007616  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2249  007622  000000                          PHS72                   ;THIS PHASE AND STATE                   PHS72
2250
2251  007624  032777  000200  171564          BIT     #IOD,@DXCB      ;IOD MUST BE ZERO
2252  007632  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2253  007634  104000                          ERROR                   ;IOD SET
2254  007636  032777  000020  171552          BIT     #NPRT,@DXCB     ;NPRT MUST BE ZERO
2255  007644  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2256  007646  104000                          ERROR                   ;NPRT SET
2257  007650  032777  010000  171520          BIT     #SYSRST,@DXDS   ;SYSRST MUST BE ZERO
2258  007656  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2259  007660  104000                          ERROR                   ;SYSRST SET
2260
2261
2262  007662  032777  020000  171506          BIT     #SELRST,@DXDS   ;SELECTIVE RESET ZERO
2263  007670  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2264  007672  104000                          ERROR                   ;SELRST SET
2265
2266
2267  007674  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2268  007700  000001                          1                       ;                               1 CLOCK PULSE(S)
2269
2270  007702  017727  171510                  MOV     @DXCB,(PC)+     ;SAVE CONTROL BITS
2271  007706  000000          SBC61           .                       ;HERE
2272  007710  042737  123777  007624          BIC     #123777,@#SBC0  ;CLEAR ALL BUT
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2273  007614  022737  006CF8  007024          CMP     @PHASLP!TS1,@#SBC6      ;VERIFY PHS21
2274  007622  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
2275  007624  104000                          ERROR                           ;NOT PHASE0 TS1
2276
2277  007626  032737  000200  171444          BIT     #DONE,@DXCS             ;
2278  007634  001401                          BNE     .+4                     ;BRANCH IF NO ERROR CONDITION
2279  007636  104000                          ERROR                           ;DONE NOT SET
2280  007640  032737  100000  171440          BIT     #LOCKO,@DXCB            ;LOCKO MUST BE SET
2281  007646  001401                          BNE     .+4                     ;BRANCH IF NO ERROR CONDITION
2282  007650  104000                          ERROR                           ;LOCKO NOT SET
2283
2284  007652  042737  000002  171440          BIC     #MCLKEN,@DXES           ;CLEAR MAINTENANCE CLOCK ENABLE
2285
2286  007660  042737  000200  171412          BIC     #DONE,@DXCS             ;CLEAR DONE
2287  007666  032737  000200  171404          BIT     #DONE,@DXCS             ;IS DONE CLEARED
2288  007674  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
2289  007676  104020                          ERROR                           ;DONE NOT ZERO
2290  007700  032737  100000  171400          BIT     #LOCKO,@DXCB            ;LOCKO MUST BE CLEARED
2291  007706  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
2292  007710  104000                          ERROR                           ;LOCKO NOT CLEARED
2293  007712  032737  001000  171306          BIT     #SYNC,@DXBC             ;PHASE AND STATE SYNC
2294  007720  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
2295  007722  104000                          ERROR                           ;SYNC NOT ZERO
2296  007724  032737  070000  171302          BIT     #PHASE7,@DXCB           ;CHECK FOR PHASE0
2297  007732  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
2298  007734  104000                          ERROR                           ;NOT PHASE ZERO
2299  007736  032737  100000  171300          BIT     #LOCKO,@DXCB            ;VERIFY LOCKO=0
2300  007744  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
2301  007746  104000                          ERROR                           ;LOCKO SET
2302
2303  007750  052737  000001  171322          BIS     #DXFRS,@DXCS            ;KEEP TTNDX NEAR ZERO
2304  007756  105737  171306                  TSTB    @TTNDX                  ;VERIFY DX RESET TTNDX
2305  007762  001401                          BEQ     .+4                     ;BRANCH IF NO ERROR CONDITION
2306  007764  104000                          ERROR                           ;DX RESET DID NOT CLEAR TTNDX
2307  007766  012737  026414  026314          MOV     #CLKMO,@#PRE1,1+2       ;ALLOW SYSRST FOR SCOPE LOOPS
2308
2309
```

```
2310                                    ;*************************************************************
2311                                    ;TEST   18      TUMBLE TABLE TRACE TEST
2312                                    ;*************************************************************
2313  ^07774  124^^E                    TST1^:  SCOPE
2314  ^07776  ^12737  ^02^00  022414            MOV     #1^24,,@#ICOUNT ;ITERATION COUNT
2315  ^1^^^4  ^12737  ^^^018  023442            MOV     #18,@#ERTSTN    ;SAVE TEST # FOR ERROR REPORT
2316  ^1^^12  ^12737  ^10^20  022428            MOV     #SCP1@,@#RETURN ;SCOPE LOOP RETURN ADRS
2317  ^1^^2^                            SCP1^:
2318
2319
2320                                    ,REM    *
2321
2322                                    THIS TEST SETS UP THE DX INTERRUPT VECTOR TO POINT TO
2323                                    A ROUTINE THAT TRACES THE TUMBLE TABLE INDEX REGISTER TO
2324                                    VERIFY INCREMENTING AND RAP AROUND,  THE TUMBLE TABLE ITSELF
2325                                    IS ALSO CHECKED FOR VALID ENTRIES,
2326                                            *
2327
2328  ^1^^3^  ^42777  ^^^2^^  171292            BIC     #DONE,@DXCS     ;CLR LOCKO IF SET
2329  ^1^^26  ^^14^1                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2330  ^1^^3^  1^4^^^                            ERROR                   ;ILLEGAL CS BIT SET
2331  ^1^^32  ^52777  ^^^^^1  171240            BIS     #DXFRS,@DXCS    ;ISSUE DX RESET TO ZERO TTNDX
2332  ^1^^4^  105777  171384                    TSTB    @TTNDX          ;
2333  ^1^^44  ^^14^1                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2334  ^1^^46  124^^^                            ERROR                   ;TTNDX NOT ZERO
2335  ^1^^5^  ^25^37  ^1^232                    CLR     @#TRANDX        ;CLEAR TTNDX TRACE
2336  ^1^^54  ^13737  ^^1442  ^1^23^            MOV     TT,@#TRATT      ;INIT SOFTWARE TT POINTER
2337  ^1^^62  ^12777  ^22^74  171174            MOV     #FALSE,@DXIV    ;SET UP FALSE INTERRUPT VECTOR
2338  ^1^^7^  ^32777  ^^^2^^  171202            BIT     #DONE,@DXCS     ;DONE MUST=0
2339  ^1^^76  ^^14^1                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2340  ^1^1^^  1^4^^^                            ERROR                   ;DONE NOT ZERO
2341  ^1^1^2  ^52777  ^^^1^^  171170            BIS     #INTEN,@DXCS    ;SET INTERRUPT ENABLE
2342  ^1^11^  ^32777  ^^^1^^  171162            BIT     #INTEN,@DXCS    ;VERIFY INTEN SET
2343  ^1^116  ^^1^^1                            BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2344  ^1^12^  1^4^2^                            ERROR                   ;INTEN NOT SET
2345  ^1^122  ^12777  177777  171146            MOV     #-1,@DXCA       ;ATTEMP TO LOAD DXCA WITH ALL ONES
2346  ^1^133  ^22777  ^^^377  171140            CMP     #377,@DXCA      ;ONLY CUAR SHOULD BE LOADED
2347  ^1^136  ^^1431                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2348  ^1^143  1^4^3^                            ERROR                   ;DXCA LOAD ERROR
2349  ^1^142  ^13737  ^^1272  177776            MOV     @#LESS1,PS      ;SET PS TO DX PRIORITY=1
2350  ^1^152  ^12737  ^1^172  ^22428            MOV     #TTTST,@#RETURN ;SET UP SCOPE RETURN ADRS
2351  ^1^156  ^13777  ^^1270  171102            MOV     @#DX^HT,@DXIS   ;LOAD INTERRUPT STATUS
2352  ^1^164  ^12777  ^1^234  171072            MOV     #TRASHV,@DXIV   ;SET UP VALID INTERRUPT VECTOR
2353  ^1^172  ^32777  1^^^^^  171110  TTTST:    BIT     #OPLO,@DXMO     ;OPERATIONAL=OUT MUST BE UP
2354  ^1^2^^  ^^1^^1                            BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2355  ^1^2^2  1^4^^^                            ERROR                   ;OPLO NOT SET
2356
2357                                    ;DROP OPLO',  THIS SHOULD CAUSE AN IBM RESET,  THE
2358                                    ;DX MUST RECORD THIS EVENT BY ENTERING THE DXDS AND
2359                                    ;DXCA INTO THE TUMBLE TABLE,  DONE SIGNIFIES COMPLETION
2360
2361  ^1^2^4  ^42777  1^^^^^  171^76            BIC     #O^LO,@DXMO     ;CAUSE AN IBM RESET
2362  ^1^212  ^25^27                            CLR     (PC)+           ;DELAY
2363  ^1^214  ^^^2^^                    SRSTL:  0                       ;FOR INTERRUPT
```

```
2364  010216  005237  010214          INC     $RSTL           ;
2365  010222  001375                  BNE     $RSTL+2         ;
2366  010224  104000                  ERROR                   ;DX FAILED TO INTERRUPT
2367  010226  000466                  RR      OVRTRA
2368
2369                                ;TRASRV, TUMBLE TABLE TRACE SERVICE ROUTINE
2370
2371  010230  000000                TRATT:  ?                       ;TUMBLE TABLE TRACE
2372  010232  000000                TRANDX: ?                       ;TTNDX TRACE
2373
2374  010234  062737  000002  010232 TRASRV: ADD     #2,@#TRANDX     ;INCREMENT TTNDX TRACE
2375  010242  123777  010232  171130        CMPB    @#TRANDX,@TTNDX ;DID TTNDX GET INCREMENTED
2376  010250  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO
2377  010252  104000                        ERROR                   ;TTNDX INCREMENT ERROR
2378  010254  022777  010000  177746        CMP     #SYSRST,@TRATT  ;VALIDATE DXDS ENTRY
2379  010262  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2380  010264  104000                        ERROR                   ;DXDS TO TT TRANSFER ERROR
2381  010266  062737  000002  010230        ADD     #2,@#TRATT      ;INCREMENT TT TRACE TO NEXT ENTRY
2382  010274  022777  000377  177726        CMP     #377,@TRATT     ;VALIDATE DXCA ENTRY
2383  010302  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2384  010304  104000                        ERROR                   ;DXCA TO TT TRANSFER ERROR
2385  010306  062737  000002  010230        ADD     #2,@#TRATT      ;
2386  010314  032777  100000  170772        BIT     #LOCKO,@DXCB    ;LOCKO MUST BE SET
2387  010322  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2388  010324  104000                        ERROR                   ;LOCKO NOT SET
2389  010326  042777  000200  170744        BIC     #DONE,@DXCS     ;CLEAR DONE, LOCKO
2390  010334  032777  000200  170736        BIT     #DONE,@DXCS     ;TEST DONE BIT
2391  010342  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2392  010344  104000                        ERROR                   ;DONE SET
2393  010346  023727  010230  004000        CMP     @#TRATT,#TST1   ;CHECK FOR END OF TT
2394  010354  001003                        BNE     TRA1
2395  010356  013737  001440  010230        MOV     @#TT,@#TRATT    ;RESTOR TT TRACE
2396  010364  032777  100000  170722 TRA1:  BIT     #LOCKO,@DXCB    ;VERIFY LOCKO CLEARED
2397  010372  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2398  010374  104000                        ERROR                   ;
2399
2400  010376  012716  010404                MOV     #OVRTRA,(SP)    ;MODIFY RETURN ADDRESS
2401  010402  000002                        RTI
2402
2403
2404  010404  052777  100000  170676 OVRTRA: BIS     #OPLO,@DXMO     ;RESTOR OPERATIONAL-OUT
2405  010412  032777  100000  170670        BIT     #OPLO,@DXMO
2406  010420  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2407  010422  104000                        ERROR                   ;OPLO NOT SET
2408
2409
2410
2411
2412
2413
2414
```

K4

```
2415                                    ! ************************************************************
2416                                    !TEST   11      "AINTENANCE CLOCK !SS SPW(15188)=0
2417                                    ! ************************************************************
2418  "10424  104470                    TST11:  SCOPE
2419  "10426  "12737  "00408  022414            "OV     #478,@#ICOUNT   ;ITERATION COUNT
2420  "10434  "12737  "00011  023442            "OV     #11,@#ENTSTN    ;SAVE TEST # FOR ERROR REPORT
2421  "10442  "12737  "10458  022428            "OV     #SCP11,@#RETURN ;SCOPE LOOP RETURN ADRS
2422  "10450                            SCP111:
2423
2424                                    ,REM    .
2425
2426
2427
2428
2429
2430
2431
2432
2433
2434
2435
2436
2437
2438
2439
2440
2441
2442
2443
2444
2445
2446
2447                                    THE FUNCTION OF THIS TEST IS TO VERIFY THAT THE DX11 CAN EXECUTE
2448                                    A CHANNEL INITIATED SELECTION AND BYPASS ITS OWN DEVICE STATUS
2449                                    TABLE FETCH BY PRESENTING THE NON ZERO STATUS CONTAINED IN SPW(07108)
2450                                    WHILE SPW (15108) IS EQUAL TO ZERO.
2451
2452                                            .
2453
2454
2455                                    ;INITIALIZE SPW TO BYPASS DST FETCH
2456                                    ;BY SETING SPW(15178)=P AND SPW(07108)=377
2457
2458  "10450  "13701  "01430                    "OV     SPW,R1          ;LOAD SPW ADRS IN R1
2459  "10454  "12702  "00377                    "OV     #377,R2         ;LOAD R2 WITH CONTENTS OF SPW
2460  "10460  "04737  "20040                    JSR     PC,S"1          ;BUILD SPW
2461
2462  "10464  "04737  "21000                    JSR     PC,@#DXXHES     ;RESET DX AND YY TRACE
2463  "10470  153777  "24774  170030            BISB    @#DEV,@CUAR     ;LOAD CUAR/ADDRESS
2464  "10476  123777  "24774  170022            CMPB    @#DEV,@CUAR     ;VERIFY LOAD
2465  "10504  "01401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2466  "10506  104000                            ERROR                   ;CUAR LOAD ERROR
2467  "10510  153737  "24774  021404            BISB    @#DEV,@#CAMAP   ;UPDATE MAP
2468  "10516  "52777  "00002  170074            BIS     #MCLKEN,@DXES   ;SET MCLKEN IN REGISTER ES
```

```
2469  *10524  *52737  *0F002  021994          BIS     #MCLKEN,@#ESMAP ;SET MCLKEN IN MAP OF ES
2470  *10532  *04737  *21360                  JSR     PC,CHKREG
2471
2472                                  ;START SEQUENCE *0F IN PHS*1
2473
2474  *10536  *32777  *04000  178990          BIT     #TSSF,@DXCR     ;
2475  *10544  *01010                          BNE     15
2476  *10546  *04537  *21074                  JSR     *5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2477  *10552  *0F001                          1                       ;                                       1 CLOCK PULSE(S)
2478  *10554  *32777  *04000  178932          BIT     #TSSF,@DXCR
2479  *10562  *01001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2480  *10564  104000                          ERROR                   ;TIME STATE ERROR
2481  *10566  *04737  *21360          151     JSR     PC,CHKREG
2482
2483                                  ;ESTABLISH CONFIDENCE IN DX STABILITY
2484
2485  *10572  *04537  *21074                  JSR     *5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2486  *10576  *00144                          100.                    ;                                       100. CLOCK PULSE(S)
2487  *10602  *04737  *21360                  JSR     PC,CHKREG
2488  *10606  *04737  *20744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2489  *10612  *04000                          PHS01                   ;THIS PHASE AND STATE                   PHS01
2490                                                                  ;PUT DEVICE ADRS ON BUS0
2491                                                                  ;CLOCK ADRS ONTO BUS0
2492                                                                  ;SET ADRS IN MAP
2493  *10612  *53777  *24774  178470          BIS     @#DEV,@DXMO     ;LOAD DEVICE ADRS ON BUS0
2494  *10620  123777  *24774  178510          CMPB    @#DEV,@BUS0     ;NO BUFFER FLOPS FOR BUS0
2495  *10626  *01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2496  *10630  104000                          ERROR                   ;DXMO LOAD ERROR
2497  *10632  *04537  021074                  JSR     *5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2498  *10636  *00002                          2                       ;                                       2 CLOCK PULSE(S)
2499  *10640  *53737  *24774  021406          BIS     @#DEV,@#MOMAP   ;UPDATE REGISTER MAP
2500  *10646  *04737  *21234                  JSR     PC,COPARO       ;COPY PARO INTO CLKO IMAGE
2501  *10652  *04737  *21360                  JSR     PC,CHKREG
2502  *10656  *04537  *21074                  JSR     *5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2503  *10662  *00010                          10                      ;                                       10 CLOCK PULSE(S)
2504  *10664  *04737  *21360                  JSR     PC,CHKREG
2505  *10670  *04737  *20744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2506  *10674  *04000                          PHS01                   ;THIS PHASE AND STATE                   PHS01
2507                                  ;RAISE ADDRESS OUT
2508
2509  *10676  052777  004000  178404          BIS     #ADRO,@DXMO     ;SET ADRS OUT
2510  *10704  *32777  *04000  178376          BIT     #ADRO,@DXMO     ;NOT WITHOUT CLOCK
2511  *10712  *01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2512  *10714  104000                          ERROR                   ;ADRO NO ZERO
2513  *10716  004537  021074                  JSR     *5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2514  *10722  *00002                          2                       ;                                       2 CLOCK PULSE(S)
2515  *10724  *32777  004000  178356          BIT     #ADRO,@DXMO     ;VERIFY SET AFTER CLOCK
2516  *10732  *01001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2517  *10734  104000                          ERROR                   ;ADRO NOT SET
2518  *10736  *52737  004000  021406          BIS     #ADRO,@#MOMAP   ;UPDATE REG MAP
2519  *10744  *32777  *00002  178342          BIT     #ADRECC,@DXCB   ;TEST FOR ADRECC
2520  *10752  *01001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2521  *10754  104000                          ERROR                   ;ADRECC NOT SET
2522  *10756  *52737  *00002  021044          BIS     #ADRECC,@#CBMAP ;UPDATE MAP
```

```
2523  "17744  "32777  "20001  170322          BIT     #ADRECD,@DXCR   ;TEST FOR ADRECD
2524  "17772  "01401                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2525  "17774  104000                          ERROR                   ;ADRECD NOT SET
2526  "17776  "52737  "00001  021344          BIS     #ADRECD,@#CBMAP ;UPDATE MAP
2527  "11004  "04737  "21366                  JSR     PC,C4KREG
2528   11013  "04537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2529  "11014  "00010                          10                      ;                                       10 CLOCK PULSE(S)
2530  "11016  "04737  "21366                  JSR     PC,C4KREG
2531  "11022  "04737  "20744                  JSR     PC,P4ST         ;CLOCK CONTROL BITS FOR
2532  "11026  "04000                          PHS01                   ;THIS PHASE AND STATE                   PHS01
2533
2534                                  ;RAISE HOLD-OUT
2535  "11030  "52777  "40000  170232          BIS     #HLDO,@DXM0     ;RAISE HOLD-OUT
2536  "11036  "32777  "40000  170244          BIT     #HLDO,@DXM0     ;NOT WITHOUT CLOCK
2537  "11044  "01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2538  "11046  104000                          ERROR                   ;HLDO NOT BUFFERED
2539  "11050  "04537  "21074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2540  "11054  "00002                          2                       ;                                       2 CLOCK PULSE(S)
2541  "11056  "32777  "40000  170224          BIT     #HLDO,@DXM0     ;VERIFY HLDO CLOCKED
2542  "11064  "01401                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2543  "11066  104000                          ERROR                   ;HLDO NOT SET
2544  "11072  "52737  "40000  021406          BIS     #HLDO,@#MOMAP   ;UPDATE REG MAP
2545  "11076  "04737  021366                  JSR     PC,C4KREG
2546  "11102  "04537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2547  "11106  "00010                          10                      ;                                       10 CLOCK PULSE(S)
2548  "11110  "04737  021366                  JSR     PC,C4KREG
2549
2550                                  ;RAISE SELECT-OUT
2551                                  ;A PAIR OF MAINTENANCE CLOCK PULSES SHOULD
2552                                  ;RAISE SELO AND LEAVE THE DX IN PHS01
2553                                  ;AND WITH THE DEVICE ADDRESS RECOGNIZED (ADRECC=1)
2554
2555  "11114  "52777  "20000  170106          BIS     #SELO,@DXM0     ;RAISE SELECT-OUT
2556  "11122  "32777  "20000  170100          BIT     #SELO,@DXM0     ;NOT WITHOUT CLOCK
2557  "11130  "01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2558  "11132  104000                          ERROR                   ;SELO NOT BUFFERED
2559  "11134  "04537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2560  "11140  "00002                          2                       ;                                       2 CLOCK PULSE(S)
2561  "11142  "32777  "20000  170140          BIT     #SELO,@DXM0     ;VERIFY SELO CLOCKED
2562  "11150  "01401                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2563  "11152  104000                          ERROR                   ;SELO NOT SET
2564  "11154  "52737  "20000  021406          BIS     #SELO,@#MOMAP   ;UPDATE MAP
2565
2566                                  ;ADDRESS IS RECOGNIZED
2567                                  ;CHECK FOR ERRONEOUS PROPOGATION OF SELECT-IN
2568                                  ;OR PRESENTATION OF STATUS-IN
2569
2570  "11162  "22777  176777  170122          CMP     #176777,@DXMI   ;DXMI SHOULD BE UNREADABLE
2571  "11170  "01405                          BEQ     .+12            ;BRANCH IF NO ERROR CONDITION
2572  "11172  "22777  177777  170112          CMP     #177777,@DXMI   ;DXMI MAY HAVE CLKD
2573  "11200  "01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2574  "11202  104000                          ERROR                   ;DXMI STATE ERROR
2575
2576                                  ;CONTROL UNIT BUSY (CUBSY) SHOULD NOT BE SET
```

```
2577
2578  011274  032777  000400  170006  UNREADI BIT     #CJBSY,@DXCS    ;CUBSY SHOULD NOT BE SET
2579  011212  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2580  011214  104000                          ERROR                   ;CUBSY NOT ZERO
2581  011216  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2582  011222  004000                          PHS01                   ;THIS PHASE AND STATE                   PHS01
2583
2584                                  ;SEE IF ANYTHING UNEXPECTED HAPPENED
2585
2586  011224  032777  004000  170046          BIT     #BSYEN,@DXCS    ;BUSY ENABLE SHOULD NOT BE SET
2587  011232  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2588  011234  104000                          ERROR                   ;BSYEN SET
2589  011236  004737  021366                  JSR     PC,CHKREG
2590
2591                                  ;ADVANCE TO PHASE ZERO TIME STATE 2 (PHS02)
2592
2593  011242  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2594  011246  000001                          1                       ;                       1 CLOCK PULSE(S)
2595  011250  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2596  011254  000000                          PHS02                   ;THIS PHASE AND STATE                   PHS02
2597
2598                                  ;LOCKOUT AND SYNC SHOULD = "1"
2599
2600  011256  032777  100000  170030          BIT     #LOCKO,@DXCB    ;CHECK LOCKO SET
2601  011264  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2602  011266  104000                          ERROR                   ;LOCKO NOT SET
2603  011270  052737  100000  021544          BIS     #LOCKO,@#CBMAP  ;UPDATE MAP
2604
2605  011276  032777  001000  170010          BIT     #SYNC,@DXCB
2606  011304  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2607  011306  104000                          ERROR                   ;SYNC NOT SET
2608  011310  052737  001000  021544          BIS     #SYNC,@#CBMAP   ;UPDATE MAP
2609
2610                                  ;BYPAS MUST NOT BE SET
2611
2612  011316  032777  000100  167770          BIT     #BYPAS,@DXCB    ;VERIFY ISS IN PROGRESS
2613  011324  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2614  011326  104000                          ERROR                   ;BYPAS SET
2615  011330  004737  021366                  JSR     PC,CHKREG
2616
2617                                  ;NEXT CLOCK TICK SHOULD FORCE THE DX
2618                                  ;INTO THE ADDRESS RESPONSE PHASE ONE TIME STATE 1
2619  011334  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2620  011340  000001                          1                       ;                       1 CLOCK PULSE(S)
2621  011342  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2622  011346  014000                          PHS11                   ;THIS PHASE AND STATE                   PHS11
2623
2624                                  ;SYNC SHOULD BE CLEARED
2625
2626  011352  032777  001000  167736          BIT     #SYNC,@DXCB     ;VERIFY SYNC CLEARED
2627  011356  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2628  011360  104000                          ERROR                   ;SYNC SET
2629  011362  042737  001000  021544          BIC     #SYNC,@#CBMAP   ;UPDATE MAP
2630  011370  032777  000400  167702          BIT     #CJBSY,@DXCS    ;CU BUSY SHOULD NOT BE SET
```

```
2631  011376  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2632  011400  104000                          ERROR                   ;CUBSY SET
2633  011402  127777  167730  167716         CMPB    @BUSO,@CUAR     ;VERIFY DEVICE ADRS IN ADRS REG
2634  011410  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2635  011412  104000                          ERROR                   ;CUAR TO BUSO TRANSFER ERROR
2636  011414  113737  024774  021424         MOVB    @#DEV,@#CAMAP   ;UPDATE MAP
2637
2638                                  ;ADRS-OUT SHOULD COPY INTO CHIS IF ADRECC="1"
2639                                  ;THIS INDICATES A CHANNEL INITIATED SELECTION IS IN
2640                                  ;PROGRESS
2641
2642  011422  032777  000200  167644         BIT     #CHIS,@DXDS     ;CHIS SET IN DEVICE STATUS REG
2643  011430  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2644  011432  104000                          ERROR                   ;THIS NOT SET
2645  011434  052737  000200  021372         BIS     #CHIS,@#DSMAP   ;UPDATE MAP
2646
2647                                  ;OPERATIONAL-IN SHOULD BE SET
2648
2649  011442  032777  100000  167620         BIT     #OPLI,@DXMI     ;VERIFY OPLI SET
2650  011450  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2651  011452  104000                          ERROR                   ;OPLI NOT SET
2652  011454  052737  100000  021510         BIS     #OPLI,@#MIMAP   ;UPDATE MAP
2653  011462  032777  000400  167622         BIT     #PARI,@DXMI     ;CHECK FOR PARITY IN
2654  011470  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2655  011472  104000                          ERROR                   ;PARI NOT SET
2656  011474  052737  000400  021510         BIS     #PARI,@#MIMAP   ;UPDATE MAP
2657                                  ;DXBA LOAD USES ITS OWN CLOCK
2658
2659                                  ;BUS ADDRESS (15110) EQUALS OFFSET REG
2660                                  ;BUS ADDRESS (00101) EQUALS CUAR (0710P)
2661
2662  011502  117727  167620                 MOVB    @CJAR,(PC)+     ;SAVE CUAR(07100)
2663  011506  000000                 IMAGBA: 0                       ;HERE, IMAGE OF EXPECTED BA
2664  011510  006337  011506                 ASL     @#IMAGBA        ;MAKE DEV ADR$ MOD(2)
2665  011514  042737  177001  011506         BIC     #177001,@#IMAGBA        ;CLEAR ALL BUT SHIFTED ADRS
2666  011522  017727  167554                 MOV     @DXOS,(PC)+     ;SAVE OFFSET AND STATUS
2667  011526  000000                 IMAGOS: 0                       ;HERE, OFFSET IMAGE
2668  011530  042737  001777  011526         BIC     #1777,@#IMAGOS  ;CLEAR ALL BUT OFFSET
2669  011536  053737  011526  011506         BIS     @#IMAGOS,@#IMAGBA       ;CREATE BA IMAGE
2670
2671                                  ;VERIFY BUS ADDRESS REGISTER WAS LOADED CORRECTLY
2672
2673  011544  023777  011506  167532         CMP     @#IMAGBA,@DXBA  ;BA EQUALS EXPECTED BA?
2674  011552  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2675  011554  104000                          ERROR                   ;CUAR TO DXBA TRANSFER ERROR
2676  011556  053737  011506  021442         BIS     @#IMAGBA,@#BAMAP        ;UPDATE MAP
2677
2678  011564  004737  021366                 JSR     PC,CHKREG
2679
2680                                  ;PHASE ONE=ADDRESS RESPONSE
2681                                  ;ADVANCE DX TO PHASE ONE TIME STATE 2
2682                                  ;SYNC IS ZERO QUALIFYING THE SIGNAL"RAAR"
2683
2684  011572  004537  021074                 JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
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 2685  *11574  *00*01                          1                       ;                                       1 CL*CK PULSE(S)
 2686  *11576  *04737  *20744                   JSR     PC,PHST         ;CHECK CONTHOL BITS FOR
 2687  *11602  *10*30                          PHS12                   ;THIS PHASE AND STATE                           PHS12
 2688
 2689
 2690  *11604  *32777  *00040  167502          BIT     #NPRX,@DXCS     ;NPRX=?
 2691  *11612  *01401                          BNE     .+4             ;BRA*CH IF NO ERROR CONDITION
 2692  *11614  104000                          ERROR                   ;NPRX NOT ZERO
 2693  *11616  *52737  000040  021544          BIS     #NPRX,@#CBMAP   ;KEEP MAP UP TO DATE
 2694
 2695  *11624  *32777  *01000  167462          BIT     #SYNC,@DXCS     ;VERIFY SYNC=*1*
 2696  *11632  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
 2697  *11634  104000                          ERROR                   ;SYNC NOT SET
 2698  *11636  052737  001000  021544          BIS     #SYNC,@#CBMAP   ;UPUATE MAP
 2699
 2700  *11644  *32777  *31000  167422          BIT     #31000,@DXDS    ;CHECK FOR NO IB* RESET
 2701  *11652  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2702  *11654  104000                          ERROR                   ;IBM RESET
 2703
 2704                                  ;VERIFY BUS ADDRESS DATA HAS TRA*SFE*RED INTO DXND
 2705
 2706  *11656  *27777  177024  167432          CMP     @IMASBA,@DXND   ;CHECK NPR DATA
 2707  *11664  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2708  *11666  104000                          ERROR                   ;SPH TO DXND TRANSFER ERROR
 2709  *11670  *57737  177012  021006          BIS     @IMASBA,@#NDMAP ;UPUATE MAP
 2710
 2711  *11676  *04737  021360          TESTAG  JSR     PC,CHKREG
 2712  *11702  *04537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 2713  *11706  *00001                          1                       ;                                       1 CLOCK PULSE(S)
 2714
 2715  *11710  *32777  *00040  167376          BIT     #NPRX,@DXCS     ;TEST FOR NPRX
 2716  *11716  *01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2717  *11720  104000                          ERROR                   ;NPRX SET
 2718  *11722  *42737  000040  021544          BIC     #NPRX,@#CBMAP   ;UPUATE MAP
 2719  *11730  *32777  *00040  167362          BIT     #NPRTO,@DXES    ;TEST FOR NPR TIME OUT
 2720  *11736  *01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2721  *11740  104000                          ERROR                   ;NPRTO SET
 2722
 2723  *11742  *04737  021360                  JSR     PC,CHKREG
 2724
 2725  *11746  *04737  020744                  JSR     PC,PHST         ;CHECK CONTHOL BITS FOR
 2726  *11752  *14000                          PHS11                   ;THIS PHASE AND STATE                           PHS11
 2727
 2728  *11754  *04537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 2729  *11760  000001                          1                       ;                                       1 CLOCK PULSE(S)
 2730  *11762  *04737  020744                  JSR     PC,PHST         ;CHECK CONTHOL BITS FOR
 2731  *11766  *10000                          PHS12                   ;THIS PHASE AND STATE                           PHS12
 2732  *11770  *04737  021360                  JSR     PC,CHKREG
 2733  *11774  *04537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 2734  *12000  000001                          1                       ;                                       1 CLOCK PULSE(S)
 2735  *12002  *04737  020744                  JSR     PC,PHST         ;CHECK CONTHOL BITS FOR
 2736  *12006  *24000                          PHS21                   ;THIS PHASE AND STATE                           PHS21
 2737
 2738
```

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                                        ;ADVANCE TO STATUS PREPARATION (PHASE TWO TIME STATE ONE)
                                        ;VERIFY SIGS EVENTS TRANSFERRED
                                        ;COPY A ONE INTO BYPAS IF DXND(15:P0)=P (NO DST)

 2743  *12010  *32777  *0P100  167276          BIT     #BYPAS,@DXCB    ;VERIFY DXND(15:P0)=0 SET BYPAS
 2744  *12016  *01401                         BNE     .+4             ;BRANCH IF NO ERROR CONDITION
 2745  *12020  104000                          ERROR                   ;BYPAS NOT SET
 2746  *12022  052737  000100  021544          BIS     #BYPAS,@#CBMAP  ;UPDATE REG MAP

                                        ;VERIFY THE LOW (NONZERO) BYTE OF SPH WAS PRESENTED
                                        ;AS STATUS BY LOADING DXND(07:P0) INTO CJSR

 2752  *12030  127777  177452  167274          CMPB    @#MASBA,@CUSR   ;VERIFY SPH(07:0P) STATUS PRESENT
 2753  *12036  001401                         BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2754  *12040  104000                          ERROR                   ;SPH TO CUSH TRANSFER ERROR
 2755  *12042  117737  167264  021430          MOVB    @CJSR,@#OSMAP   ;UPDATE REG MAP
 2756  *12050  127777  167252  167264          CMPB    @CJAR,@BUSI     ;VERIFY ADRS ON BUSI FOR ECHO
 2757  *12056  001401                         BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2758  *12060  104000                          ERROR                   ;CUAR TO BUSI TRANSFER ERROR
 2759  *12062  017727  167224                  MOV     @DXMI,(PC)+     ;SAVE DXMI
 2760  *12066  000000          SMIP1   0               ;HERE
 2761  *12070  042737  177000  012066          BIC     #177*00,@#SMIP  ;CLEAR ALL BUT ADRS+PARITY
 2762  *12076  023737  024774  012066          CMP     @#DEV,@#SMIP    ;COMPARE DEV ADRS+PARITY
 2763  *12104  001401                         BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2764  *12106  104000                          ERROR                   ;MI LOAD ERROR
 2765  *12110  042737  000777  021510          BIC     #777,@#MIMAP
 2766  *12116  053737  012066  021510          BIS     SMIP,@#MIMAP    ;UPDATE MAP
 2767  *12124  032777  001000  167102          BIT     #SYNC,@DXCR     ;SYNC ZERO?
 2768  *12132  001401                         BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 2769  *12134  104000                          ERROR                   ;SYNC SET
 2770  *12136  042737  001000  021544          BIC     #SYNC,@#CBMAP   ;UPDATE MAP
 2771
                                        ;WAITING FOR ADRI(ADRO DROP) TO COME UP

 2774  *12144  004737  021366                  JSR     PC,C4KREG
 2775  *12150  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 2776  *12154  000001                          1                       ;                                       1 CLOCK PULSE(S)
 2777  *12156  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
 2778  *12162  020000                          PHS22                   ;THIS PHASE AND STATE                           PHS22
 2779  *12164  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 2780  *12170  000011                          11                      ;                                       11 CLOCK PULSE(S)
 2781  *12172  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
 2782  *12176  024000                          PHS21                   ;THIS PHASE AND STATE                           PHS21
 2783  *12200  004737  021366                  JSR     PC,C4KREG
 2784
                                        ;DROPPING OF ADRO SHOULD RAISE ADRI

 2787  *12204  042777  004000  167076          BIC     #ADRO,@DXMO     ;DROP ADRO
 2788  *12212  032777  004000  167070          BIT     #ADRO,@DXMO     ;NOT WITHOUT CLOCK
 2789  *12220  001401                         BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
 2790  *12222  104000                          ERROR                   ;ADRO NOT SET
 2791  *12224  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 2792  *12230  000002                          2                       ;                                       2 CLOCK PULSE(S)
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2793  012232  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2794  012236  024020                          PHS21                   ;THIS PHASE AND STATE                   PHS21
2795  012240  032777  004000  167042          BIT     #ADRO,@DXMO     ;ADRO SHOULD DROP
2796  012246  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2797  012250  104020                          ERROR                   ;ADRO SET
2798  012252  042737  004000  021496          BIC     #ADRO,@#MOMAP   ;UPDATE MAP
2799
2800                                  ;ADRECC,D DROP WHEN AURD DROPS
2801
2802  012260  032777  000002  167026          BIT     #ADRECC,@DXCR   ;TEST FOR NO ADRECC
2803  012266  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2804  012270  104020                          ERROR                   ;ADRECC SET
2805  012272  042737  000002  021544          BIC     #ADRECC,@#CBMAP ;UPDATE CB MAP
2806  012300  032777  000001  167006          BIT     #ADRECD,@DXCR   ;TEST FOR NO ADRECD
2807  012306  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2810  012310  104020                          ERROR                   ;ADRECD SET
2811  012312  042737  000001  021544          BIC     #ADRECD,@#CBMAP ;UPDATE CB MAP
2812  012320  004737  021366                  JSR     PC,CHKREG
2813  012324  004537  021674                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2814  012330  000001                          1                       ;                                       1 CLOCK PULSE(S)
2815  012332  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2816  012336  024040                          PHS22                   ;THIS PHASE AND STATE                   PHS22
2817  012340  032777  010000  165744          BIT     #ADRI,@DXMI     ;ADRS-IN SHOULD BE UP
2820  012346  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2821  012350  124000                          ERROR                   ;ADRI NOT SET
2822  012352  052737  010000  021510          BIS     #ADRI,@#MIMAP   ;UPDATE MAP
2823  012360  004737  021366                  JSR     PC,CHKREG
2824  012364  004537  021674                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2825  012370  000010                          10                      ;                                       10 CLOCK PULSE(S)
2826  012372  112777  000000  165710          MOVB    #0,@DXMO        ;REMOVE ADRS FROM BUS0
2827  012376  112737  000000  021466          MOVB    #0,@#MOMAP      ;UPDATE MAP
2830  012404  004537  021674                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2831  012410  000002                          2                       ;                                       2 CLOCK PULSE(S)
2832  012412  004737  021366                  JSR     PC,CHKREG
2833                                  ;RELEAVE ALL ONES STATUS FROM BUS1
2834  012420  012737  000400  024776          MOV     #TIOC,CMD       ;LOAD COMMAND
2835  012424  053777  024776  165654          BIS     CMD,@DXMO       ;LOAD CMD & PARITY ON BUS0
2836  012430  053737  024776  021466          BIS     CMD,@#MOMAP     ;UPDATE MAP
2837  012436  004537  021674                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2840  012442  000002                          2                       ;                                       2 CLOCK PULSE(S)
2841  012444  032777  001000  165634          BIT     #CLKO,@DXMI     ;TEST FOR CLOCK-OUT
2842  012450  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2843  012452  104020                          ERROR                   ;CLKO NOT SET
2844  012454  052737  001000  021510          BIS     #CLKO,@#MIMAP   ;UPDATE MI MAP
2845  012462  004737  021366                  JSR     PC,CHKREG
2846                                  ;STILL WAITING IN PHS21 FOR CMDO
2847  012466  052777  002000  165630          BIS     #CMDO,@DXMO     ;RAISE COMMAND-OUT
2850  012474  032777  002000  165620          BIT     #CMDO,@DXMO     ;NOT WITHOUT CLOCK
2851  012502  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2852  012504  104020                          ERROR                   ;CMDO NOT BUFFERED
2853  012506  004537  021674                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2854  012512  000001                          1                       ;                                       1 CLOCK PULSE(S)
2855  012514  032777  002000  165606          BIT     #CMDO,@DXMO     ;CMDO SHOULD BE UP
2856  012522  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
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2647  012532  104000                        ERROR                   ;CMD* NOT SET
2646  012534  052737  022000  021406        BIS     #CMD0,@#MOMAP   ;UPDATE MAP
2649  012542  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2650  012546  000001                        1                       ;                       1 CLOCK PULSE(S)
2651  012550  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2652  012554  000000                        PHS22                   ;THIS PHASE AND STATE           PHS22
2653  012556  032777  010000  100926        BIT     #ADMI,@DXMI     ;ADMS-IN SHOULD BE DOWN
2654  012564  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2655  012566  104000                        ERROR                   ;ADMI DID NOT DROP
2656  012570  042737  010000  021510        BIC     #ADMI,@#MIMAP   ;UPDATE MAP
2657  012576  123777  024770  100924        CMPB    CMD,@CUCR       ;CMD SHOULD BE IN CUCR
2660  012604  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2661  012606  104000                        ERROR                   ;CMD LOAD ERROR
2662  012610  113737  024770  021405        MOVB    CMD,@#CAMAP+1   ;UPDATE CMD SIDE OF CA MAP
2663  012616  004737  021360                JSR     PC,CHKREG
2664
2665                                ;ADVANCE TO STATUS PRESENTATION (PHASE THREE TIME STATE 1)
2666  012622  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2667  012626  000001                        1                       ;                       1 CLOCK PULSE(S)
2670  012630  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2671  012634  034000                        PHS31                   ;THIS PHASE AND STATE           PHS31
2672  012636  032777  004000  100446        BIT     #STAI,@DXMI     ;STATUS-IN=0
2673  012644  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2674  012646  104000                        ERROR                   ;STAI SET
2675  012650  032777  000200  100416        BIT     #CMIS,@DXDS     ;MUST BE CHANNEL INITIATED SELECTION
2676  012656  001401                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2677  012660  104000                        ERROR                   ;THIS NOT SET
2700  012662  032777  000100  100424        BIT     #BYPAS,@DXCB    ;PARITY OF CMD OK
2701  012670  001401                        BNE     .+4             ;BRANCH IF NO ERROR CONDITIO*
2702  012672  104000                        ERROR                   ;BYPAS NOT SET
2703
2704  012674  004737  021360                JSR     PC,CHKREG
2705
2706  012700  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2707  012704  000002                        2                       ;                       2 CLOCK PULSE(S)
2710  012706  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2711  012712  034000                        PHS31                   ;THIS PHASE AND STATE           PHS31
2712
2713                                ;VERIFY "UNIT CHECK" BIT OF STATUS SET COMMAND REJECT
2714  012714  032777  000001  100392        BIT     #CMDREJ,@DXDS   ;UCHECK COPIED INTO CMDREJ
2715  012722  001401                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2716  012724  104000                        ERROR                   ;CMDREJ NOT SET
2717  012726  052737  000001  021372        BIS     #CMDREJ,@#DSMAP ;UPDATE DS MAP
2720
2721                                ;CHECK THAT STATUS CONTAINED IN SPW (87100)
2722                                ;MADE IT TO BUS-IN
2723
2724
2725  012734  127777  176946  100408        CMPB    @IMASBA,@BUSI   ;SPW (87100)=BUS-IN
2726  012742  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2727  012744  104000                        ERROR                   ;SPW (87100) TO BUSI TRANSFER ERROR
2730  012746  117737  176534  021510        MOVB    @IMASBA,@#MIMAP ;UPDATE MAP
2731  012754  117737  176526  021430        MOVB    @IMASBA,@#DSMAP ;UPDATE STATUS MAP
2732  012762  032777  000400  100322        BIT     #PARI,@DXMI     ;PARITY IN=1
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2911  013772  001371                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2912  013772  104000                          ERROR                   ;PANI NOT SET
2913  013774  052737  000400  021510          BIS     #PANI,@#MIMAP   ;UPDATE MAP
2914  014002  004737  021366                  JSR     PC,CHKREG
2915  014006  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2916  014012  000010                          10                      ;                                       10 CLOCK PULSE(S)
2917
2918                                  ;WAIT FOR CMDO TO DROP
2919
2920                                  ;PREP FOR SIG6A
2921
2922  014014  032777  001000  166206          BIT     #SRVO,@DXMO     ;SRVO=0?
2923  014022  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2924  014024  104000                          ERROR                   ;SRVO SET
2925  014026  032777  034000  166240          BIT     #IBMRST,@DXDS   ;IBM RESET
2926  014034  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2927  014036  104000                          ERROR                   ;
2928  014040  042777  002000  166242          BIC     #CMDO,@DXMO     ;DROP COMMAND-OUT
2929  014046  032777  002000  166234          BIT     #CMDO,@DXMO     ;NOT WITHOUT CLOCK
2930  014054  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2931  014056  104000                          ERROR                   ;CMDO NOT BUFFERED
2932  014060  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2933  014064  000002                          2                       ;                                       2 CLOCK PULSE(S)
2934  014066  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2935  014072  034000                          PHS31                   ;THIS PHASE AND STATE                           PHS31
2936  014074  032777  002000  166206          BIT     #CMDO,@DXMO     ;CMDO SHOULD BE ZERO
2937  014102  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2938  014104  104000                          ERROR                   ;CMDO STUCK HIGH
2939  014106  042737  002000  021406          BIC     #CMDO,@#MOMAP   ;UPDATE MAP
2940
2941                                  ;VERIFY SIG6A EVENTS TRANSPIRED
2942  014114  032777  000400  166152          BIT     #BSYS,@DXDS     ;BUS1(04) COPIED INTO BUSY SENT
2943  014122  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2944  014124  104000                          ERROR                   ;BSYS NOT SET
2945  014126  052737  000400  021372          BIS     #BSYS,@#DSMAP   ;UPDATE MAP
2946  014134  032777  001000  166132          BIT     #CMENDS,@DXDS   ;BUS1(P3) COPIED INTO CMEND SENT
2947  014142  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2948  014144  104000                          ERROR                   ;CMENDS NOT SET
2949  014146  052737  001000  021372          BIS     #CMENDS,@#DSMAP ;UPDATE DS MAP
2950
2951
2952
2953  014154  032777  002000  166112          BIT     #UCHKS,@DXDS    ;BUS1(P1) COPIED INTO UCHECK SENT
2954  014162  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2955  014164  104000                          ERROR                   ;UCHKS NOT SET
2956  014166  052737  002000  021372          BIS     #UCHKS,@#DSMAP  ;UPDATE DS MAP
2957  014174  032777  004000  166110          BIT     #STAI,@DXMI     ;VERIFY STATUS-IN UP
2958  014202  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2959  014204  104000                          ERROR                   ;STATUS-IN NOT SET
2960  014206  052737  004000  021510          BIS     #STAI,@#MIMAP   ;UPDATE MI MAP
2961
2962  014214  004737  021366                  JSR     PC,CHKREG
2963  014220  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2964  014224  000010                          10                      ;                                       10 CLOCK PULSE(S)
```

```
                                        ;WAIT FOR SIG0 QUALIFIED SRV0,STA1
 2955
 2956  013226  004737  021360                  JSR     PC,C4KREG
 2957  013232  004737  020744                  JSR     PC,P4ST         ;CHECK CONTROL BITS FOR
 2958  013236  034000                          PHS31                   ;THIS PHASE AND STATE                   PHS31
 2959  013240  017737  166030  020936          MOV     @DUXDS,@@ENTRY1 ;LOAD IT ENTRY ONE
 2960  013246  017737  166024  020976          MOV     @DUXCA,@@ENTRY2 ;LOAD IT ENTRY TWO
 2961  013254  012777  022074  166002          MOV     #FALSE,@DUXIV   ;POINT INTER VECTOR TO TRAP
 2962  013262  013777  001272  165774          MOV     LESS1,@DUXIV    ;DX PRT MINUS ONE
 2963  013270  052777  000100  166002          BIS     #INTEN,@DUXCS   ;SET INTERRUPT ENABLE
 2964  013276  032737  000100  021416          BIT     #INTEN,@@CSMAP  ;UPDATE MAP
 2965
 2966  013304  004737  021360                  JSR     PC,C4KREG
 2967  013310  052777  001000  165772          BIS     #SRV0,@DUXMO    ;ENABLE SIG0
                                        ;ADVANCE TO MARK (PHASE FOUR TIME STATE 1)
 2968
 2969
 2970  013316  004537  021074                  JSR     R5,@@CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 2971  013322  000002                          2                       ;                               2 CLOCK PULSE(S)
 2972  013324  032777  001000  165756          BIT     #SRV0,@DUXMO    ;SRV0 IS UP
 2973  013332  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITIO*
 2974  013334  104000                          ERROR                   ;SRV0 NOT SET
 2975  013336  052737  001000  021466          BIS     #SRV0,@@MOMAP   ;UPDATE MAP
 2976  013344  032777  004000  165740          BIT     #STA1,@DUXMI    ;STATUS-IN SHOULD DROP
 2977  013352  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
 2978  013354  104000                          ERROR                   ;STA1 STUCK HIGH
 2979  013356  042737  004000  021510          BIC     #STA1,@@MIMAP   ;UPDATE MI MAP
 2980  013364  004737  020744                  JSR     PC,P4ST         ;CHECK CONTROL BITS FOR
 2981  013370  044000                          PHS41                   ;THIS PHASE AND STATE                   PHS41
 2982                                  ;BA LOAD IS ASYNC
 2983
 2984  013372  032777  001000  165704          BIT     #BIT9,@DUXBA    ;TTNOX OFFSET
 2985  013400  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
 2986  013402  104000                          ERROR                   ;DXBA(F9) NOT SET
 2987  013404  052737  001000  021442          BIS     #BIT9,@@BAMAP   ;UPDATE MAP
 2988  013412  105777  165666                  TSTB    @DUXBA          ;SET UP FOR TT ENTRY
 2989  013416  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
 2990  013420  104000                          ERROR                   ;DXBA LOAD ERROR
 2991  013422  105037  021442                  CLRB    @@BAMAP         ;UPDATE BAMAP
 2992  013426  023777  001440  165650          CMP     @@TT,@DUXBA     ;DXBA MUST POINT TO TT
 2993  013434  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
 2994  013436  104000                          ERROR                   ;DXBA LOAD ERROR
 2995  013440  017737  165640  021442          MOV     @DUXBA,@@BAMAP  ;UPDATE MAP
 2996  013446  004737  021360                  JSR     PC,C4KREG
 2997                                  ;VERIFY SIG7
 2998  013452  032777  000040  165634          BIT     #NPRX,@DUXCB    ;NPRX MUST BE ZERO
 2999  013460  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
 3000  013462  124000                          ERROR                   ;NPRX SET
 3001  013464  032777  000400  165622          BIT     #SYNC,@DUXCB    ;SYNC MUST BE ZERO
 3002  013472  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 3003  013474  104000                          ERROR                   ;SYNC SET
 3004  013476  004537  021074                  JSR     R5,@@CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 3005  013502  000001                          1                       ;                               1 CLOCK PULSE(S)
 3006  013504  004737  020744                  JSR     PC,P4ST         ;CHECK CONTROL BITS FOR
 3007  013510  046000                          PHS42                   ;THIS PHASE AND STATE                   PHS42
 3008                                  ;VERIFY BUS ADDRESS
```

```
3.29  013512  017727  165564                MOV     @DXDS,(PC)+     ;SAVE OFFSET
3.30  013516  000000            IBA2:   .                       ;HERE, BA IMAGE #2
3.31  013520  042737  001777  013516        BIC     #1777,@#IBA2    ;CLEAR ALL BUT OFFSET
3.32  013526  117727  165616                MOVB    @TTNDX,(PC)+    ;SAVE TTNDX
3.33  013532  000000            INDX:   .                       ;HERE
3.34  013534  005337  013532                DEC     @#INDX          ;LOOK BACK TO SEE WHERE DATA WENT
3.35  013540  006337  013532                ASL     @#INDX          ;WORD BOUNDARIES
3.36  013544  042737  177001  013532        BIC     #177401,@#INDX  ;CLEAR ALL BUT TTNDX BITS
3.37  013552  053737  013532  013516        BIS     @#INDX,@#IBA2   ;BUILD BA IMAGE
3.38  013560  052737  001000  013516        BIS     #BIT9,@#IBA2    ;TT OFFSETS SPH BY 1200
3.39                          ;VERIFY DXBA CONTAINS PROPER TT ADRS
3.40  013566  023777  013516  165510        CMP     @#IBA2,@DXBA    ;IMAGE BA=BA
3.41  013574  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3.42  013576  104000                        ERROR                   ;DXBA LOAD ERROR
3.43                          ;VERIFY DS MADE IT TO ND
3.44  013600  027777  165470  165510        CMP     @DXDS,@DXND     ;CONTENTS OF DS MADE IT TO ND
3.45  013606  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3.46  013610  104000                        ERROR                   ;DS INTO ND TRANSFER ERROR
3.47  013612  057737  165456  021036        BIS     @DXDS,@#NDMAP   ;UPDATE ND MAP
3.48
3.49                          ;VERIFY ND DATA MADE IT TO TUMBLE TABLE
3.50  013622  027777  165450  177070        CMP     @DXDS,@IBA2     ;DS MADE IT TO TT?
3.51  013626  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3.52  013630  104000                        ERROR                   ;DS INTO TT TRANSFER ERROR
3.53  013632  013737  013516  021442        MOV     @#IBA2,@#BAMAP  ;UPDATE
3.54  013640  032777  001000  165446        BIT     #SYNC,@DXCS     ;SIGB
3.55  013646  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3.56  013650  104000                        ERROR                   ;SYNC NOT SET
3.57  013652  052737  001000  021544        BIS     #SYNC,@#CBMAP   ;UPDATE MAP
3.58  013660  117737  165464  021565        MOVB    @TTNDX,@#ESMAP+1        ;UPDATE ES MAP
3.59  013666  032777  000100  165420        BIT     #BYPAS,@DXCS    ;BYPAS SHOULD DROP
3.60  013674  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3.61  013676  104000                        ERROR                   ;BYPAS SET
3.62  013700  042737  000100  021544        BIC     #BYPAS,@#CBMAP  ;UPDATE MAP
3.63  013706  032777  000040  165400        BIT     #NPRX,@DXCR     ;NPRX SHOULD BE UP
3.64  013714  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3.65  013716  104000                        ERROR                   ;NPRX NOT SET
3.66  013720  052737  000040  021544        BIS     #NPRX,@#CBMAP   ;UPDATE MAP
3.67  013726  032777  000020  165360        BIT     #NPRT,@DXCS     ;NPRT SHOULD BE UP
3.68  013734  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3.69  013736  104000                        ERROR                   ;NPRT NOT SET
3.70  013740  052737  000020  021544        BIS     #NPRT,@#CBMAP   ;UPDATE MAP
3.71  013746  004737  021366                JSR     PC,CHKREG
3.72  013752  042777  001000  165330        BIC     #SRVD,@DXMO     ;GET RID OF SRVD ON NEXT CLOCK
3.73  013760  042737  001000  021456        BIC     #SRVD,@#MOMAP   ;UPDATE MAP
3.74
3.75  013766  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3.76  013772  000001                        1                               1 CLOCK PULSE(S)
3.77  013774  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3.78  014000  044000                        PHS41                   ;THIS PHASE AND STATE           PHS41
3.79  014002  032777  000040  165364        BIT     #NPRX,@DXCR     ;TEST FOR NPRX=0
3.80  014010  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3.81  014012  104000                        ERROR                   ;NPRX DID NOT DROP
3.82  014014  042737  000040  021544        BIC     #NPRX,@#CBMAP   ;UPDATE MAP
```

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3063
3064  014022  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3065  014026  000001                        1                       ;                              1 CLOCK PULSE(S)
3066  014030  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3067  014034  040000                        PHS42                   ;THIS PHASE AND STATE                  PHS42
3068  014036  013727  001440                MOV     TT,(PC)+
3069  014042  000000                STT1:   0                       ;SAVE TT ADRS
3070  014044  062737  000002  014042        ADD     #2,STT1         ;CREATE BA IMAGE
3071  014052  023777  014042  165224        CMP     STT1,@DXBA      ;VERIFY CORRECT BUS ADDRESS
3072  014060  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3073  014062  104000                        ERROR                   ;DXBA LOAD ERROR
3074  014064  013737  014042  021442        MOV     STT1,@AMAP      ;UPDATE MAP
3075  014072  004737  021366                JSR     PC,CHKREG
3076
3077
3078
3079
3080
3081
3082
3083
3084
3085  014076  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3086  014102  000001                        1                       ;                              1 CLOCK PULSE(S)
3087  014104  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3088  014110  040000                        PHS71                   ;THIS PHASE AND STATE                  PHS71
3089  014112  027777  165200  165196        CMP     @DXND,@DXCA     ;ND SHOULD CONTAIN CA
3090  014120  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3091  014122  104000                        ERROR                   ;CA INTO ND TRANSFER ERROR
3092  014124  017737  165166  021006        MOV     @DXND,NDMAP     ;UPDATE MAP
3093  014132  032777  001000  165194        BIT     #SYNC,@DXCB     ;
3094  014140  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3095  014142  104000                        ERROR                   ;SYNC SET
3096  014144  042737  001000  021044        BIC     #SYNC,@#CBMAP   ;UPDATE CB MAP
3097  014152  032777  000040  165134        BIT     #NPRX,@DXCB     ;NPRX MUST BE ONE
3098  014160  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3099  014162  104000                        ERROR                   ;NPRX NOT SET
3100  014164  052737  000040  021044        BIS     #NPRX,@#CBMAP   ;UPDATE CB MAP
3101  014172  032777  000200  165120        BIT     #DONE,@DXCS     ;DONE MUST BE SET
3102  014200  001401                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3103  014202  104000                        ERROR                   ;DONE NOT SET
3104  014204  052737  000200  021416        BIS     #DONE,@#CSMAP   ;UPDATE MAP
3105  014212  032777  000200  165100        BIT     #INTREQ,@DXES   ;TEST FOR INTREQ
3106  014220  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3107  014222  104000                        ERROR                   ;INTREQ NOT SET
3108  014224  052737  000200  021504        BIS     #INTREQ,@#ESMAP ;UPDATE MAP
3109  014232  062737  000400  021504        ADD     #400,ESMAP      ;UPDATE TTNDX  MAP
3110  014240  004737  021366                JSR     PC,CHKREG
3111
3112
3113  014244  004537  021074                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3114  014250  000001                        1                       ;                              1 CLOCK PULSE(S)
3115  014252  004737  020744                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3116  014256  040000                        PHS72                   ;THIS PHASE AND STATE                  PHS72
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K5

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3117  014260  032777  000040  165026          BIT     @NPRX,@DXCR     ;NPRX SHOULD = ZERO
3118  014266  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3119  014270  104000                          ERROR                   ;NPRX SET
3120  014272  042737  000040  021544          BIC     @NPRX,@BMAP     ;UPDATE MAP
3121  014300  004737  021360                  JSR     PC,@#KREG
3122
3123
3124  014304  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3125  014310  000001                          1                       ;                                1 CLOCK PULSE(S)
3126  014312  004737  020744                  JSR     PC,@#ST         ;CHECK CONTROL BITS FOR
3127  014316  014000                          PHS71                   ;THIS PHASE AND STATE                    PHS71
3128  014320  004737  021360                  JSR     PC,@#KREG
3129
3130
3131
3132
3133
3134  014324  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3135  014330  000001                          1                       ;                                1 CLOCK PULSE(S)
3136  014332  004737  020744                  JSR     PC,@#ST         ;CHECK CONTROL BITS FOR
3137  014336  014020                          PHS72                   ;THIS PHASE AND STATE                    PHS72
3138  014340  032777  001000  164746          BIT     @SYNC,@DXCR     ;SYNC'S UP
3139  014346  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3140  014350  104000                          ERROR                   ;SYNC NOT SET
3141  014352  052737  001000  021544          BIS     @SYNC,@#CBMAP   ;UPDATE MAP
3142  014360  032777  000040  164726          BIT     @NPRX,@DXCR     ;NPRX IS ZERO
3143  014366  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3144  014370  104000                          ERROR                   ;NPRX NOT ZERO
3145  014372  042737  000040  021544          BIC     @NPRX,@BMAP     ;UPDATE MAP
3146  014400  032777  000020  164706          BIT     @NPRY,@DXCR     ;NPRY IS ZERO
3147  014406  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3148  014410  104000                          ERROR                   ;NPRY NOT ZERO
3149  014412  042737  000020  021544          BIC     @NPRY,@BMAP     ;UPDATE MAP
3150  014420  005777  164690                  TST     @DXDS           ;DEVICE STATUS REG MUST BE ZERO
3151  014424  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3152  014426  104000                          ERROR                   ;DS
3153  014430  005037  021372                  CLR     @#DSMAP         ;UPDATE MAP
3154  014434  004737  021360                  JSR     PC,@#KREG
3155
3156  014440                          TEST:
3157  014440  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3158  014444  000001                          1                       ;                                1 CLOCK PULSE(S)
3159  014446  004737  020744                  JSR     PC,@#ST         ;CHECK CONTROL BITS FOR
3160  014452  014020                          PHS71                   ;THIS PHASE AND STATE                    PHS71
3161  014454  004737  021360                  JSR     PC,@#KREG
3162  014460  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3163  014464  000010                          10                      ;                                10 CLOCK PULSE(S)
3164  014466  004737  021360                  JSR     PC,@#KREG
3165  014472  042777  000002  164020          BIC     @#CLKEN,@DXES   ;CLEAR MAINT CLK EN
3166  014476  032777  000002  164012          BIT     @#CLKEN,@DXES
3167  014504  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3168  014510  104000                          ERROR                   ;MCLKEN STUCK HIGH
3169  014512  042777  000200  164000          BIC     @DONE,@DXCS     ;CLEAR DONE AND LOCKO
3170  014520  032777  000200  164000          BIT     @DONE,@DXCS
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3171  "14526  "21471                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO"
3172  "14530  104078                    ERROR                   ;DONE STUCK
3173  "14532  "32777  13"000  104994    BIT     #LOC"0,@DXCB    ;LOC"0 MUST BE ZERO
3174  "14536  "21471                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO"
3175  "14542  104078                    ERROR                   ;LOC"0 STUCK HIGH
3176  "14544  "52777  "00001  104926    BIS     @DXPRS,@DXCB    ;RETURN TO PHASE ZERO
3177  "14552  "17727  104930            MOV     @DXCB,(PC)+     ;SAVE CB
3178  "14556  "00000                    SC981   :               ;MEME
3179  "14560  "42737  004000  014996    BIC     #TSSF,SC98      ;CLEAR TIME STATE FLOP
3180  "14566  "05737  "14996            TST     "C98
3181  "14572  "21471                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3182  "14574  104038                    ERROR                   ;NOT PHASE ZERO
3183                                  ;EXIT IN PHASE ZERO
3184
3185  "14576  "04737  "25772            JSR     "C,S"W,SETUP    ;REW"ILD SPW
3186
3187
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3198                                    ; ***********************************************************
3199                                    ;TEST   12      ADRECD TEST
3200                                    ; ***********************************************************
3201  014672  012700                    TST12:  SCOPE
3202  014674  012737  000001  022414            MOV     #1,@#ICOUNT     ;ITERATION COUNT
3203  014702  012737  000012  023442            MOV     #12,@#ENTSTN    ;SAVE TEST # FOR ERROR REPORT
3204  014710  012737  014726  022420            MOV     #SCP12,@#RETURN ;SCOPE LOOP RETURN ADRS
3205  014726                            SCP12:
3206
3207                                    ,REM    <
3208                                            VERIFY THE PROPER OPERATION OF THE ADDRESS RECOGNITION
3209                                            AND SELECT-IN, SELECT-OUT LOGIC
3210                                            <
3211  014726  032737  000010  177570            BIT     #BIT3,@#SWR             ;TEST IF SELECTED
3212  014734  001402                            BNE     1$                      ;BR IF NOT DONE ONCE
3213  014736  000137  015370                    JMP     @#SCT11                 ;EXIT IF DONE ONCE
3214  014742  105037  014762            1$:     CLR     @#ANYB
3215  014746  105027                            CLR     (PC)+                   ;START WITH ADRS 00
3216  014750  000000                    TADRS1: 0                               ;TEST ADDRESS
3217  014752  104427  014750                    PARITY  ,TADRS1                 ;PUT PARITY ON ADRS
3218  014756  113727  014750  014762            MOVB    TADRS1,(PC)+            ;ANYTHING BUT
3219  014762  000000                    ANYB:   0                               ;ADDRESS
3220  014764  105237  014762                    INCB    @#ANYB                  ;MAKE IT ANYTHING BUT
3221  014770  004737  021000                    JSR     PC,DXRES                ;RESET DX AND TT
3222  014774  113777  014762  164424            MOVB    @#ANYB,@CUAR            ;LOAD CUAR FOR NO ADRECD
3223  015002  123777  014762  164416            CMPB    @#ANYB,@CUAR            ;VERIFY LOAD
3224  015010  001401                            BEQ     ,+4                     ;BRANCH IF NO ERROR CONDITION
3225  015012  104000                            ERROR                           ;CUAR LOAD ERROR
3226  015014  113737  014762  021404            MOVB    @#ANYB,@#CAMAP          ;UPDATA CA MAP
3227  015022  052777  000002  164370            BIS     #MCLKEN,@DXES           ;SET MCLKEN IN REGISTER ES
3228  015030  052737  000002  021504            BIS     #MCLKEN,@#ESMAP         ;SET MCLKEN IN MAP OF ES
3229  015036  004737  021202                    JSR     PC,TIMS1                ;GET INTO TIME STATE 1
3230  015042  004737  021366                    JSR     PC,CHKREG               ;LOOK AROUND THE REGISTERS
3231  015046  004537  021074                    JSR     R5,@#CLK                ;ROUTINE TO ISSUE CLOCK PULSES
3232  015052  000010                            10                              ;                               10 CLOCK PULSE(S)
3233  015054  004737  021366                    JSR     PC,CHKREG               ;AND DO IT AGAIN
3234  015060  004737  020744                    JSR     PC,PHST                 ;CHECK CONTROL BITS FOR
3235  015064  004000                            PHS01                           ;THIS PHASE AND STATE                   PHS01
3236  015066  053777  014650  164314            BIS     @#TADRS1,@DXMD          ;PUT ADRS ON BUS-OUT
3237  015074  123777  014650  164326            CMPB    @#TADRS1,@DXMD          ;NO BUFFER FLOPS FOR DXMD
3238  015102  001401                            BEQ     ,+4                     ;BRANCH IF NO ERROR CONDITION
3239  015104  104000                            ERROR                           ;DXMD LOAD ERROR
3240  015106  053737  014650  021406            BIS     @#TADRS1,@#MDMAP        ;UPDATE MAP
3241  015114  004737  021234                    JSR     PC,@#COPARO             ;COPY PARITY-OUT
3242  015120  004737  021366                    JSR     PC,CHKREG
3243                                    ;RAISE ADDRESS-OUT,SELECT-OUT AND HOLD-OUT
3244                                    ;AND VERIFY THAT THOSE FUNCTIONS ARE SET
3245  015124  052777  064000  164296            BIS     #HLDO!SELO!ADRO,@DXMD
3246  015132  004537  021074                    JSR     R5,@#CLK                ;ROUTINE TO ISSUE CLOCK PULSES
3247  015136  000001                            1                               ;                               1 CLOCK PULSE(S)
3248  015140  017727  164244                    MOV     @DXMD,(PC)+             ;SAVE DXMD
3249  015144  000000                    TASMD1: 0                               ;HERE
3250  015146  042737  000777  015044            BIC     #777,@#TASMD1           ;REMOVE BUSO-PARO
3251  015154  022737  164000  015044            CMP     #OPLO!HLDO!SELO!ADRO,@#TASMD1
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3242  715062  701471                          BEQ     ,+4             ;BRANCH IF NO ERROR CONDITION
3243  715064  104000                          ERROR                   ;CONS LOAD ERROR
3244  715066  052737  064000  021406          BIS     #HLDD!SELO!ADRO,@#MDMAP!JPDATE MAP
3245  715074  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3246  715103  000000                          PHS02                   ;THIS PHASE AND STATE                   PHS02
3247                                  ,REM    •
3248                                          USE TEST ADDRESS (TADRS1) AS INDEX TO SPM
3249                                          TO DETERMINE IF ADRS IS LEGAL AND THEREFORE
3250                                          SHOULD SET ADRECC,  ALSO SELI SHOULD
3251                                          NOT BE PROPOGATED IF ADRS IS RECOGNIZED
3252                                          •
3253
3254  715072  113701  014050                  MOVB    TADRS1,R1       ;LOAD DEVICE ADDRESS
3255  715076  042701  177400                  BIC     #177400,R1      ;CLEAR EXTENDED SIGN BITS
3256  715112  006301                          ASL     R1              ;SCALE MOD (2)
3257  715114  022761  030400  002020          CMP     @DSTADRS,2000(R1) ;LOOK FOR LEGAL SPM
3258  715122  001007                          BNE     PSELI1          ;PASS SELECT-IN IF NOT RECOGNIZED
3259
3260                                  ;ADRESS IS A LEGAL ADDRESS AND THEREFORE MUST BE RECOGNIZED
3261                                  ;(RAISE ADRECC AND BECAUSE CUAR CONTAINES DEVICE ADRS ADRECD)
3262                                  ;SELECT-IN SHOULD NOT BE PROPOGATED
3263                                  ;•••••••••••••••••••••••• MOD APR 74 ••••••••••••••••••••••••••••••••
3264                                  ;•              ADRESS VERIFICATION MOD
3265
3266  715124  004737  001444                  JSR     PC,LAMS         ;VERIFY ADDRESS RANGE
3267  715130  032737  000001  021696          BIT     #ADRECD,CBMAPS  ;VERIFY ADDRESS RANGE
3268  715136  001473                          BEQ     PXX1            ;(NO) CUAR-DXMO-LEGAL ADD DID NOT COMPARE
3269                                  ;•••••••••••••••••••••••• MOD APR 74 ••••••••••••••••••••••••••••••••
3270
3271  715140  032777  000002  164146  ZZZ1:   BIT     #ADRECC,@DXCS   ;ADRS-RECOGNITION-CONTROL UNIT
3272  715146  001001                          BNE     ,+4             ;BRANCH IF NO ERROR CONDITION
3273  715150  104000                          ERROR                   ;ADRECC NOT SET
3274  715152  052737  000002  021544          BIS     #ADRECC,@#CBMAP ;UPDATE MAP
3275  715160  032777  000001  164126          BIT     #ADRECD,@DXCS   ;ADRS-RECOGNITION-DEVICE
3276  715166  001001                          BNE     ,+4             ;BRANCH IF NO ERROR CONDITION
3277  715170  104000                          ERROR                   ;ADRECD FAILURE TO SET
3278  715172  052737  000001  021544          BIS     #ADRECD,@#CBMAP ;UPDATE MAP
3279
3280  715200  032777  001000  164106          BIT     #SYNC,@DXCS     ;
3281  715206  001401                          BEQ     ,+4             ;BRANCH IF NO ERROR CONDITION
3282  715210  104000                          ERROR                   ;SYNC SET
3283  715212  032777  100000  164074          BIT     #LOC<0,@DXCS    ;
3284  715220  001401                          BEQ     ,+4             ;BRANCH IF NO ERROR CONDITION
3285  715222  104000                          ERROR                   ;
3286                                  ;DXMI IS UNREADABLE
3287                                  ;       BIT     #SELI,@DXMI     ;SELECT IN SHOULD NOT BE PROPOGATED
3288                                  ;       ERCALL  BEQ,<SELECT IN ERROR>
3289  715224  004737  021366                  JSR     PC,CHKREG       ;
3290
3291  715230  052777  000001  164042          BIS     #DXFRS,@DXCS    ;ISSUE DX RESET
3292  715236  042777  000002  164034          BIC     #MCLKEN,@DXES   ;CLEAR MAINTENANCE
3293  715244  052777  000001  164026          BIS     #DXFRS,@DXES    ;ISSUE DX RESET
3294  715252  022777  100000  164030          CMP     #OPLD,@DXMO     ;DXRESET SHOULD CLEAR MO
3295  715260  001401                          BEQ     ,+4             ;BRANCH IF NO ERROR CONDITION
```

```
3296  015262  104000                          ERROR                   ;DXMP DXRESET ERROR
3297  015264  012737  100000  021466          MOV     #OPLO,@#MOMAP   ;UPDATE MAP
3298  015272  042737  000003  021696          BIC     #3,CBMAPS
3299  015300  000526                          BR      NXT11           ;DO NEXT ADRS
3300
3301                                  ;ADDRESS NOT RECOGNIZED BY DX
3302                                  ;********** NEW MOD APR 74 **********
3303                                  ;*              LEGAL  DDRESS RESOLUTION MOD
3304
3305  015302  022737  000020  029016  PSEL11: CMP     #27,MAX.DEV.CU
3306  015310  001420                          BEQ     PP1
3307  015312  004737  001444                  JSR     PC,LAMS         ;VERIFY LEGAL ADDRESS
3308  015316  022737  000003  021696  P1X1:   CMP     #ADRECC!ADRECD,CBMAPS   ;TEST ADRESS C + D COMPARE
3309  015324  001725                          BEQ     ZZZ             ;(YES) BRANCHES
3310  015326  032737  000002  021696  PXX11:  BIT     #ADRECC,CBMAPS  ;TEST ADRESS C
3311  015334  001406                          BEQ     PP1             ;(NO) BRANCHES
3312  015336  032777  000002  163730          BIT     #ADRECC,@DXCR
3313  015344  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3314  015346  104000                          ERROR                   ;FALSE ADDRESS C FAILURE TO SET IN DXCB
3315  015350  000405                          BR      PX1
3316  015352  032777  000002  163734  PP1:    BIT     #ADRECC,@DXCR   ;ADRECC SHOULD NOT BE SET
3317  015360  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3318  015362  104020                          ERROR                   ;FALSE ADDRESS RECOGNITION
3319  015364  032777  000001  163722  PX11:   BIT     #ADRECD,@DXCR   ;ADRECD SHOULD NOT BE SET
3320                                  ;********** MOD APR 74 **********
3321  015372  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3322  015374  104000                          ERROR                   ;FALSE DEVICE RECOGNITION
3323  015376  032777  040000  163706          BIT     #SELI,@DXMI     ;SELECT-IN MUST BE PROPOGATED
3324  015404  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3325  015406  104000                          ERROR                   ;SELECT-IN WAS NOT PASSED
3326  015410  052737  040000  021510          BIS     #SELI,@#MIMAP   ;UPDATE MAP
3327  015416  042777  020000  163664          BIC     #SELO,@DXMO     ;DROP SELECT-OUT
3328  015424  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3329  015430  000001                          1                       ;                       1 CLOCK PULSE(S)
3330
3331  015432  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3332  015436  004000                          PHS01                   ;THIS PHASE AND STATE           PHS01
3333  015440  032777  020000  163642          BIT     #SELO,@DXMO     ;SELO MUST DROP
3334  015446  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3335  015450  104000                          ERROR                   ;SELO DID NOT DROP
3336  015452  042737  020000  021466          BIC     #SELO,@#MOMAP   ;UPDATE MAP
3337                                          BIT     #SELI,@DXMI     ;SELI MUST DROP
3338                                          ERCALL  BEQ,<SELI DID NOT DROP>
3339  015460  042737  040000  021510          BIC     #SELI,@#MIMAP   ;UPDATE MAP
3340  015466  042777  077777  163614          BIC     #77777,@DXMO    ;CLEAR ALL BUT OPLO
3341  015474  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3342  015500  000002                          2                       ;                       2 CLOCK PULSE(S)
3343  015502  022777  100000  163600          CMP     #OPLO,@DXMO     ;CHECK MAINTENANCE-OUT
3344  015510  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3345  015512  104000                          ERROR                   ;DXMO ILLEGAL STATE
3346  015514  012737  100000  021466          MOV     #OPLO,@#MOMAP   ;UPDATE MAP
3347  015522  004737  021234                  JSR     PC,COMAMO
3348  015526  042777  000002  163604          BIC     #MCL<EN,@DXES   ;
3349  015534  042737  000003  021696          BIC     #3,CBMAPS
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C.6

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3350  015542  123737  014662  014630          CMPB    @#ANYB,@#TADRS1
3351  015550  001402                          BEQ     NXT11
3352  015552  000137  014664                  JMP     @#ANYB+2
3353  015556  105237  014630          NXT111  INCB    TADRS1          ;INC TO NEXT ADRESS
3354  015562  122737  000000  014630          CMPB    #0,@#TADRS1
3355  015570  001402                          BEQ     SCT11           ;BRANCH IF FINISHED
3356  015572  000137  014632                  JMP     @#TADRS1+2      ;CONTINUE TEST
3357  015576                          SCT111
3358
3359
```

```
3360                                    ;*************************************************************
3361                                    ;TEST   13      SELECTION CONTROL TEST
3362                                    ;*************************************************************
3363   015576  104400                   TST13:  SCOPE
3364   015600  012737  000002  022414           MOV     #2,@#ICOUNT     ;ITERATION COUNT
3365   015606  012737  000013  023442           MOV     #13,@#ENTSTN    ;SAVE TEST # FOR ERROR REPORT
3366   015614  012737  015622  022420           MOV     #SCP13,@#RETURN ;SCOPE LOOP RETURN ADRS
3367   015622                           SCP13:
3368
3369                                    ,REM    *
3370                                            VERIFY THE PROPER OPERATION OF THE ADDRESS RECOGNITION
3371                                            AND SELECT-IN, SELECT-OUT LOGIC
3372                                            *
3373
3374   015622  032737  000004  024706           BIT     #BIT2,@#ONESHOT
3375   015630  001002                           BNE     1$
3376   015632  000137  016464                   JMP     @#SCT1
3377   015636  042737  000004  024706   1$:     BIC     #BIT2,@#ONESHOT ;DO THIS TEST ONCE
3378   015644  005027                           CLR     (PC)+           ;START WITH ADRS 00
3379   015646  000000                   TADRS:  0                       ;TEST ADDRESS
3380   015650  104007  015646                   PARITY  ,TADRS          ;PUT PARITY ON ADRS
3381   015654  004737  021060                   JSR     PC,DXRES        ;RESET DX AND TT
3382   015660  113777  015646  163440           MOVB    @#TADRS,@#CUAR  ;LOAD CUAR TO SET ADRECD
3383   015666  123777  015646  163432           CMPB    @#TADRS,@#CUAR  ;VERIFY LOAD
3384   015674  001401                           BEQ     ,+4             ;BRANCH IF NO ERROR CONDITION
3385   015676  104000                           ERROR                   ;CUAR LOAD ERROR
3386   015700  113737  015646  021404           MOVB    @#TADRS,@#CAMAP ;UPDATE CA MAP
3387   015706  052777  000002  163404           BIS     #MCLKEN,@#DXES  ;SET MCLKEN IN REGISTER ES
3388   015714  052737  000002  021504           BIS     #MCLKEN,@#ESMAP ;SET MCLKEN IN MAP OF ES
3389   015722  004737  021202                   JSR     PC,TIMS1        ;GET INTO TIME STATE 1
3390   015726  004737  021360                   JSR     PC,CHKREG       ;LOOK AROUND THE REGISTERS
3391   015732  004537  021074                   JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3392   015736  000010                           10                      ;                                       10 CLOCK PULSE(S)
3393   015740  004737  021360                   JSR     PC,CHKREG       ;AND DO IT AGAIN
3394   015744  004737  020744                   JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3395   015750  004000                   PHS01                           ;THIS PHASE AND STATE                   PHS01
3396   015752  053777  015646  163330           BIS     @#TADRS,@#DXMO  ;PUT ADRS ON BUS-OUT
3397   015760  123777  015646  163322           CMPB    @#TADRS,@#DXMO  ;NO BUFFER FLOPS FOR DXMO
3398   015766  001401                           BEQ     ,+4             ;BRANCH IF NO ERROR CONDITION
3399   015770  104000                           ERROR                   ;DXMO LOAD ERROR
3400   015772  053737  015646  021406           BIS     @#TADRS,@#MOMAP
3401   016000  004737  021234                   JSR     PC,@#COPARO     ;COPY PARITY-OUT
3402
3403
3404
3405
3406
3407
3408
3409
3410
3411
3412
3413
```

E6

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3414  716074  "24737  "21366                  JSR     PC,CHKREG
3415                                  ;RAISE ADDRESS-OUT,SELECT-OUT AND HOLD-OUT
3416                                  ;AND VERIFY THAT THOSE FUNCTIONS ARE SET
3417  716100  "52777  "64000  163272          BIS     #HLDO!SELO!ADRO,@DXMC
3418  716106  "24537  "21674                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3419  716112  "000001                         1                       ;                                1 CLOCK PULSE(S)
3420  716114  "17727  163260                  MOV     @DXMO,(PC)+     ;SAVE DXMO
3421  716120  "000000                 TASMO:  ?                       ;MEMF
3422  716122  "42737  "0F777  "16036          BIC     #777,@#TASMO    ;REMOVE BUSO+PARO
3423  716130  "22737  164000  "16036          CMP     #OPLO!HLDO!SELO!ADRO,@#TASMO
3424  716136  "01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3425  716140  104000                          ERROR                   ;CONO LOAD ERROR
3426  716142  "52737  "64000  "21406          BIS     #HLDO!SELO!ADRO,@#SMOMAP;UPDATE MAP
3427  716150  "04737  "20744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3428  716154  "0F000                          PHS02                   ;THIS PHASE AND STATE                    PHS02
3429                                  ,REM    +
3430                                  USE TEST ADDRESS (TADRS) AS INDEX TO SPW
3431                                  TO DETERMINE IF ADRS IS LEGAL AND THEREFORE
3432                                  SHOULD SET ADRECC AND ADRECD,  ALSO SELI
3433                                  SHOULD NOT BE PROPOGATED IF ADRS IS RECOGNIZED
3434                                  +
3435
3436  716156  113701  "15040                  MOVB    TADRS,R1        ;LOAD DEVICE ADDRESS
3437  716162  "42701  177400                  BIC     #177400,R1      ;CLEAR EXTENDED SIGN BITS
3438  716166  "06301                          ASL     R1              ;SCALE MOD (2)
3439  716170  "22761  "30400  "02000          CMP     #OSTADRS,2000(R1) ;LOOK FOR LEGAL SPW
3440  716176  "01056                          BNE     @SELI           ;PASS SELECT-IN IF NOT RECOGNIZED
3441
3442                                  ;ADRESS IS A LEGAL ADDRESS AND THEREFORE MUST BE RECOGNIZED
3443                                  ;(RAISE ADRECC AND BECAUSE CUAR CONTAINES DEVICE ADRS ADRECD)
3444                                  ;SELECT-IN SHOULD NOT BE PROPOGATED
3445
3446  716110  "32777  "0F002  163176          BIT     #ADRECC,@DXCR   ;ADRS-RECOGNITION-CONTROL UNIT
3447  716116  "01001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3448  716120  104000                          ERROR                   ;ADRECC NOT SET
3449  716122  "52737  "00002  "21544          BIS     #ADRECC,@#CBMAP ;UPDATE MAP
3450  716130  "32777  "00001  163156          BIT     #ADRECD,@DXCR   ;ADRS-RECOGNITION-DEVICE
3451  716136  "01001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3452  716140  104000                          ERROR                   ;ADRECD NOT SET
3453  716142  "52737  "00001  "21544          BIS     #ADRECD,@#CBMAP ;UPDATE MAP
3454
3455  716150  "32777  "01000  163136          BIT     #SYNC,@DXCR     ;
3456  716156  "01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3457  716160  104000                          ERROR                   ;SYNC SET
3458  716162  "32777  100000  163124          BIT     #LOC<0,@DXCB    ;
3459  716170  "01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3460  716172  104000                          ERROR                   ;
3461                                  ;DXMI IS UNREADABLE
3462                                  ;       BIT     #SELI,@DXMI     ;SELECT IN SHOULD NOT BE PROPOGATED
3463                                  ;       ERCALL  BEQ,<SELECT IN ERROR>
3464  716174  "24737  "21366                  JSR     PC,CHKREG       ;
3465
3466  716200  "52777  "00001  163072          BIS     #DXFRS,@DXCS    ;ISSUE DX RESET
3467  716206  "42777  "00002  163104          BIC     #MCL<EN,@DXES   ;CLEAR MAINTENANCE
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3468  016214  052777  000001  163876          BIS     #DXIES,@DXES    ;ISS E DX RESET
3469  016222  022777  100000  163868          CMP     #OPLO,@DXMO     ;DXMRESET SHOULD CLEAR MO
3470  016230  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
3471  016232  104000                          ERROR                   ;DXMO DXRESET ERROR
3472  016234  012737  100000  021406          MOV     #OPLO,@#MOMAP   ;UPDATE MAP
3473  016242  000578                          RR      *XTADRS         ;DO *EXT ADRS
3474
3475                                  ;ADDRESS NOT RECOGNIZED BY DX
3476
3477  016244  032777  000002  163842  PSELII  BIT     #ADRECC,@DXCR   ;ADRECC SHOULD NOT BE SET
3478  016252  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
3479  016254  104000                          ERROR                   ;FALSE ADDRESS RECOGNITION
3480  016256  042737  000002  021636          BIC     #ADRECC,CBMAPS
3481  016264  032777  000001  163822          BIT     #ADRECD,@DXCR   ;ADRECD SHOULD NOT BE SET
3482  016272  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION*
3483  016274  104000                          ERROR                   ;FALSE DEVICE RECOGNITION
3484  016276  032777  040000  163826  PXI     BIT     #SELI,@DXMI     ;SELECT-IN MUST BE PROPOGATED
3485  016304  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITIO*
3486  016306  104000                          ERROR                   ;SELECT-IN WAS NOT PASSED
3487  016310  052737  040000  021510          BIS     #SELI,@#MIMAP   ;UPDATE MAP
3488  016316  004737  021366                  JSR     PC,C#KREG
3489  016322  042777  020000  162700          BIC     #SELO,@DXMO     ;DROP SELECT-OUT
3490  016330  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3491  016334  000001                          1                       ;                               1 CLOCK PULSE(S)
3492
3493  016336  004737  020744                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3494  016342  004020                          PHS01                   ;THIS PHASE AND STATE                   PHS01
3495  016344  032777  020000  162736          BIT     #SELO,@DXMO     ;SELO MUST DROP
3496  016352  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITIO*
3497  016354  104000                          ERROR                   ;SELO DID NOT DROP
3498  016356  042737  020000  021406          BIC     #SELO,@#MOMAP   ;UPDATE MAP
3499                                  ;       BIT     #SELI,@DXMI     ;SELI MUST DROP
3500                                  ;       ERCALL  BEQ,<SELI DID NOT DROP>
3501  016364  042737  040000  021510          BIC     #SELI,@#MIMAP   ;UPDATE MAP
3502  016372  042777  077777  162710          BIC     #77777,@DXMO    ;CLEAR ALL BUT OPLO
3503  016400  004537  021074                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3504  016404  000002                          2                       ;                               2 CLOCK PULSE(S)
3505  016406  022777  100000  162674          CMP     #OPLO,@DXMO     ;CHECK MAINTENANCE-OUT
3506  016414  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION*
3507  016416  104000                          ERROR                   ;DXMO ILLEGAL STATE
3508  016420  012737  100000  021406          MOV     #OPLO,@#MOMAP   ;UPDATE MAP
3509  016426  004737  021234                  JSR     PC,COPAMO
3510  016432  004737  021366                  JSR     PC,C#KREG
3511  016436  042777  000002  162694          BIC     #MCL<LN,@DXES   ;
3512  016444  105237  015646          *XTADRS:INCB    TADRS           ;INC TO NEXT ADRESS
3513  016450  122737  000000  015646          CMPB    #0,@#TADRS
3514  016456  001402                          BEQ     SCT1            ;BRANCH IF FINISHED
3515  016460  007137  019058                  JMP     @#TADRS+2       ;CONTINUE TEST
3516  016464                          SCT11
3517
3518
```

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3519                                    ;*****************************************************************
3520                                    ;TEST   14      DX TIMEOUT, 9 SEC OPLI
3521                                    ;*****************************************************************
3522  016464  104402                    TST14:  SCOPE
3523  016466  012737  000001  022414            MOV     #1,@#ICOUNT     ;ITERATION COUNT
3524  016474  012737  000014  023442            MOV     #14,@#ENTSTN    ;SAVE TEST # FOR ERROR REPORT
3525  016502  012737  016518  022420            MOV     #SCP14,@#RETURN ;SCOPE LOOP RETURN ADRS
3526  016516                            SCP14:
3527
3528                                    ;************************ MOD APR 74 **********************************
3529                                    ;*              SCAN CONTROL RESTORATION
3530                                    ;*              FOR ADDRESS RESOLUTION MOD
3531
3532  016516  004737  025772                    JSR     PC,SPW;SETUP    ;RESTORE SCAN CONTROL
3533                                    ;************************ MOD APR 74 **********************************
3534  016522  032737  000001  024706            BIT     #FIVESEC,ONESHOT
3535  016530  001544                            BEQ     DXT0,0 *
3536  016532  005037  025832                    CLR     COUNT
3537  016536  005037  024770                    CLR     CARRY
3538  016542  004737  021066                    JSR     PC,DXRES        ;RESET AND RESTORE
3539  016546  042777  000010  102592            BIC     #TIMDIS,@DXES
3540  016554  032777  000010  102544            BIT     #TIMDIS,@DXES
3541  016562  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3542  016564  104000                            ERROR                   ;TIMDIS STUCK HIGH
3543  016570  012737  000483  024776            MOV     #NOPC,CMD       ;LOAD NOP COMMAND
3544  016576  004737  020350                    JSR     PC,SEL;ISS
3545  016602  032777  100000  102512            BIT     #OPLI,@DXMI
3546  016610  001401                            BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3547  016612  104000                            ERROR                   ;SELECTION FAILED?
3548  016614  062737  000001  025832  DXT0,1:   ADD     #1,COUNT
3549  016622  103011                            BCC     DXT0,2
3550  016624  105537  024770                    ADCB    CARRY
3551  016630  122737  000050  024770            CMPB    #50,CARRY
3552  016636  001401                            BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3553  016640  104000                            ERROR                   ;5 SECOND TIMEOUT FAILED
3554  016642  005037  025832          DXT0,3:   CLR     COUNT
3555  016646  032737  000020  102494  DXT0,2:   BIT     #DXT0,@DXES
3556  016654  001757                            BEQ     DXT0,1
3557  016656  022777  104610  102436            CMP     #OPLI!STALLCMEND!DEVEND!UCHECK,@DXMI
3558  016664  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3559  016666  104000                            ERROR                   ;COND LOAD ERROR
3560  016670  042777  060000  102422            BIC     #SELO!HLDO,@DXMO        ;DESELECT
3561  016676  052777  001000  102414            BIS     #SRVO,@DXMO             ;RELEAVE STATUS
3562  016704  042777  001000  102406            BIC     #SRVO,@DXMO             ;
3563  016712  004737  021066                    JSR     PC,DXRES        ;RESET AND RESTORE
3564  016716  042777  000020  102404            BIC     #DXT0,@DXES
3565  016724  032777  000020  102376            BIT     #DXT0,@DXES     ;CHECK DXT0
3566  016732  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3567  016734  104000                            ERROR                   ;DXT0 STUCK HIGH
3568
3569
3570                                    ;TEST TIMER DISABLE "TIMDIS"
3571
3572  016736  052777  000010  102404            BIS     #TIMDIS,@DXES
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3573  "16734  "32777  000010  102356          BIT     #TIMOIS,@DXES
3574  "16742  "01401                          BNE     .+4                 ;BRANCH IF NO ERROR CONDITION
3575  "16744  104000                          ERROR                       ;TIMOIS NOT SET
3576  "16746  004737  "20222                  JSR     PC,FASTISS
3577  "16752  "06337  "25032                  ASL     COUNT               ;+/- FUDGE
3578  "16756  "05337  "25032          DXTO,4  DEC     COUNT
3579  "16762  "01375                          BNE     DXTO,4
3580  "16764  105737  "24770                  TSTB    CARRY
3581  "16770  "01406                          BEQ     DXTO,5
3582  "16772  "06237  "24770                  ASR     CARRY
3583  "16776  "12737  "77777  025032          MOV     #77777,COUNT
3584  "17004  000764                          BR      DXTO,4
3585  "17006  "32777  000020  102304  DXTO,5  BIT     #DXTO,@DXES
3586  "17014  "01401                          BEQ     .+4                 ;BRANCH IF NO ERROR CONDITION
3587  "17016  104000                          ERROR                       ;DXTO SET
3588
3589  "17020  "42777  000200  102252          BIC     #DONE,@DXCS
3590  "17026  "52777  000001  102244          BIS     #DXFBS,@DXCS
3591  "17034  "42737  "00001  "24706  DXTO,6  BIC     #FIVESEC,ONESHOT
3592
3593
```

```
                                        ;*************************************************************
                                        ;TEST   15      NXM TEST, NPR TIMEOUT CALIBRATION ROUTINE
                                        ;*************************************************************
017042  012700                  TST15:  SCOPE
017044  012737  000010  022414          MOV     #10,@#ICOUNT    ;ITERATION COUNT
017052  012737  000015  023442          MOV     #15,@#ENTSTN    ;SAVE TEST # FOR ERROR REPORT
017060  012737  017066  022420          MOV     #SCP15,@#RETURN ;SCOPE LOOP RETURN ADRS
017066                          SCP15:
                                        ;IF OTHER THAN NPR TIMEOUT ERRORS ARE DETECTED IN THIS TEST
                                        ;RUN MAINTENANCE CLOCK 2
017066                          NPR,CAL:                        ;NPR TIMEOUT CALIBRATION
                                        ;************************** MOD APR 74 ********************************
                                        ;*                      MEMORY MANAGEMENT MOD
017066  013727  000004                  MOV     @#4,(PC)+
017072  000000                  L4:     .
017074  013727  000000                  MOV     @#6,(PC)+
017100  000000                  L6:     .
017102  005027                          CLR     (PC)+
017104  000000                  FLGMM:  .
017106  012737  017144  000004          MOV     #LINK,@#4
017114  012737  000340  000006          MOV     #LEVEL7,@#6
017122  013727  177776                  MOV     @#PS,(PC)+
017126  000000                  PSWS:   .
017130  005777  00F270                  TST     @KIPAR7         ;KERNAL PAGE ADDRESS REGISTER
017134  013737  017520  017104          MOV     EABITS,FLGMM    ;PERIPHERAL PAGE XBA BITS
017142  000401                          BR      PAST
017144  022626                  LINK:   CMP     (SP)+,(SP)+
017146  000240                  PAST:   NOP
                                        ;************************** MOD APR 74 ********************************
                                        ;**NOTE:
                                        ;*      FOR SYSTEMS WITH KT11 OPTIONS THE TUMBLE TABLE
                                        ;*      ASSOCIATED NXM BIT 14 IS NOT VERIFIED DUE TO THE
                                        ;*      POSSIBILITY OF NOT HAVING THE ASSOCIATED 32K MEMORY BANK
                                        ;*      AVAILABLE, ON THESE SYSTEMS THE POP-TO BIT 14 OF THE DXDS
                                        ;*      REGISTER IS VERIFIED AS FUNCTIONAL
                                        ;
                                        ;************************** MOD APR 74 ********************************
017150  013737  001440  017436          MOV     TT,SOFTT        ;LOAD SOFTWARE TT POINTER
017156  012777  017352  162100          MOV     #FISSD,@DXIV    ;INTERRUPT ON FAST ISS DONE
017164  013777  001270  162074          MOV     DXPRT,@DXIS     ;SELECTOR CHANNEL ONLY
017172  013777  001430  162102          MOV     SPW,@DXDS       ;LOAD LEGAL OFFSET
017200  052777  000001  162072          BIS     #DXFRS,@DXCS    ;DX RESET, ZERO TTNDX
017206  005037  177776                  CLR     @#PS            ;CLEAR PROCESSOR STATUS
017212  012737  000001  024776          MOV     #WRITEC,CMD     ;SET UP FOR 300 WRITE
017220  052777  000100  162052          BIS     #INTEN,@DXCS    ;SET INTERRUPT ENABLE
017226  004737  020350                  JSR     PC,SEL.ISS      ;DUE FAST ISS
017232
```

```
3648                                    ;************************** MOD APR 74 ******************************
3649
3650  017232  012737  000004  000004          MOV     #0,@#4
3651  017240  013737  032770  000006          MOV     @TX,@#6
3652  017246  153777  017164  162024          BIS     FLSHW,@DXCS     ;SET UP XBA BITS
3653  017254  012777  177320  162022          MOV     #177320,@DXBA   ;DATA DESTINATION IS NON-X-MEM
3654
3655                                    ;       ADDRESS USED IS FOR 2ND KE11 OPTION
3656                                    ;       XBA BITS 4,3 OF DXCS MUST BE = 11
3657                                    ;       IF KT11 MEMORY OPTION IS PRESENT
3658                                    ;
3659                                    ;************************** MOD APR 74 ******************************
3660
3661  017262  012777  177776  162016          MOV     #-2,@DXBC       ;TAKES TWO BYTES TO CAUSE ONE NPR
3662  017270  012737  000002  017434          MOV     #2,BCNT         ;LOAD SOFTWARE BYTE COUNT
3663  017276  152777  000003  161774          BIS     #DXFI!GO,@DXCS  ;FUNCTION INPUT AND GO
3664  017304  052777  000777  162024  NPRC2:  BIS     #777,@BUSO      ;PUT DATA ON BUS-OUT
3665  017312  052777  001000  161770          BIS     #SRVO,@DXMO     ;RAISE SERVICE-OUT
3666  017320  042777  061000  161762          BIC     #SRVO!MLDOISELO,@DXMO   ;MUX CH ONLY
3667                                                                  ;SEL CH CAUSES DX TO ENTER PH3
3668  017326  005337  017434                  DEC     BCNT            ;DEC BYTE COUNT
3669  017332  001364                          BNE     NPRC2           ;BRANCH IF NOT DONE
3670  017334  012700  001750                  MOV     #1000.,R0       ;PASS COUNT
3671  017340  005300          15$:    DEC     R0              ;PASS TIME = 7.6 MICRO SEC
3672  017342  001376                          BNE     15$             ;ON AN 11/20
3673  017344  104000                          ERROR                   ;NPR DID NOT TAKE PLACE
3674  017346  000137  017000                  JMP     NPRC1
3675                                    ;NPR TIMEOUT CALIBRATION ROUTINES
3676
3677                                    ;FAST ISS DONE INTERRUPT
3678
3679  017352                            FISSD:
3680  017352  032777  000200  161720          BIT     #DONE,@DXCS
3681  017360  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3682  017362  104000                          ERROR                   ;FALSE INTERRUPT
3683  017364  042777  000200  161706          BIC     #DONE,@DXCS     ;CLEAR DONE
3684  017372  032777  000200  161700          BIT     #DONE,@DXCS     ;
3685  017400  001001                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3686  017402  104000                          ERROR                   ;DONE STUCK HIGH
3687  017404  013701  001440                  MOV     TT,R1
3688  017410  032761  000200  000000          BIT     #CHIS,0(R1)
3689  017416  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3690  017420  104000                          ERROR                   ;CHIS NOT SET IN TT
3691  017422  012777  017440  161634          MOV     #NPRINT,@DXIV   ;SET UP FOR NPR TIMEOUT
3692  017430  000002                          RTI
3693  017432  172340          KIPARX: 172340                  ;KERNAL PAGE ADDRESS REGISTER
3694
3695  017434  000000          BCNT:   0                       ;SOFTWARE BYTE COUNT
3696  017436  000000          SOFTT:  0                       ;SOFTEARE TT POINTER
3697                                    ;NPR TIMEOUT INTERRUPT
3698
3699  017440                            NPRINT:
3700  017440  032777  000200  161632          BIT     #DONE,@DXCS
3701  017446  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
```

```
3712  017452  005737  017134                  TST     FLGMM           ;TEST KT11 OPTION PRESENT
3713  017456  001421                          BEQ     NPRCM           ;(NO) BRANCHES
3714  017460  017727  161574                  MOV     @DXCS,(PC)+
3715  017464  000000                  SEABITS:0
3716  017466  042737  177747  017524          BIC     #177747,SEABITS ;MASK OUT OTHER THAN 4,3
3717  017474  023727  017524                  CMP     SEABITS,(PC)+
3718  017503  000030                  EABITS: 30                      ;BITS 4,3
3719  017502  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3720  017504  104000                          ERROR                   ;XBA BITS 4,3 FAILED TO REMAIN SET
3721  017506  032777  040000  161540          BIT     #NXM,@DXDS      ;TEST PDP-TO BIT 14 SHOULD BE SET
3722  017514  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3723  017516  104000                          ERROR                   ;17772R 2ND KE11  ADDRESS RESPONSE
3724  017520  000417                          BR      NPRCX
3725  017522  013701  001440          NPRCM:  MOV     TT,R1
3726  017526  032761  040000  000004          BIT     #NXM,4(R1)
3727  017534  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3728  017536  104000                          ERROR                   ;NXM DID NOT COPY INTO TT
3729  017540  042761  040000  000004          BIC     #NXM,4(R1)      ;WELL MEMORY WORKS
3730  017546  032761  040000  000004          BIT     #NXM,4(R1)
3731  017554  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3732  017556  104000                          ERROR                   ;
3733  017560  012716  017606          NPRCX:  MOV     #NPRC1,@SP      ;LOAD RETURN PC
3734  017564  000002                          RTI                     ;RETURN
3735  017566  052777  000001  161464  NPRC1:  BIS     @DXFRS,@DXCS    ;DX RESET
3736
3737  017614  013737  017672  000004          MOV     L4,@04
3738  017622  013737  017700  000006          MOV     L6,@06
3739  017630  013737  017126  177776          MOV     @PSW,PS
3740
3741
3742
3743
3744
3745
```

```
                                        ; ***************************************************************
                                        ;TEST   16      FAST NPR DATA TEST
                                        ; ***************************************************************
017636  104402                  TST16:  SCOPE
017640  012737  000010  022414          MOV     #10,@#ICOUNT    ;ITERATION COUNT
017646  012737  000016  023442          MOV     #16,@#ERNTSTN   ;SAVE TEST # FOR ERROR REPORT
017654  012737  017662  022420          MOV     #SCP16,@#RETURN ;SCOPE LOOP RETURN ADRS
017662                          SCP161:
                                        ;
                                        ;
017662  004737  021060                  JSR     PC,DXRES        ;RESET AND RESTORE
017666  004737  020050                  JSR     PC,CLRDXD       ;CLEAR DX DATA FILE
017672  012777  017746  161304          MOV     #SOS,ISR,@DXIV  ;LOAD SOSIEN INT VECTOR
017700  013777  001270  161300          MOV     DXPRT,@DXIS     ;LOAD INT STATUS
017706  012777  100525  161374          MOV     #100525,@DXMO   ;LOAD BUSO WITH DATA PATTERN
017714  005037  177776                  CLR     @S              ;LOWER PROCESSOR STATUS
017720  052777  000100  161352          BIS     #INTEN,@DXCS    ;SET INTERRUPT ENABLE
017726  004737  020070                  JSR     PC,DXGO
017732  000001                          WAIT                    ;FOR NPR'S TO FINISH
017734  000776                          BR      .-2
017736  104000                          ERROR                   ;RETURN FROM INTERRUPT FAILED
                                        ;FAST NPR DATA TEST INTERRUPT SERVICE ROUTINE
                                        ;
017740                          SOS,ISR:
017740  010146                          MOV     R1,     -(6)    ;SAVE REGISTERS
017742  010246                          MOV     R2,     -(6)
017744  032777  000200  161326          BIT     #DONE,@DXCS     ;VERIFY DONE SET
017752  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
017754  104000                          ERROR                   ;INVALID INTERRUPT
017756  032777  000040  161334          BIT     #NPRTO,@DXES    ;TEST FOR NPRTO ERROR
017764  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
017766  104000                          ERROR                   ;NPRTO SET
017770  005777  161312                  TST     @DXBC           ;VERIFY BYTE COUNT ZERO
017774  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
017776  104000                          ERROR                   ;BYTE COUNT NOT ZERO
020000  012701  037426                  MOV     #NPRDATA,       R1
020004  012702  000012                  MOV     #10.,   R2
020010  122721  000125          DXDCK:  CMPB    #125,   (1)+            ;CHECK DATA
020014  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
020016  104000                          ERROR                   ;DATA TRANSFER ERROR
020020  005302                  DXDTE:  DEC     R2
020022  001372                          BNE     DXDCK
020024  042777  000200  161246          BIC     #DONE,@DXCS             ;CLEAR DONE
020032  004737  020050                  JSR     PC,CLRDXD       ;CLEAR DX DATA FILE
020036  012602                  DXOUT:  MOV     (SP)+,R2
020040  012601                          MOV     (SP)+,R1
020042  012716  020104                  MOV     #SOSDONE,@SP    ;FUDGE RETURN PC
020046  000002                          RTI
                                        ;
020052  012701  037426          CLRDXD: MOV     #NPRDATA,R1
020056  012702  000012                  MOV     #10.,,R2
020062  105021                  DS,3:   CLRB    (R1)+
020062  005302                          DEC     R2
020064  001375                          BNE     DS,3
```

M6

```
  3618  '20046  '02207                          RTS     PC
  3621
  3622
  3623  '20072  '12777  '37420  101476  DXSDI   MOV     #NPRDATA,@DXRA          ;SET UP BASE ADRS REG
  3624  '20076  '12777  177760  101502          MOV     #-16.,@DXBC             ;SET DXBC
  3625  '20104  '52777  '00023  101106          BIS     #DXFI,@DXCS             ;DX FUNCTION INPUT (36P WRITE)
  3626  '20112  '52777  '02030  101170          BIS     #SELD!MLDD,@DXMD        ;CUI = SELD, MLDD
  3627  '20120  '42777  '00020  101152          BIC     #SELD!MLDD,@DXMD
  3630  '20126  '52777  '02000  101134          BIS     #CMDD,@DXMD             ;CMDD
  3631  '20134  '42777  '02000  101146          BIC     #CMDD,@DXMD             ;
  3632  '20142  '52777  '00004  101130          BIS     #SOSIEN,@DXES           ;SOSIEN FOR FAST NPR
  3633  '20150  '32777  '00004  101142          BIT     #SOSIEN,@DXES           ;VERIFY SOSIEN CLEARED
  3634  '20156  '01001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
  3635  '20160  104000                          ERROR                   ;SOSIEN NOT SET
  3636  '20162  '00207                          RTS     PC              ;RETURN
  3637  '20164  '42777  '00004  101120  SOSDONE:        BIC     #SOSIEN,@DXES   ;CLEAR SRVD-SRVI ENABLE
  3640
  3641
  3642
  3643
```

```
3820                                    ;*****************************************************************
3821                                    ;TEST   17      END OF TEST STRING
3822                                    ;*****************************************************************
3823   020172  104400                   TST17:  SCOPE
3824   020174  012737  000001  022414           MOV     #1,@#ICOUNT     ;ITERATION COUNT
3825   020202  012737  000017  023442           MOV     #17,@#ENTSTN    ;SAVE TEST # FOR ERROR REPORT
3826   020210  012737  020216  022420           MOV     #SCP17,@#RETURN ;SCOPE LOOP RETURN ADRS
3827   020216                           SCP17:
3828
3829
3830                                    .REM    *
3831
3832                                    THIS TEST FUNCTIONS AS A TERMINATOR FOR THE CHAINABLE TEST STRING,
3833                                    AS SUCH IT TRANSFERS CONTROL TO THE LOOP CONTROL SUBROUTINE,
3834
3835                                            *
3836
3837
3838   020216  000137  024472                   JMP     @#LPCNTL
```

```
3839
3840                                    ;FAST ISS SELECTOR CH ONLY
3841
3842  020222                            FASTISS:
3843  020222  053777  024774  101006            BIS     DEV,@DXMO       ;PUT DEVICE ADRS ON OUT TAGS
3844  020230  052777  004000  101002            BIS     #ADRO,@DXMO     ;RAISE ADRS-OUT
3845  020236  052777  060000  101004            BIS     #HLDO!SELO,@DXMO        ;RAISE SELECT-OUT, HOLD-OUT
3846  020244  042777  004000  101036            BIC     #ADRO,@DXMO     ;REMOVE ADRS-OUT
3847  020252  043777  024774  101030            BIC     DEV,@DXMO       ;REMOVE ADRS
3848  020260  053777  024776  101022            BIS     CMD,@DXMO       ;PUT COMMAND ON OUT TAGS
3849  020266  052777  002000  101014            BIS     #CMDO,@DXMO     ;RAISE CMD-OUT
3850  020274  043777  024776  101006            BIC     CMD,@DXMO       ;REMOVE CMD
3851  020302  042777  002000  101000            BIC     #CMDO,@DXMO     ;REMOVE CMD-OUT
3852  020310  105737  024776                    TSTB    CMD             ;TEST FOR #TEST I/O# COMMAND
3853  020314  001403                            BEQ     FISS1           ;CLEAR SELO,HLDO IF TIO CMD
3854  020316  105777  161020                    TSTB    @BUSI           ;TEST BUSI FOR ZERO STATUS
3855  020322  001403                            BEQ     FISS2           ;DON'T CLEAR SELO,HLDO ON 0 STATUS
3856  020324  042777  060000  100796  FISS1:    BIC     #HLDO!SELO,@DXMO        ;CLEAR SELO AND HLDO
3857  020332  052777  001000  100790  FISS2:    BIS     #SRVO,@DXMO     ;RELEAVE STATUS
3858  020340  042777  001000  100742            BIC     #SRVO,@DXMO     ;
3859  020346  000207                            RTS     PC
3860
3861                                    ;SEL CH ISS
3862
3863  020350                            SEL.ISS:
3864  020350  053777  024774  100730            BIS     DEV,@CUAR       ;PRESET COM/ADD REG DEV ADDRESS
3865  020356  042777  000400  100742            BIC     #400,@CUAR      ;PARITY RESET
3866  020364  053777  024774  100716            BIS     DEV,@DXMO       ;PUT DEVICE ADRS ON OUT TAGS
3867  020372  052777  004000  100710            BIS     #ADRO,@DXMO     ;RAISE ADRS-OUT
3868  020400  052777  060000  100712            BIS     #HLDO!SELO,@DXMO        ;RAISE SELECT-OUT, HOLD-OUT
3869  020406  042777  004000  100674            BIC     #ADRO,@DXMO     ;REMOVE ADRS-OUT
3870  020414  043777  024774  100666            BIC     DEV,@DXMO       ;REMOVE ADRS
3871  020422  053777  024776  100660            BIS     CMD,@DXMO       ;PUT COMMAND ON OUT TAGS
3872  020430  052777  002000  100652            BIS     #CMDO,@DXMO     ;RAISE CMD-OUT
3873  020436  043777  024776  100644            BIC     CMD,@DXMO       ;REMOVE CMD
3874  020444  042777  002000  100636            BIC     #CMDO,@DXMO     ;REMOVE CMD-OUT
3875  020452  052777  001000  100630            BIS     #SRVO,@DXMO     ;RELEAVE STATUS
3876  020460  042777  001000  100622            BIC     #SRVO,@DXMO     ;
3877  020466  000207                            RTS     PC
3878
3879                                    ;TT,TRACE, ROUTINE TO TRACE TUMBLE TABLE ENTRIES
3880                                    ;AND THE TTNDX
3881  020470                            TT',TRACE:
3882
3883  020470  010146                            MOV     R1,-(SP)
3884  020472  013701  020676                    MOV     @#TTRACE,R1     ;LOAD R1 WITH SOFTWARE IT
3885  020476  020137  001440                    CMP     R1,@#TT         ;CHECK FOR BOTTOM OF TABLE
3886  020502  001005                            BNE     1$              ;BRANCH IF  NOT  BOTTOM
3887  020504  005737  003776                    TST     @#3776          ;LOOK AT  TOP OF TT
3888  020510  001401                            BEQ     .+4             ;BRANCH IF NO RAP AROUND
3889  020512  104002                            TRACER                  ;REPORT TT TRACE ERROR
3890  020514  000404                            BR      2$
3891  020516  005741                    1$:     TST     -(R1)           ;CHECK FOR TT OVERFLOW
3892  020520  001401                            BEQ     .+4             ;BRANCH IF NO RAP AROUND
```

```
3893  002522  104402                          TRACER                  ;TT OVERFLOW ERROR
3894  002524  005721                          TST     (R1)+           ;INC TO ENTRY
3895  002526  011127                  2$:     MOV     (R1),(PC)+      ;SAVE ENTRY ONE
3896  002530  000000                  SENRY1: .                       ;HERE
3897  002532  023727  002538                  CMP     @#SENRY1,(PC)+  ;COMPARE SAVED ENTRY WITH
3898  002536  000000                  ENTRY1: .                       ;EXPECTED ENTRY
3899  002540  001407                          BEQ     1$              ;BRANCH IF DXDS ENTRY OK
3900  002542  013737  002538  020704          MOV     @#SENRY1,@#TTWAS
3901  002550  013737  002536  020706          MOV     @#ENTRY1,@#TTSHOULD
3902  002556  104402                          TRACER                  ;REPORT TT TRACE ERROR
3903  002560  005037  002536          1$:     CLR     ENTRY1
3904  002564  005021                          CLR     (R1)+           ;CLEAR ENTRY AND ADVANCE POINTER
3905  002566  011127                          MOV     (R1),(PC)+      ;SAVE ENTRY TWO
3906
3907  002572  000000                  SENRY2: .                       ;HERE
3908  002572  023727  002570                  CMP     @#SENRY2,(PC)+  ;COMPARE SAVED ENTRY WITH
3909  002576  000000                  ENTRY2: .                       ;EXPECTED ENTRY
3910  002600  001411                  TT;T0:  BEQ     2$              ;BRANCH IF DXCA ENTRY OK
3911  002602  013737  002570  020704          MOV     @#SENRY2,@#TTWAS
3912  002610  013737  002576  020706          MOV     @#ENTRY2,@#TTSHOULD
3913  002616  104402                          TRACER                  ;REPORT TT TRACE ERROR
3914  002620  005037  002576                  CLR     ENTRY2
3915  002624  005021                  2$:     CLR     (R1)+           ;CLEAR
3916  002626  027701  004000                  CMP     #TST1,R1        ;CHECK FOR SOFTWARE
3917  002632  001002                          BNE     TT;T1           ;BRANCH IF NO OVERFLOW
3918  002634  013701  001440                  MOV     @#TT,R1
3919  002640  005037  002650          TT;T11: CLR     @#TT,T2
3920  002644  117727  160500                  MOVB    @TTNDX,(PC)+    ;SAVE TTNDX
3921  002650  000000                  TT;T21: .                       ;HERE
3922  002652  006337  002650                  ASL     TT;T2           ;SCALE MOD(2)
3923  002656  063737  001440  002650          ADD     @#TT,@#TT,T2    ;ADD BASE OF TT TO INDEX
3924  002664  123701  002650                  CMPB    @#TT,T2,R1      ;COMPARE TT POINTERS
3925  002670  001401                          BEQ     .+4             ;BRANCH IF HARDWARE AND SOFTWARE TT POINTERS MATCH
3926  002672  104402                          TRACER                  ;REPORT TT TRACE ERROR
3927  002674  011127                          MOV     R1,(PC)+        ;SAVE TT TRACE
3928  002676  000000                  TTRACE: .                       ;HERE
3929  002700  012601                          MOV     (SP)+,R1
3930  002702  000207                          RTS     PC              ;RETURN
3931  002704  000000                  TTWAS:  .       ;ACTUAL CONTENTS OF TT
3932  002706  000000                  TTSHOULD:       .               ;EXPECTED CONTENTS OF TT
3933
3934
3935                                   ;CHKPHS, ROUTINE TO CHECK CONTROL BITS FOR CORRECT PHASE
3936
3937  002710  012527                  CHKPHS: MOV     (R5)+,(PC)+     ;SAVE EXPECTED PHASE
3938  002712  000000                  SPHS:   .                       ;HERE
3939  002714  117727  160374                  MOV     @DXCB,(PC)+     ;SAVE CONTROL BITS
3940  002720  000000                  SCB:    .                       ;HERE
3941  002722  042737  107777  020720          BIC     #107777,SCB     ;CLEAR ALL BUT PHASE FLOPS
3942  002730  023737  002712  020720          CMP     SPHS,SCB        ;COMPARE SAVED PHASE WITH EXPECTED
3943  002736  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3944  002740  104000                          ERROR                   ;PHASE ERROR
3945  002742  000205                          RTS     R5              ;RETURN
3946
```

```
3947                                        ;PHST, CHECK PHASE AND STATE CONTROL BITS
3948
3949  020744  017627  000000        PHST:   MOV     @(SP),(PC)+     ;SAVE EXPECTED PHASE AND STATE
3950  020752  000000                SPHST:  .                       ;HERE
3951  020752  062716  000002                ADD     #2,@SP          ;ING RETURN PC
3952  020756  017727  160332                MOV     @DXCS,(PC)+     ;SAVE CONTROL BITS
3953  020762  000000                SCB1:   .                       ;HERE
3954  020764  042737  103777  020762        BIC     #103777,SCB1    ;CLEAR ALL BUT PHASE & STATE
3955  020772  023737  020750  020762        CMP     SPHST,SCB1      ;EXPECTED VS ACTUAL
3956  021002  001416                        BEQ     PHSTE           ;EXIT IF OK
3957  021004  000024  021040                TYPE    ,PHSTLR
3958  021006  011627                        MOV     @SP,(PC)+       ;SAVE ERROR ORIGIN
3959  021010  000000                PSTMP:  0                       ;HERE
3960  021012  162737  000002  021010        SUB     #2,@#PSTMP      ;
3961  021020  010546                        MOV     TTY,-(SP)       ;SAVE TTY
3962  021022  013705  021010                MOV     @#PSTMP,TTY             ;TYPE IN OCTAL
3963  021026  004737  027650                JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
3964  021032  012605                        MOV     (SP)+,TTY       ;RESTORE TTY
3965  021034  104000                        ERROR
3966  021036  000207                PHSTE:  RTS     PC              ;RETURN
3967  021040  050137  040510  042523 PHSTLR: .ASCIZ  "<PHASE OR STATE ERROR AT> "
3968  021046  047440  020122  052123
3969  021054  052101  020105  051105
3970  021062  047522  020122  052101
3971  021070  020072     000
3972          021074                .EVEN
3973                                        ;ROUTINE TO ISSUE 1 MAINT, CLOCK PULSES
3974
3975  021074  012527                CLK1:   MOV     (R5)+,(PC)+     ;SAVE
3976  021076  000000                CLKC1:  .                       ;CLOCK COUNT HERE
3977  021100  005737  021076                TST     CLKC            ;TEST FOR ZERO COUNT
3978  021104  001435                        BEQ     CLKE            ;BRANCH IF COUNT EMPTY
3979  021106  032737  002000  177570        BIT     #BIT10,SWR      ;TEST FOR SINGLE STEP
3980  021114  001423                        BEQ     CLK1            ;BRANCH IF AUTO CLOCK
3981  021116  000004  035240                TYPE    ,CRLF
3982  021122  010546                        MOV     TTY,-(SP)       ;SAVE TTY
3983  021124  010505                        MOV     R5,TTY          ;TYPE IN OCTAL
3984  021126  004737  027650                JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
3985  021132  012605                        MOV     (SP)+,TTY       ;RESTORE TTY
3986  021134  000004  035236                TYPE    ,SPACE
3987  021140  012737  000003  021102        MOV     #BPT,1$         ;RESTORE BREAK POINT TRAP
3988  021146  012737  000240  031172        MOV     #NOP,@,@UIN     ;CODE FOR ODT RESTORE
3989  021154  012737  021162  031126        MOV     #1$,@,@UBR1     ;TELL ODT BREAK LEGAL
3990  021162  000003                1$:     BPT                     ;BREAK TO ODT
3991  021164  052777  000001  160126 CLK11:  BIS     #MCLKP,@DXES    ;ISSUE MAINT CLK PULSE
3992  021172  005337  021076                DEC     CLKC            ;DEC CLOCK COUNT
3993  021176  001372                        BNE     CLK1            ;CONTINUE IF COUNT NOT ZERO
3994  021200  000205                CLKE:   RTS     R5              ;RETURN
3995
3996                                        ;ROUTINE TO FORCE DX INTO TIME STATE 1
3997
3998  021202  032777  004000  160104 TIMS1:  BIT     #TSSF,@DXCS     ;CHECK TIME STATE
3999  021210  001010                        BNE     1$              ;BRANCH IF TS1
4000  021212  052777  000001  160100        BIS     #MCLKP,@DXES    ;ADVANCE TO TS1
```

```
4.01   021222  032777  004000  100006          BIT     #TSSF,PUXCS     ;T317
4.02   021226  001401                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
4.03   021230  104000                          ERROR                   ;TIME STATE MALFUNCTION
4.04   021232  000207                  1$1:    RTS     PC
4.05
4.06
4.07
4.08                                   ;ROUTINE TO COPY PANO BIT INTO CLKC
4.09   021234  032777  000400  100046  COPAR0: BIT     #PANO,PUXMD
4.10   021242  001407                          BEQ     1$
4.11   021244  052737  001000  021510          BIS     #CLKO,@#MIMAP
4.12   021252  052737  001000  021520          BIS     #CLKO,@#NOMI    ;NO MI MAP
4.13   021260  000406                          BR      3$
4.14   021262  042737  001000  021510  1$1:    BIC     #CLKO,@#MIMAP
4.15   021270  042737  001000  021520          BIC     #CLKO,@#NOMI    ;
4.16   021276  000207                  3$1:    RTS     PC
4.17   021300  000000                  NOMI:   0               ;MASK TO SEE IF MI IS UNREADABLE
4.18
4.19                                   ;ZEROTT, ROUTINE TO ZERO TUMBLE TABLE
4.20
4.21   021302                          ZEROTT:
4.22   021302  010146                          MOV     R1,-(SP)
4.23   021304  010246                          MOV     R2,-(SP)
4.24   021306  013701  001440                  MOV     TT,R1
4.25   021312  012702  000020                  MOV     #256.,R2
4.26   021316  005021                  2TT1:   CLR     (R1)+
4.27   021320  005302                          DEC     R2
4.28   021322  001375                          BNE     2TT1
4.29   021324  012602                          MOV     (SP)+,R2
4.30   021326  012601                          MOV     (SP)+,R1
4.31   021330  000207                          RTS     PC
4.32
4.33                                   ;TTZERO, ROUTINE TO VERIFY TT ZERO
4.34
4.35   021332                          TTZERO:
4.36   021332  010146                          MOV     R1,-(SP)
4.37   021334  010246                          MOV     R2,-(SP)
4.38   021336  013701  001440                  MOV     TT,R1
4.39   021342  012702  000020                  MOV     #256.,R2
4.40   021346  005721                  TTZ1:   TST     (R1)+
4.41   021350  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
4.42   021352  104000                          ERROR                   ;ILLEGAL TT ENTRY
4.43   021354  005302                          DEC     R2
4.44   021356  001373                          BNE     TTZ1
4.45   021360  012602                          MOV     (SP)+,R2
4.46   021362  012601                          MOV     (SP)+,R1
4.47   021364  000207                          RTS     PC
4.48
4.49                                   ;ROUTINE TO VERIFY THAT NO UNEXPECTED CHANGE
4.50                                   ;HAS OCCURRED IN ANY REGISTER
4.51
4.52                                   ;THIS ROUTINE DOES NOT LOOK AT THE PHASE CONTROL OR
4.53                                   ;TIME STATE FLIP FLOP SO THAT THIS ROUTINE
4.54                                   ;MAY BE USED IN EITHER THE MAINTENANCE OR
```

```
4.55                                        ;FREE RUNNING CLOCK MODE
4.56
4.57  "21466  "27727  157772          CHKREG1: CMP     @DXDS,(PC)+     ;COMPARE DXDS WITH
4.58  "21472  "00000                  DSMAP1:  .                       ;DS MAP
4.59  "21474  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.60  "21476  104001                           MAPERR                  ;REPORT MAP ERROR
4.61  "21500  "27727  157672                    CMP     @DXCA,(PC)+     ;COMPARE DXCA WITH
4.62  "21504  "00000                  CAMAP1:  .                       ;CA MAP
4.63  "21506  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.64  "21510  104001                           MAPERR                  ;REPORT MAP ERROR
4.65  "21512  "27727  157662                    CMP     @DXCS,(PC)+     ;COMPARE DXCS WITH
4.66  "21516  "00000                  CSMAP1:  .                       ;CS MAP
4.67  "21520  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.68  "21522  104001                           MAPERR                  ;REPORT MAP ERROR
4.69  "21524  "27727  157652                    CMP     @DXDS,(PC)+     ;COMPARE DXDS WITH
4.70  "21530  "00000                  DSMAP1:  .
4.71  "21532  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.72  "21534  104001                           MAPERR                  ;REPORT MAP ERROR
4.73  "21536  "27727  157642                    CMP     @DXBA,(PC)+     ;COMPARE BUS ADRS WITH
4.74  "21542  "00000                  BAMAP1:  .                       ;BUS ADRS MAP
4.75  "21544  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.76  "21546  104001                           MAPERR                  ;REPORT MAP ERROR
4.77  "21550  "27727  157632                    CMP     @DXBC,(PC)+     ;COMPARE BYTE COUNT WITH
4.78  "21554  "00000                  BCMAP1:  .                       ;BYTE COUNT MAP
4.79  "21556  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.80  "21560  104001                           MAPERR                  ;REPORT MAP ERROR
4.81  "21562  "27727  157622                    CMP     @DXMO,(PC)+     ;COMPARE MAINTENANCE-OUT WITH
4.82  "21566  "00000                  MOMAP1:  .                       ;MAINTENANCE-OUT MAP
4.83  "21570  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.84  "21572  104001                           MAPERR                  ;REPORT MAP ERROR
4.85
4.86  "21574  "23777  "21330  157610          CMP     @#ND41,@DXMI    ;TEST FOR UNREADABILITY
4.87  "21602  "01405                           BEQ     CKRG1           ;BRANCH IF UNREADABLE
4.88  "21604  "27727  157602                    CMP     @DXMI,(PC)+     ;COMPARE MAINTENANCE-IN WITH
4.89  "21610  "00000                  MIMAP1:  .                       ;MAINTENANCE-IN MAP
4.90  "21612  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4.91  "21614  104001                           MAPERR                  ;REPORT MAP ERROR
4.92  "21616  "17727  157572          CKRG1:   MOV     @DXCB,(PC)+     ;SAVE DXCB
4.93  "21622  "00000                  SDXCB:   .                       ;HERE
4.94                                        ;************************ MOD APR 74 ***********************************
4.95                                        ;*                  MODULO ADDRESS MODIFICATION
4.96  "21624  "53737  "21696  021544                  BIS     CBMAPS,CBMAP
4.97                                        ;************************ MOD APR 74 ***********************************
4.98  "21632  "42737  "74000  021522                  BIC     #PHS71,@#SDXCB  ;CLEAR PHASE & STATE FLOPS
4.99  "21640  "23727  021522                          CMP     @#SDXCB,(PC)+   ;COMPARE SAVED DXBC - PHS71 WITH
4100  "21644  "00000                  CBMAP1:  .                       ;CONTROL BIT MAP
4101  "21646  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4102  "21650  104001                           MAPERR                  ;REPORT MAP ERROR
4103  "21652  "17727  157542                    MOV     @DXES,(PC)+     ;SAVE DX EXTRA SIGNAL
4104  "21656  "00000                  SDXES:   .                       ;HERE
4105  "21660  "23727  021656                    CMP     @#SDXES,(PC)+   ;COMPARE SAVED ES WITH MAP
4106  "21664  "00000                  ESMAP1:  .                       ;ES MAP
4107  "21666  "01401                           BEQ     .+4             ;BRANCH IF NO ERROR
4108  "21670  104001                           MAPERR                  ;REPORT MAP ERROR
```

```
4109
4110  *21572  *32777  *00472  157920          RIS     @MCLKEN,@DXES   ;CHECK FOR MAINTENANCE MODE
4111  *21576  *21475                          BNE     CHKEND          ;BRANCH IF MAINT MODE
4112  *21602  *27727  157918                  CMP     @DMA0),(PC)+    ;COMPARE NPR DATA WITH
4113  *21606  *00402                  'DMAPI  .                       ;NPR DATA MAP
4114  *21610  *21471                          BEQ     .+4             ;BRANCH IF NO ERROR
4115  *21612  104431                          *APERR                  ;REPORT MAP ERROR
4116                                          ;********************** MOD APR 74 **********************************
4117                                          ;*                      MODULO ADDRESS MODIFICATION
4118  *21614  *43737  *21690  021944  CHKEND: BIC     #BMAPS,CBMAP
4119  *21622  *05037  *21690                  CLR     #BMAPS
4120  *21626  *00207                  RTS     PC                      ;RETURN
4121                                  ;ADDRESS OF MAPS
4122  *21630  *21372                  ADRDSMI: DSMAP
4123  *21632  *21404                  ADRCAMI: CAMAP
4124  *21634  *21416                  ADRCSMI: CSMAP
4125  *21636  *21434                  ADRDSMI: DSMAP
4126  *21640  *21442                  ADRBAMI: BAMAP
4127  *21642  *21454                  ADRBCMI: BCMAP
4128  *21644  *21466                  ADRMDMI: MDMAP
4129  *21646  *21512                  ADRMIMI: MIMAP
4130  *21650  *21544                  ADRCBMI: CBMAP
4131  *21652  *21570                  ADRNDMI: NDMAP
4132  *21654  *21564                  ADRESMI: ESMAP
4133                                  ;********************** MOD APR 74 **********************************
4134                                  ;*                      MODULO ADDRESS MODIFICATION
4135  *21656  *00200                  CBMAPS: .
4136                                  ;********************** MOD APR 74 **********************************
4137                                  ;DXRES, ROUTINE TO ISSUE DX RESET AND SETUP TABLES
4138                                  ;TO TRACE THE TTYDX AND THE TUMBLE TABLE ENTRIES
4139
4140  *21660  *42777  *00002  157432  DXRES:  BIC     @MCLKEN,@DXES   ;CLEAR MAINT CLK
4141  *21646  *42777  *00200  157404          BIC     @DONE,@DXCS     ;CLEAR DONE & LOCKO
4142  *21674  *32777  *00200  157376          BIT     @DONE,@DXCS     ;VERIFY DONE CLEAR
4143  *21702  *01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
4144  *21704  104420                          ERROR                   ;DONE NOT ZERO
4145  *21706  *52777  *00001  157364          BIS     @DXFRS,@DXCS    ;ISSUE DX RESET
4146  *21714  *04737  *21502                  JSR     PC,@EMOTT       ;CLEAR TT
4147  *21720  *04737  *21770                  JSR     PC,RESMAP       ;CLEAR REG MAP(EXCEPT OPLO)
4148  *21724  *52777  *00010  157366          BIS     @TIMDIS,@DXES   ;SET TIMER DISABLE
4149  *21732  *04737  *21434                  JSR     PC,COMAND       ;COPY PARO INTO CLKO MAP
4150  *21736  *04737  021300                  JSR     PC,CHKREG       ;VERIFY NO UNEXPECTED REG CHANGE
4151  *21742  *04737  *21532                  JSR     PC,TTZERO       ;VERIFY NO TT ENTRIES
4152  *21746  *13737  *01440  023076          MOV     @#TT,TTRACE     ;INIT SOFTWARE TT POINTER
4153  *21754  105777  157378                  TSTB    @TTNDX          ;VERIFY TTNDX ZERO
4154  *21763  *01401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
4155  *21762  104420                          ERROR                   ;TTNDX NOT ZERO
4156  *21764  *05037  *20530                  CLR     @#ENTRY1
4157  *21770  *05037  *20570                  CLR     @#ENTRY2
4158  *21774  *00207                          RTS     PC
4159
4160
4161                                  .REM    .
4162
```

```
4163                                    THIS SUBROUTINE RESTORES THE TRACE MAP TO THE STATE THE REGISTERS
4164                                    SHOULD BE IN FOLLOWING A DX RESET,
4165
4166                                            .
4167                                    ;************************** MOD APR 74 ********************************
4168                                    ;*              STORAGE REDUCTION MOD
4169
4170  022776  005037  021372           RESMAP: CLR     @#DSMAP
4171  023002  005037  021424                   CLR     @#CAMAP
4172  023006  005037  021416                   CLR     @#CSMAP
4173  023012  053737  001430  021430           BIS     SP#,DSMAP
4174  023020  105037  021438                   CLRB    @#DSMAP
4175  023024  005037  021442                   CLR     @#BAMAP
4176  023030  005037  021434                   CLR     @#BCMAP
4177                                    ;************************** MOD APR 74 ********************************
4178  023034  012737  100000  021436           MOV     #OPLD,@#MOMAP
4179  023042  012737  000400  021510           MOV     #PARI,@#MIMAP
4180                                    ;************************** MOD APR 74 ********************************
4181  023050  005037  021444                   CLR     @#CBMAP
4182  023054  005037  021600                   CLR     @#NUMAP
4183  023060  005037  021650                   CLR     @#CBMAPS
4184  023064  012737  000010  021504           MOV     #TIMOIS,@#ESMAP
4185  023072  000207                           RTS     PC
4186
4187
4188
4189
4190
4191                                    ;INTERRUPT HANDLERS
4192
4193  023074  104000                  FALSE:  ERROR                   ;FALSE OR UNEXPECTED INTERRUPT
4194  023076  000002                          RTI
4195
4196  023100  032777  000200  157172  INTR:   BIT     #DONE,@DXCS     ;TEST DONE
4197  023106  001001                          BNE     .+4             ;BRANCH ON DONE
4198  023110  104000                          ERROR                   ;FALSE INTERRUPT
4199  023112  042777  000200  157160          BIC     #DONE,@DXCS     ;CLEAR INT CONDTION
4200  023120  052737  100000  022130          BIS     #INTOK,INTPAS   ;SET INT PASS FLAG
4201  023126  000002                          RTI
4202
4203  023130  000000                  INTPAS: 0                       ;INTERRUPT PASS FLAG
4204
4205
4206                                    ;INTERR, ROUTINE TO TEST FOR SUCCESSFUL INTERRUPT
4207
4208  023132                          INTERR:
4209  023132  032737  100000  022130          BIT     #INTOK,INTPAS   ;DID INTERRUPT OCCUR
4210  023140  001405                          BEQ     IRR             ;BRANCH IF NOT
4211  023142  062716  000002          IRR2:   ADD     #2,@SP          ;INC RETURN PC
4212  023146  042737  100000  022130          BIC     #INTOK,INTPAS   ;CLEAR PASS FLAG
4213  023154  000207                  IRR:    RTS     PC
4214
4215                                    ;EMULATOR DECODER ROUTINE
4216
```

```
4217  *22156                          EMTDECODE:
4218  *22156  *11646                          MOV     @R6,-(R6)       ;DUPLICATE PC ON STACK
4219  *22160  162716  *0F022                  SUB     #2,@R6          ;POINT PC TO EMT INST,
4220  *22164  *17616  *00000                  MOV     @(R6),@R6       ;MOV EMT INST ONTO STACK
4221  *22170  121627  *00024                  CMPB    @R6,#24.        ;TEST THAT CALL IS WITHIN LIMITS
4222  *22174  101471                          BLOS    EMTOK           ;BRANCH IF WITHIN LIMITS
4223  *22176  104000                          ERROR
4224  *22200  *06116          EMTOK:  ROL     @R6                     ;EMT ARGUMENT X 2,
4225  *22202  *42716  177001                  BIC     #177*01,@R6     ;CLEAR HIGH BYTE
4226  *22206  *62716  *22220                  ADD     #EMTAG,@R6      ;FORM ADRS OF ROUTINE ADRS
4227  *22212  *17616  *00000                  MOV     @(R6),@R6       ;PUT ROUTINE ADRS ON STACK
4228  *22216  *00136                          JMP     @(R6)+          ;JUMP TO ROUTINE
4229                                                                  ;TAGS FOR EMT CALL
4230
4231  *22220                  EMTAG:                                  ;BEGIN*ING OF EMT TABLE
4232
4233  *22220  *00024                  .BLKW   20.                     ;RESERVE 16. WORDS FOR ADRS LIST
4234                          ;SCOPE LOOP AND CONTROL SUBROUTI*E
4235
4236  *22260  105777  157102  SCOPEC:  TSTB    @TKS
4237  *22264  100014                  BPL     SCOPEH
4238  *22266  *17727  157076          MOV     @TKB,(PC)+
4239  *22272  *00000          DTMP:   0
4240  *22274  *42737  *00200  022302          BIC     #200,DTMP
4241  *22302  123727  *22302  000003          CMPB    DTMP,#3
4242  *22310  *01002                  BNE     SCOPEH
4243  *22312  *00137  023530                  JMP     @#MON1*,0
4244  *22316  *32737  *40000  177570  SCOPEH: BIT     #BIT14,SR       ;TEST FOR SCOPE
4245  *22324  *01012                  BNE     SCOPEB                  ;BRANCH IF SCOPE SELECTED
4246  *22326  *32737  *04000  177570          BIT     #BIT11,SR       ;TEST FOR ITERATIONS
4247  *22334  *01020                  BNE     SCOPEA                  ;EXIT IF ITERATIONS INHIBITED
4248  *22336  *05237  *22416                  INC     SCOPEF          ;INCREMENT ITERATION COUNT
4249  *22342  023737  *22416  022414          CMP     SCOPEF,ICOUNT   ;TEST FOR COMPLETION OF ITERATIONS
4250  *22350  *01410                  BEQ     SCOPEG                  ;BRANCH IF COMPLETE
4251  *22352  *12737  177777  024706  SCOPEB: MOV     #-1,ONESHOT     ;SO *OU CAN SCOPE ON ONCE ONLY CODE
4252  *22360  *05726                  TST     (SP)+                   ;POP RETURN PC
4253  *22362  *12637  177776                  MOV     (SP)+,PS        ;RES*OR PROCESSOR STATUS
4254  *22366  *00177  000016                  JMP     @RETURN         ;
4255  *22372  *11637  *22420          SCOPEG: MOV     @SP,RETURN      ;SET UP SCOPE RETURN ADRS
4256  *22376  *05037  022416          SCOPEA: CLR     SCOPEF          ;CLEAR ITERATION COUNT
4257  *22402  000002                  SCOPER: RTI
4258  022414  *00001          ICOUNT: 1                               ;NUMBER OF REQUESTED ITERATIONS
4259  *22416  *00000          SCOPEF: *                               ;ITERATION COUNT
4260  *22420  *04000          RETURN: TST1                            ;DEFAULT RETURN
4261  *22422                  TSTABLE:                                ;BEGINNING OF TABLE OF TEST ADDRESSES
4262          *22522                  .=.+100                         ;TEST ADDRESS LIST
4263
4264
4265
4266                          ;ENTRY POI*T FOR MAP ERRORS
4267  *22522                  *,MAPERR:
4268  *22522  *12737  177777  023426          MOV     #-1,ERFLG       ;FLAG THAT THIS IS  MAP ERROR
4269  022530  *00137  022672                  JMP     @#CERF
4270  *22534  *00000          YERPC:  0               ;ORIGI* OF TRACE ERROR
```

```
4271                                    ;JUMBLE TABLE TRACE ERROR TRAP
4272  *22536                            *,TRACER1
4273  *22536  *12737  177776  023446            MOV     #-2,ERFLG
4274  *22544  *00004  *35555                    TYPE    ,TRC*1
4275  *22552  *10546                            MOV     TTY,-(SP)       ;SAVE TTY
4276  *22552  *13705  *23442                    MOV     ERTSTN,TTY              ;TYPE ERTSTN IN OCTAL
4277  *22556  *04737  027000                    JSR     R7,PRINTS       ;AND SUPRESS LEADING ZERO'S
4278  *22562  *12605                            MOV     (SP)+,TTY       ;RESTORE TTY
4279  *22564  *00004  *35067                    TYPE    ,TRC*   ;TRACE ERROR AT!
4280  *22570  *10546                            MOV     TTY,-(SP)       ;SAVE TTY
4281  *22572  *13705  022934                    MOV     TERPC,TTY               ;TYPE IN OCTAL
4282  *22576  *04737  027050                    JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4283  *22602  *12605                            MOV     (SP)+,TTY       ;RESTORE TTY
4284  *22604  *00004  *35727                    TYPE    ,TRC1
4285  *22610  *10546                            MOV     TTY,-(SP)       ;SAVE TTY
4286  *22612  *13705  *20704                    MOV     TTWAS,TTY               ;TYPE IN OCTAL
4287  *22616  *04737  027050                    JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4288  *22622  *12605                            MOV     (SP)+,TTY       ;RESTORE TTY
4289  *22624  *00004  035731                    TYPE    ,TRC2
4290  *22630  *10546                            MOV     TTY,-(SP)       ;SAVE TTY
4291  *22632  *13705  *20700                    MOV     TTSMJULU,TTY            ;TYPE IN OCTAL
4292  *22636  *04737  027050                    JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4293  *22642  *12605                            MOV     (SP)+,TTY       ;RESTORE TTY
4294  *22644  *32701  000002                    BIT     #BIT1,R1        ;TEST FOR DXDS OR DXCA
4295  *22650  *01003                            BNE     1$              ;BR IF DXCA
4296  *22652  *00004  035753                    TYPE    ,TTDS
4297  *22656  *00402                            BR      2$
4298  *22660  *00004  036000            1$:     TYPE    ,TTCA
4299  *22664                            2$:
4300  *22664  *00402                            BR      DEF
4301
4302                                    ;ENTRY POINT FOR MOST ERRORS
4303
4304  *22666                            *,ERROR1
4305  *22666  *05037  023436                    CLR     ERFLG           ;FLAG THIS AS  NORMAL ERROR
4306  *22672  *05237  023440            DEF1:   INC     ERRCNT          ;INC ERROR COUNT
4307  *22676  *10037  023444                    MOV     R0,E,R0         ;SAVE R0
4308  *22702  *10137  023446                    MOV     R1,E,R1         ;SAVE R1
4309  *22706  *10237  023450                    MOV     R2,E,R2         ;SAVE R2
4310  *22712  *10337  023452                    MOV     R3,E,R3         ;SAVE R3
4311  *22716  *10437  023454                    MOV     R4,E,R4         ;SAVE R4
4312  *22722  *10537  023456                    MOV     R5,E,R5         ;SAVE R5
4313  *22726  *32737  *20000  177570            BIT     #BIT13,SR       ;TEST FOR INHIBIT  PRINT
4314  *22734  *01131                            BNE     *ERR*C          ;BRANCH IF INHIBIED
4315  *22736  *00004  035271                    TYPE    ,ERR*
4316  *22742  *11627                            MOV     @SP,(PC)+       ;SAVE ERROR *C +2
4317  *22744  *00000                    ETMP2:  *                       ;HERE
4318  *22746  162737  *00002  022744            SUB     #2,ETMP0        ;CORRECT PC
4319  *22754  *10546                            MOV     TTY,-(SP)       ;SAVE TTY
4320  *22756  *13705  *22744                    MOV     @#ETMP0,TTY             ;TYPE IN OCTAL
4321  *22762  *04737  027050                    JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4322  *22766  *12605                            MOV     (SP)+,TTY       ;RESTORE TTY
4323  *22772  *32737  *10000  177570            BIT     #BIT12,SR       ;TEST FOR SHORT ERROR REPORT
4324  *22776  *01110                            BNE     *ERR*C          ;BRANCH IF SHORT SELECTED
```

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4325  023002  022737  177776  023466          CMP     @#2,EHFLG
4326  023006  001410                          BEQ     1$
4327  023010  004737  035535                  TYPE    ,MSG35          ;ERROR IN TEST)
4328  023014  010546                          MOV     TTY,-(SP)       ;SAVE TTY
4329  023016  013705  023442                  MOV     ENTSTN,TTY              ;TYPE ENTSTS IN OCTAL
4330  023022  004737  027060                  JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
4331  023026  012605                          MOV     (SP)+,TTY       ;RESTORE TTY
4332  023030  004737  035434          1$:     TYPE    ,MSG29
4333  023034  042737  177400  021466          BIC     #177400,MOMAP   ;MASK OUT CU+DEV ADDRESS
4334  023042  010546                          MOV     TTY,-(SP)       ;SAVE TTY
4335  023044  013705  021466                  MOV     MOMAP,TTY               ;TYPE IN OCTAL
4336  023050  004737  027060                  JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4337  023054  012605                          MOV     (SP)+,TTY       ;RESTORE TTY
4338                                  ;REGISTER DUMP ROUTINE
4339
4340  023056  005737  023470                  TST     EHFLG
4341  023062  001456                          BEQ     PERRPC          ;BRANCH IF NOT MAP ERROR
4342  023064  004004  035526                  TYPE    ,MSG36          ;MAP ERROR ORIGIN
4343  023070  016627  000004                  MOV     4(SP),(PC)+     ;SAVE ERROR PC +2
4344  023074  000000          ETMP1:  .       ;HERE
4345  023076  162737  000004  023074          SUB     #4,@#ETMP1      ;CORRECT PC
4346  023104  010546                          MOV     TTY,-(SP)       ;SAVE TTY
4347  023106  013705  023074                  MOV     ETMP1,TTY               ;TYPE IN OCTAL
4348  023112  004737  027060                  JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4349  023116  012605                          MOV     (SP)+,TTY       ;RESTORE TTY
4350  023120  004004  035112                  TYPE    ,RDM
4351  023124  012701  023410                  MOV     #ADRA,R1
4352  023130  012702  001274                  MOV     #DXDS,R2
4353  023134  012703  021630                  MOV     #ADRDSM,R3
4354  023140  012137  023150          RDMP1:  MOV     (R1)+,RDMP1
4355  023144  027273  000000  000000          CMP     @(R2),@(R3)     ;COMP MAP VS REGISTER
4356  023152  001416                          BEQ     RDMP2           ;DUMP ONLY ON DISCREPANCY
4357  023154  004004                          TYPE
4358  023156  000000          RDMP11: .
4359  023160  004004  035227                  TYPE    ,SPACE
4360  023164  017205  000000                  MOV     @(R2),TTY       ;DUMP CONTENTS OF REGISTER
4361  023170  004737  027060                  JSR     PC,PRINTR
4362  023174  004004  035230                  TYPE    ,SPACE
4363  023200  017305  000000                  MOV     @(R3),TTY       ;DUMP CONTENTS OF MAP
4364  023204  004737  027060                  JSR     PC,PRINTR
4365  023210  023233          RDMP21: CMP     @(R2)+,@(R3)+   ;INC R2,R3
4366  023212  020127  023436                  CMP     R1,#ADRAE
4367  023216  001350                          BNE     RDMP1
4368  023220  032737  100000  177570  PERRPC: BIT     #HLTSW,SR       ;TEST FOR HALT ON ERROR
4369  023226  001422                          BEQ     ERRLOP          ;BRANCH IF NO HALT
4370  023230  032737  001000  177570          BIT     #BIT9,SR        ;TEST FOR INHIBIT ODT
4371  023236  001415                          BEQ     2$              ;BR IF ODT NOT SELECTED
4372  023240  004004  035240                  TYPE    ,CRLF
4373  023244  012737  000003  023206          MOV     #BPT,1$         ;RESTORE BREAK POINT TRAP
4374  023252  012737  000240  031172          MOV     #NOP,0,UIN      ;CODE FOR ODT RESTORE
4375  023260  012737  023266  031126          MOV     #1$,0,ADR1      ;TELL ODT BREAK LEGAL
4376  023266  000003          1$:     BPT             ;BREAK TO ODT
4377  023270  000771                          BR      ERRLOP
4378
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4402
4403
4404  723272  000000                    251     HALT                    ;HALT ON ERROR
4405
4406
4407  723274                          ERRLOP: 
4408  723274  713700  023444                    MOV     E,R0,HR         ;RESTORE R0
4409  723300  713701  023446                    MOV     E,R1,H1         ;RESTORE R1
4410  723304  713702  023450                    MOV     E,R2,H2         ;RESTORE R2
4411  723310  713703  023452                    MOV     E,R3,H3         ;RESTORE R3
4412  723314  713704  023454                    MOV     E,R4,H4         ;RESTORE R4
4413  723320  713705  023456                    MOV     E,R5,H5         ;RESTORE R5
4414  723324  032737  040000  177570            BIT     #LOPSW,SR       ;TEST FOR SCOPE LOOP
4415  723332  001424                            BEQ     EXTR1
4416  723334  012706  001100                    MOV     #BEGIN,SP       ;REINIT STACK POINTER
4417  723340  012737  177777  024706            MOV     #-1,ONESHOT     ;REINIT ONESHOT TEST FLAGS
4418  723346  042777  000002  155744            BIC     #MCLKEN,@DXCS   ;CLEAR MAINT CLOCK
4419  723354  005077  155730                    CLR     @DXMD           ;SYSTEM RESET
4420  723360  052777  000001  155712            BIS     #DXFRS,@DXCS    ;DX RESET
4421  723366  004737  026266                    JSR     PC,PRLI         ;REINITIALIZE DX
4422  723372  013737  001272  177776            MOV     LESS1,PS        ;DX PRIORITY MINUS ONE
4423  723400  000177  177014                    JMP     @RETJMN
4424
4425  723404  000002                  EXTR1:  RTI
4426  723406  000000                  ERFLG:  0                       ;ERROR CONTROL FLAG =1=MAP ERROR
4427                                  ;LIST OF ASCII MESSAGE ADDRESSES
4428
4429  723410  735376                  ADRAI   ADXDS
4430  723412  735315                          ADXCA
4431  723414  735324                          ADXCS
4432  723416  735333                          ADXDS
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4433  023420  035342                          ADXBA
4434  023422  035341                          ADXBC
4435  023424  035362                          ADXND
4436  023426  035367                          ADXNI
4437  023430  035376                          ADXCR
4438  023432  035415                          ADXND
4439  023434  035414                          ADXES
4440  023436  035403                ADRAE1:   ADXES1
4441
4442
4443
4444                                    ;ERROR COUNT
4445
4446  023440  023370                    ERRCNT: 0
4447  023442  023372                    ERTSTN: 0               ;TEST NUMBER
4448
4449
4450                                    ;REGISTER STORAGE FOR ERROR REPORTING
4451
4452  023444  023374                    E.R0:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4453  023446  023376                    E.R1:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4454  023450  023400                    E.R2:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4455  023452  023402                    E.R3:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4456  023454  023404                    E.R4:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4457  023456  023406                    E.R5:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4458
4459                                    .SBTTL  MONITOR
4460
4461                                    ;*****************************************************************
4462  023460                            MONITOR:
4463                                    ;*****************************************************************
4464
4465
4466
4467  023460  012706  001100                    MOV     #BEGIN,SP       ;SET UP STACK POINTER
4468  023464  012737  000340  177776            MOV     #LEVEL7,PS      ;MONITOR AT LEVEL 7
4469  023472  004737  025300                    JSR     PC,@#MONDFLT    ;SET UP DEFAULT PARAMETERS
4470
4471  023476  012737  030026  000060            MOV     #TTYI,@#60      ;TTY KEYBOARD INT VEC
4472  023504  012737  000200  000062            MOV     #LEVEL4,@#62    ;LEVEL 4
4473  023512  005004  035146                    TYPE    ,HOME           ;HOME UP AND ERASE SCREEN
4474
4475  023516  005004  034200            M1:     TYPE    ,HEADER
4476  023522  012737  023052  023520            MOV     #RELOU,@#H+2    ;HEADER TEXT GETS WIPED BY NPRIS
4477
4478  023530  000005                    MON1,01 RESET
4479  023532  105777  155042                    TST     @TKB            ;CLEAR FLAG
4480  023536  052777  000100  155032            BIS     #INTEN,@TKS     ;SET INTERRUPT ENABLE
4481  023544  012706  001100                    MOV     #BEGIN,SP       ;SET UP STACK POINTER
4482  023550  012737  000340  177776            MOV     #LEVEL7,PS      ;MONITOR AT LEVEL 7
4483  023556  005004  034560                    TYPE    ,FSTART
4484  023562  124026                            KEY,TO,R0
4485  023564  122700  000104                    CMPB    #'D,R0          ;D = DEFAULT PARAMETERS
4486  023570  001006                            BNE     1$
```

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4487  023572  012737  020017  024222          MOV     #17,@UXX        ;SET UP FOR LATER  CALC
4488  023600  004737  025300                  JSR     PC,@#MONDFLT
4489  023604  000423                          BR      2$
4490  023606  122700  000120          1$:     CMPB    #'P,R0          ;P = PREVIOUSLY SELECTED PARAMETERS
4491  023612  001002                          BNE     3$
4492  023614  000137  024356          2$:     JMP     @#MON12
4493  023620  122700  000123          3$:     CMPB    #'S,R0          ;S = GO THROUGH AND SELECT PARAMETERS
4494  023624  001426                          BEQ     MON1
4495  023626  122700  000116                  CMPB    #'N,R0          ;N = START AT THIS TEST #
4496  023632  001336                          BNE     MON1,@
4497  023634  005004  034044                  TYPE    ,MSG5
4498  023642  104035                          ACCEPTO
4499  023642  013737  025012  025014          MOV     @CTNJM,FIRST,TST
4500  023650  000761                          BR      2$
4501
4502  023652  051137  046105  040517  RELOD1: .ASCIZ  "<RELOAD FOR HEADER TEXT>"
4503  023663  020104  047506  020122
4504  023666  042510  042101  051105
4505  023674  052040  054105  000124
4506                                  .EVEN
4507                                  ;SET UP TEST PARAMETERS
4508
4509  023702  004737  025300          MON11:  JSR     PC,MONDFLT      ;SET UP DEFAULT PARAMETERS
4510  023706  005004  034044                  TYPE    ,MSG5           ;FIRST TEST #
4511
4512  023712  104035                          ACCEPTO ;ACCEPT TEST NUMBER FROM KEYBOARD
4513
4514
4515  023714  005737  025012                  TST     @CTNJM          ;TEST FOR DEFAULT
4516  023720  001403                          BEQ     MON3            ;BRANCH ON DEFAULT
4517  023722  013737  025012  025014          MOV     @CTNJM,FIRST,TST        ;LOAD FIRST TEST #
4518
4519  023730  005004  034062          MON31:  TYPE    ,MSG2           ;BASE ADDRESS:
4520
4521
4522  023734  104035                          ACCEPTO                 ;ACCEPT BASE ADDRESS  FROM KEYBOARD
4523
4524  023736  005737  025012                  TST     @CTNJM          ;TEST FOR DEFAULT
4525  023742  001403                          BEQ     MON4            ;BRANCH IF DEFAULT
4526  023744  013737  025012  001202          MOV     @CTNJM,@XBASE   ;LOAD NON-DEFAULT ADDRESS
4527
4528  023752  005004  035451          MON41:  TYPE    ,MSG28          ;ACCEPT INTERRUPT VECTOR
4529  023756  104035                          ACCEPTO
4530  023760  005737  025012                  TST     @CTNJM          ;TEST FOR DEFAULT
4531  023764  001411                          BEQ     MON4,1          ;BRANCH IF DEFAULT
4532  023766  013737  025012  001204          MOV     @CTNJM,@XIV     ;LOAD NON-DEFAULT INT VECTOR ADRS
4533  023774  062737  000002  025012          ADD     #2,@#CTNUM      ;FORM INT STATUS ADRS
4534  024002  013737  025012  001206          MOV     @#CTNUM,@#XIS   ;INT STATUS ADDRESS
4535
4536
4537  024010  005004  035047          MON4,11:TYPE    ,MSG12          ;PRIORITY
4538  024014  104035                          ACCEPTO         ;ACCEPT DX PRIORITY LEVEL
4539  024016  005737  025012                  TST     @CTNJM          ;TEST FOR DEFAULT
4540  024022  001425                          BEQ     MON6            ;BRANCH ON DEFAULT
```

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4541  ?24024  ?06337  ?25012                 ASL     ?CTNJM          ;SHIFT PRIORITY
4542  ?24030  ?06337  ?25012                 ASL     ?CTNJM          ;INTO PROCESSOR
4543  ?24034  ?06337  ?25012                 ASL     ?CTNJM          ;PRIORITY BITS OF
4544  ?24040  ?06337  ?25012                 ASL     ?CTNJM          ;PROCESSOR STATUS WORD
4545  ?24044  ?06337  ?25012                 ASL     ?CTNJM
4546  ?24050  ?13737  ?25012  ?01270         MOV     ?CTNJM,DXPRT    ;LOAD PRIORITY
4547  ?24056  ?05337  ?25012                 DEC     ?CTNJM
4548  ?24062  ?42737  ?00037  ?25012         BIC     #37,?#CTNUM     ;CLEAR TNZVC
4549  ?24070  ?13737  ?25012  ?01272         MOV     ?CTNJM,LESS1    ;PRIORITY TO ALLOW DX INTERRUPTS
4550
4551
4552
4553                                  ;GENERATE A LIST OF LEGAL ADDRESSES
4554
4555  ?24076  ?00?74  ?34663         MON6:   TYPE    ,MSG4           ;LEGAL ADDRESS LIST
4556  ?24102  ?12?03  ?25034                 MOV     #LEGAL',ADRS,R3 ;START OF LEGAL ADRS TABLE
4557  ?24106  ?00?74  ?34755         MON7:   TYPE    ,MSG5           ;ADRS)
4558  ?24112  ?04737  ?27010                 JSR     PC,GETHEX       ;GET HEXADECIMAL CU ADDRESS
4559  ?24116  ?04?27  ?27172                 PARITY  ,HEXNUM         ;PUT PARITY (ODD) ON ADRS
4560  ?24122  ?13723  ?27172                 MOV     HEXNJM,(R3)+    ;SAVE LEGAL ADDRESS
4561  ?24126  ?040?6                         KEY,TO',R?
4562  ?24132  ?22700  ?00015                 CMPB    #CR,R0          ;ALL DONE?
4563  ?24134  ?01364                         BNE     MON7            ;CONTINUE LIST IF NOT <CR>
4564                                  ;************************** MOD APR 74 **************************
4565                                  ;*
4566                                  ;*                      ADDRESS RESPONSE MOD
4567                                  ;
4568  ?24136  ?13727  ?27172                 MOV     HEXNJM,(PC)+
4569  ?24142  ?00000          VLUHEX10:
4570  ?24144  ?42737  ?00400  ?24142         BIC     #400,VLUHEX
4571  ?24152  ?23727  ?24142  ?00376         CMP     VLJHEX,#376     ;TEST FOR > FF
4572  ?24160  ?03473                         BLE     1$              ;(OK) BRANCHES
4573  ?24162  ?00?74  ?35074                 TYPE,   MSG13           ;OUTPUT "# ILLEGAL ?" I.E, > "FF"
4574  ?24166  ?00747                         BR      MON7            ;TRY AGAIN
4575  ?24170  ?12723  177777         1$:     MOV     #-1,(R3)+       ;MARK END OF LIST
4576                                  ;************************** MOD APR 74 **************************
4577                                  ;*                          #DEV/CU MOD
4578
4579                                  ;SET UP MAXIMUM NUMBER OF DEVICES PER CONTROL UNIT
4580                                  ;THIS INFORMATION DETERMINES WHAT THE SPW TABLE LOOKS LIKE
4581
4582  ?24174  ?00?24  ?34622         MON5:   TYPE    ,MSG3           ;MAX # DEVICES/CU
4583  ?24200  ?04?05                         ACCEPTO                 ;ACCEPT NUMBER OF DEVICES/CU
4584  ?24202  ?05737  ?25012                 TST     ?CTNJM          ;USE 16- ON DEFAULT
4585  ?24206  ?01?03                         BNE     X1$
4586  ?24210  ?00?74  ?35074                 TYPE,   MSG13           ;OUTPUT "# ILLEGAL ?" I.E, # "00"
4587  ?24214  ?00767                         BR      MON5            ;TRY AGAIN
4588
4589  ?24216  ?13727  ?25012         X1$:    MOV     ?CTNJM,(PC)+
4590  ?24222  ?00017          MDXX1:  17      ;THIS IS THE DEFAULT VALJE',.GETS WIPED BY CONSVERSATION
4591  ?24224  ?05337  ?24222                 DEC     ?DXX            ;RANGE MODULO 1
4592  ?24230  ?13727  ?24142                 MOV     VLJHEX,(PC)+
4593  ?24234  ?00000          MDXX1:  0       ;RANGE MASK
4594  ?24236  ?63737  ?24222  ?24234         ADD     ?DXX,MDXX       ;SCALE
```

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4595  024244  105137  024234          COMB    @DXX            ;FCHK FINAL
4596  024250  042737  177400  024234  BIC     #177400,@DXX    ;CU PORTION CLR
4597
4598                                  ;********************************* MOD APR 74 ***************************
4599                                  ;
4600  024256  013737  025012  025016  MOV     OCTNJM,MAX'DEV'CU
4601  024264  004737  026160          MON5,11 JSR     PC,C<CUA        ;CHECK FOR LEGAL NUMBER OF DEV PER CU
4602
4603
4604                                  ;GET COMMAND LIST
4605
4606                                  ,REM    •
4607
4608                                  THIS ROUTINE ACCEPTS AN IBM COMMAND LIST FROM THE CONSOL,  ALL
4609                                  COMMANDS MUST BE NON ZERO (I.E;  TAB MUST BE TYPED WITH PARITY
4610                                  ADD),  WITH EACH COMMAND THE MONITOR ASKS FOR ITS ASSOCIATED DST
4611                                  STATUS.
4612
4613                                          •
4614
4615  024270  012704  025200          MON81   MOV     #CMD,STAT,R4
4616  024274  012703  025220                  MOV     #CMD,ADRS,R3
4617  024300  000004  035004                  TYPE    ,MSG9           ;LEGAL CMD LIST
4618  024304  000004  035035          MON91   TYPE    ,MSG10          ;CMD:
4619  024310  104005                          ACCEPTO         ;ACCEPT LEGAL COMMANDS FROM KEYBOARD
4620  024312  005737  025012                  TST     OCTNJM
4621  024316  001417                          BEQ     MON12
4622  024320  104007  025012                  PARITY  ,OCTNUM
4623  024324  013723  025012                  MOV     OCTNJM,(R3)+
4624  024330  000004  035473                  TYPE    ,MSG31          ;"STATUS: "
4625  024334  104005                          ACCEPTO
4626  024336  113724  025012                  MOVB    OCTNJM,(R4)+
4627  024342  104006                          KEY,TO,R7
4628  024344  120027  000015                  CMPB    R0,#CR
4629  024350  001355                          BNE     MON9
4630  024352  012723  177777                  MOV     #-1,(R3)+       ;LOAD TERMINATOR
4631
4632
4633                                  ;ASK FOR DYNAMIC SWITCH SETTINGS ON CONSOL SWITCHES
4634
4635  024356                          MON101
4636  024356  012737  177777  024706          MOV     #-1,ONESHOT
4637  024364  005037  023440                  CLR     ERRCNT
4638  024370  000004  034765                  TYPE    ,MSG7           ;SET DYNAMIC SWITCHES
4639  024374  104006                          KEY,TO,R7               ;TYPE ANYTHING
4640  024376  122700  000003                  CMPB    #3,R7           ;TEST FOR CONTROL C
4641  024402  001002                          BNE     MON11           ;GO IF NO ^C
4642  024404  000137  023538                  JMP     @#MON1,0
4643
4644
4645                                  ;SET UP TABLES
4646
4647  024410  113727  177570          MON11:  MOVB    SWR,(PC)+       ;SAVE MODE CONTROL SWITCH SETTINGS
4648  024414  000000                  PARA1:  0                       ;HERE
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D8

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4649  P24416  P84737  P26100                  JSR     PC,C4CUA        ;CMP ADRS VS MAX DEV PER CU
4650  P24422  P84737  P25772                  JSR     PC,SPW,SETUP    ;SET UP STATUS POINTER WORDS
4651  P24426  P84737  P25010                  JSR     PC,TT,CLR       ;CLEAR TUMBLE TABLE
4652  P24432  P84737  P26130                  JSR     PC,DST,SETUP    ;SETUP DEVICE STATUS TABLE
4653  P24436  P84737  P25034                  JSR     PC,DDAT         ;SET 360 SIM OUTPUT DATA FILE
4654  P24442  P84737  P26454                  JSR     PC,REG,SETUP    ;SCALE ADDRESSES
4655
4656  P24446                          LPCSUI
4657  P24446  P12737  000001  025036          MOV     #1,DEVCNT       ;INIT DEVICE COUNT
4658  P24454  P12737  P25034  025032          MOV     #LEGAL,ADRS,ACUA ;ADRS OF CU ADRS
4659  P24462  117737  P00314  025034          MOVB    @ACUA,CUADRS    ;CU ADDRESS
4660  P24470  P00460                          BR      LPC1
4661
4662  P24472  P00004  035191          LPCNTLI TYPE    ,BELL
4663
4664  P24476  P62737  000001  025034          ADD     #1,CJADRS       ;
4665  P24504  P65237  P25036                  INC     DEVCNT          ;INC DEVICE COUNT
4666  P24510  P23737  P25036  025016          CMP     DEVCNT,MAX,DEV,C1
4667  P24516  P03445                          BLE     LPC1
4668  P24520  P12737  000001  025036          MOV     #1,DEVCNT       ;INIT DEVICE COUNT
4669  P24526  P27727  000250  177777          CMP     @ACUA,#-1
4670  P24534  P01430                          BNE     LPC2
4671
4672                                  ;************************ MOD APR 74 ********************************
4673                                  ;*
4674                                  ;*                      OPLI TIMEOUT RESET MOD
4675                                  ;
4676  P24536  P12777  P00001  154534          MOV     #1,@DXCS        ;DX RESET OPLI
4677
4678                                  ;************************ MOD APR 74 ********************************
4679                                  ;
4680  P24544  P00004  P35193                  TYPE    ,ENDTST
4681  P24550  P00004  035200                  TYPE    ,ECM            ;ERROR COUNT MESSAGE
4682  P24554  P10546                          MOV     TTY,-(SP)       ;SAVE TTY
4683  P24556  P13705  025440                  MOV     ERRCNT,TTY              ;TYPE IN OCTAL
4684  P24562  P84737  027650                  JSR     PC,PRINTR       ;TYPE LEADING ZEROES
4685  P24566  P12605                          MOV     (SP)+,TTY       ;RESTORE TTY
4686
4687                                  ;THE FOLLOWING CODE IS FOR INTERFACE WITH DDP AND ACT11
4688
4689  P24570  P13700  P00042                  MOV     @042,R0         ;IF 42 = 0 REMAIN IN DX DIAGNSTIC
4690  P24574  P01405                          BEQ     LPC3
4691  P24576  P00005                          RESET                   ;LINK TO DDP OR ACT11
4692  P24600                          LOGICAL1
4693  P24600  P04710                          JSR     PC,@R0
4694  P24602  P00240                          NOP
4695  P24604  P00240                          NOP
4696  P24606  P00240                          NOP
4697  P24610  P12737  025034  025032  LPC51   MOV     #LEGAL,ADRS,ACUA
4698  P24616  P17737  000100  025034  LPC21   MOV     @ACUA,CUADRS
4699  P24624  P62737  P00002  025032          ADD     #2,ACUA
4700  P24632  104007  025004          LPC11   PARITY  ,CJADRS
4701  P24636  P13737  P25004  024774          MOV     CUADRS,DEV
4702  P24644  P13737  P24774  025000          MOV     DEV,DEV,A       ;MULTI THREAD
```

```
4723  ?24652  ?23737  ?25006  025016          CMP     "EVCNT,MAX",DEV,CU
4724  ?24660  ?01404                          BEQ     LPC3
4725  ?24662  ?62737  ?00001  025020          ADD     #1,DEV",A
4726  ?24670  ?000403                         BR      LPC4
4727  ?24672  162737  ?00001  025040  LPC3:   SUB     #1,DEV",A
4728  ?24706  104007  ?25000          LPC4:   PARITY  ,DEV,A
4729
4730
4731  ?24704  ?04737  ?26266          "ON12:  JSR     PC,PRE!         ;DO PRE INIT
4732  ?24712  ?12777  022074  154346          "OV     #FALSE,@DXIV    ;SET UP FALSE INTERRUPT VECTOR TRAP
4733  ?24716  ?13777  ?01270  154342          "OV     DXPRT,@DXIS     ;SET UP INTERRUPT PRIORITY
4734  ?24724  ?13700  ?25014                  "OV     FIRST,TST,R0    ;TEST FOR DEFAULT
4735  ?24730  ?001002                         BNE     "ON13           ;BRA'CH IF NOT DEFAULT
4736  ?24732  ?05237  ?25014                  INC     FIRST,TST       ;DEFAULT TEST NUMBER IS ONE
4737  ?24736  ?13737  ?25014  023442  "ON13:  "OV     FIRST,TST,ERTSTN
4738  ?24744  ?06300                          ASL     R0
4739  ?24746  ?16037  ?22420  022420          "OV     TSTABLE-2(R0),@#RETURN
4740  ?24754  ?62737  ?00024  022420          ADD     #24,@#RETURN
4741  ?24762  ?00170  ?22420          "ON14:  JMP     @TSTABLE-2(R?)  ;JUMP TO SELECTED TEST
4742
4743
4744                                  ,SBTTL  "ONITOR FILES
4745
4746                                  ; ONE PASS FLAGS
4747
4748          ?00001                  FIVESEC=1                       ;5 SEC OPLI TIMER TEST
4749  ?24766  177777                  ONESHOT:        -1              ;ONE PASS FLAGS
4750  ?24770  000000                  CARRY:  0                       ;CARRY COUNT
4751  ?24772  000000                  TMP:    ?               ;TEMPORARY STORAGE
4752  ?24774  ?00020                  DEV:    20              ;DEVICE ADDRESS TO SELECT - MUST INCLDE PARITY
4753                                                          ; ( I.E, 441 IS DEV=1, CU=2)
4754  ?24776  ?00403                  CMD:    403             ;COMMAND TO PRESET - MUST INCLUDE PARITY
4755                                                          ; (403 IS BASIC NOP COMMAND)
4756
4757  ?25000  ?00421                  DEV.A:  421             ;SECOND DEVICE FOR DUAL TESTS
4758
4759
4760  ?25002  ?00000                  ACUA:   ?               ;ADRS OF CU ADRS
4761
4762
4763  ?25004  ?00000                  CUADRS: ?               ;CU ADRS
4764  ?25006  ?00000                  DEVCNT: ?               ;DEVICE COUNT
4765
4766  ?25010  ?02000                  OFFSET: 2000            ;OFFSET TO ADDRESS REGISTER
4767  ?25012  ?00000                  OCTNUM:         ?               ;OCTAL INPUT FROM TTY
4768  ?25014  ?00000                  FIRST,TST:      ?               ;FIRST TEST  TO RUN
4769  ?25016  ?00000                  MAX,DEV,CU:     ?               ;MAXIMUM # OF DEVICES/CU
4770
4771                                  ;DIAGNOSTIC VARIABLES
4772
4773  ?25020  ?00777                  SSTAT:  777             ;SAVED STATUS
4774  ?25022  ?00000                  SRCCNT: ?               ;SOURCE DATA
4775  ?25024  ?00000                  DSTCNT: ?               ;DESTINATION DATA
4776  ?25026  ?00000                  SAVDEV: ?               ;SAVED DEVICE ADDRESS
```

```
 4757  "25030  "000000                TSSFT:  "               ;TSSF TRACE
 4758  "25032  "000000                COUNT:  "               ;USED BY CM "IM "O COUNT BYTES TRANSFERRED
 4759
 4760
 4761                                  ;LEGAL ADDRESS LIST
 4762
 4763  "25034                          LEGAL.ADR"S:
 4764
 4765  "25034  "000000                ,WORD   "
 4766  "25036  "000000                ,WORD   "
 4767  "25040  "000000                ,WORD   "
 4768  "25042  "000000                ,WORD   "
 4769  "25044  "000000                ,WORD   "
 4770  "25046  "000000                ,WORD   "
 4771  "25050  "000000                ,WORD   "
 4772  "25052  "000000                ,WORD   "
 4773  "25054  "000000                ,WORD   "
 4774  "25056  "000000                ,WORD   "
 4775  "25060  "000000                ,WORD   "
 4776  "25062  "000000                ,WORD   "
 4777  "25064  "000000                ,WORD   "
 4778  "25066  "000000                ,WORD   "
 4779  "25070  "000000                ,WORD   "
 4780  "25072  "000000                ,WORD   "
 4781  "25074  "000000                ,WORD   "
 4782
 4783  "25076                          SCALD.ADR"S:
 4784
 4785  "25076  "000000                ,WORD   "
 4786  "25100  "000000                ,WORD   "
 4787  "25102  "000000                ,WORD   "
 4788  "25104  "000000                ,WORD   "
 4789  "25106  "000000                ,WORD   "
 4790  "25110  "000000                ,WORD   "
 4791  "25112  "000000                ,WORD   "
 4792  "25114  "000000                ,WORD   "
 4793  "25116  "000000                ,WORD   "
 4794  "25120  "000000                ,WORD   "
 4795  "25122  "000000                ,WORD   "
 4796  "25124  "000000                ,WORD   "
 4797  "25126  "000000                ,WORD   "
 4798  "25130  "000000                ,WORD   "
 4799  "25132  "000000                ,WORD   "
 4800  "25134  "000000                ,WORD   "
 4801  "25136  "000000                ,WORD   "
 4802
 4803
 4804                                  ;LIST OF DEFAULT COMMANDS
 4805
 4806  "25142                          DFLT.CMD:
 4807
 4808  "25142  "000000                        TIOC            ;TEST I/O COMMAND
 4809  "25142  "000001                        WRITEC          ;WRITE COMMAND
 4810  "25144  "000002                        READC           ;READ COMMAND
```

```
4611  025146  000423                  ;OPC                    ;NOP COMMAND
4612  025150  000424                  SENSEC                  ;SENSE COMMAND
4613  025152  000425                  ILLC                    ;ILLAGAL COMMAND
4614  025154  177777                  -1                      ;LIST TERMINATOR
4615  025156  177777                  -1                      ;LIST TERMINATOR
4616  025160  177777                  -1                      ;LIST TERMINATOR
4617  025162  177777                  -1                      ;LIST TERMINATOR
4618  025164  177777                  -1                      ;LIST TERMINATOR
4619  025166  177777                  -1                      ;LIST TERMINATOR
4620  025170  177777                  -1                      ;LIST TERMINATOR
4621  025172  177777                  -1                      ;LIST TERMINATOR
4622  025174  177777                  -1                      ;LIST TERMINATOR
4623  025176  177777                  -1                      ;LIST TERMINATOR
4624
4625
4626
4627
4628
4629                                  ;DEFAULT STATUS LIST
4630
4631  025200                          DFLT,STAT;
4632  025200      000                         ,BYTE   0
4633  025201      000                         ,BYTE   0
4634  025202      000                         ,BYTE   0
4635  025203      014                         ,BYTE   CR!DE
4636  025204      000                         ,BYTE   0
4637  025205      002                         ,BYTE   JC
4638  025206      002                         ,BYTE   JC
4639  025207      002                         ,BYTE   JC
4640  025210      002                         ,BYTE   JC
4641  025211      002                         ,BYTE   JC
4642  025212      002                         ,BYTE   JC
4643  025213      002                         ,BYTE   JC
4644  025214      002                         ,BYTE   JC
4645  025215      002                         ,BYTE   JC
4646  025216      002                         ,BYTE   JC
4647  025217      002                         ,BYTE   JC
4648
4649
4650
4651                                  ;LIST OF LEGAL COMMANDS
4652
4653  025220                          CMD,ADRS;
4654
4655  025220  000000                  ,WORD   0
4656  025222  000000                  ,WORD   0
4657  025224  000000                  ,WORD   0
4658  025226  000000                  ,WORD   0
4659  025230  000000                  ,WORD   0
4660  025232  000000                  ,WORD   0
4661  025234  000000                  ,WORD   0
4662  025236  000000                  ,WORD   0
4663  025240  000000                  ,WORD   0
4664  025242  000000                  ,WORD   0
```

```
4865  025244  000000                  ,WORD   0
4866  025246  000000                  ,WORD   0
4867  025250  000000                  ,WORD   0
4868  025252  000000                  ,WORD   0
4869  025254  000000                  ,WORD   0
4870  025256  000000                  ,WORD   0
4871
4872                                  ;COMMAND STATUS
4873
4874  025260                          CMD.STAT:
4875
4876  025260      000                         ,BYTE   0
4877  025261      000                         ,BYTE   0
4878  025262      000                         ,BYTE   0
4879  025263      000                         ,BYTE   0
4880  025264      000                         ,BYTE   0
4881  025265      000                         ,BYTE   0
4882  025266      000                         ,BYTE   0
4883  025267      000                         ,BYTE   0
4884  025270      000                         ,BYTE   0
4885  025271      000                         ,BYTE   0
4886  025272      000                         ,BYTE   0
4887  025273      000                         ,BYTE   0
4888  025274      000                         ,BYTE   0
4889  025275      000                         ,BYTE   0
4890  025276      000                         ,BYTE   0
4891  025277      000                         ,BYTE   0
4892
4893
4894
4895
4896                                  ;SET UP DEFAULT PARAMETERS
4897
4898  025300                          MONDFLT:
4899  025300  005037  020036                 CLR     @#ENTRY1        ;TT TRACE ENTRY1
4900  025304  005037  020070                 CLR     @#ENTRY2        ;TT TRACE ENTRY2
4901  025310  013737  001440  020076         MOV     @#TT,@#TTRACE   ;INIT TT TRACE
4902  025316  012737  170777  021300         MOV     #170777,@#NOMI  ;MI READABILITY MASK
4903  025324  012737  177777  020706         MOV     #-1,ONESHOT     ;ONE PASS FLAGS
4904  025332  005037  025014                 CLR     FIRST,TST       ;DEFAULT TEST #
4905  025336  005037  023442                 CLR     ERTSTN          ;ERROR TEST NUMBER
4906  025342  005037  023440                 CLR     ERRCNT          ;ERROR COUNT
4907  025346  013737  025276  022420         MOV     @#D,FIRST,TST,@#RETURN  ;FIRST TEST
4908  025354  013737  025000  001202         MOV     @#D,DXBASE,@#DXBASE     ;BASE ADDRESS
4909  025362  013737  025002  001204         MOV     @#D,DXIV,@#DXIV         ;INT VECTOR ADRS
4910  025370  013737  025014  001206         MOV     @#D,DXIS,@#DXIS         ;INT STATUS ADRS
4911  025376  013737  025004  001210         MOV     @#D,DXPRT,@#DXPRT               ;PRIORITY LEVEL
4912  025404  013737  025006  020016         MOV     @#D,MAX.DEV.CU,@#MAX.DEV.CU     ;MAX DEVICES
4913  025412  013737  025012  020020         MOV     @#D,DEV.A,@#DEV.A       ;SECOND DEVICE
4914  025420  013737  025010  020034         MOV     @#D,LEGAL.ADRS,@#LEGAL.ADRS     ;CU ADRS
4915  025426  012737  177777  020036         MOV     #-1,LEGAL.ADRS+2
4916  025434  012737  030000  001442         MOV     #USTADRS,@#DST  ;INIT DST ADRS
4917  025442  012700  025140                 MOV     #DFLT.CMD,R0    ;ADRS OF DEFAULT CMD LIST
4918  025446  012701  025220                 MOV     #CMD.ADRS,R1    ;ADRS OF LEGAL CMD LIST
```

```
4919
4920  025452  012821                  MON21   MOV     (R2)+,(R1)+     ;LOAD DEFAULT CMD LIST
4921  025454  022710  177777                  CMP     #-1,(R2)        ;TEST FOR TERMINATOR
4922  025460  001374                          BNE     MON2
4923  025462  012721  177777                  MOV     #-1,(R1)+       ;LOAD TERMINATOR
4924  025466  012727  000020                  MOV     #16.,(PC)+
4925  025472  000000                  MON2,81 ?
4926  025474  012700  025200                  MOV     #DFLT,STAT,R0   ;DEFAULT STATUS
4927  025500  012701  025200                  MOV     #CMD,STAT,R1    ;STATUS FOR EACH COMMAND
4928  025504  112821                  MON2,11 MOVB    (R2)+,(R1)+
4929  025506  005337  025472                  DEC     MON2,0
4930  025512  001374                          BNE     MON2,1
4931
4932  025514  013737  025010  001436          MOV     OFFSET,SPW      ;LOAD ADRS OF SPW
4933  025522  013737  025010  001440          MOV     OFFSET,TT       ;LOAD ADRS OF TT
4934  025530  062737  001000  001440          ADD     #1000,TT        ; "   "   "  "
4935  025536  005024                          CLR     @4
4936  025540  012700  034176                  MOV     #0',TRTC,R0
4937  025544  020427  000020          MON2,21 CMP     R4,#0,BKP+2     ;ALL DONE?
4938  025550  101011                          BHI     MON2,3          ;JUMP IF YES
4939  025552  012064  031126                  MOV     R0,0,ADR1(R4)   ;RESET BKPT
4940  025556  012764  000003  031172          MOV     #TRT,0',UIN(R4) ;RESET CONTENTS OF TABLE
4941  025564  005364  031190                  CLR     0,CT(R4)        ;CLEAR COUNT
4942  025570  005724                          TST     (R4)+           ;INCREMENT BY TWO
4943  025572  000764                          BR      MON2,2
4944  025574  000207                  MON2,31 RTS     PC
4945                                  ;DEFAULT PARAMETERS
4946
4947  025576  004020                  0,FIRST,TST1    TST1            ;FIRST TEST
4948  025600  176200                  0',DXBASE1      176200          ;BASE ADDRESS
4949  025602  000300                  0',DXIV1        300             ;INT VECTOR ADRS
4950  025604  000200                  0,DXPRT1        LEVEL4          ;DX PRIORITY LEVEL
4951  025606  000020                  0',MAX,DEV,CU1  20              ;MAX # DEVICES PER CU
4952  025610  000020                  0,LEGAL,ADRS1   220             ;DEFAULT CU ADRS
4953  025612  000421                  0,DEV,A1        421
4954  025614  000302                  0',DXIS1        302             ;INT STATUS ADRS
4955
4956
4957                                  ,SBTTL  MONITOR SUBROUTINES
4958
4959                                  ;TT,CLR, CLEAR TIMBLE TABLE
4960
4961
4962  025616                          TT',CLR1
4963  025616  013701  001440                  MOV     TT,R1           ;BOTTOM OF TT
4964  025622  005021                  CL11:   CLR     (R1)+           ;CLEAR TT
4965  025624  020127  004000                  CMP     R1,#ENDTT               ;TEST FOR END OF TT
4966  025630  001374                          BNE     CL1             ;BRANCH IF NOT END
4967  025632  000207                          RTS     PC
4968
4969
4970                                  ;REINIT OUTPUT DATA
4971
4972
```

```
4973  025634                                  ;DAT1
4974  025634  017046                          MOV     @#,-(SP)
4975  025636  012708  036420                  MOV     #WDATA,R0
4976  025642  005027                          CLR     (PC)+
4977  025644  000000                  ;DAT1:  0
4978  025646  104007  025644          ;DAT2:  PARITY  ,DAT1
4979  025652  013720  025644                  MOV     @DAT1,(R0)+
4980  025656  042737  000400  025644          BIC     #PAR0,DAT1
4981  025664  105237  025644                  INCB    DAT1
4982  025670  001366                          BNE     DAT2
4983  025672  012678                          MOV     (SP)+,@#
4984  025674  000207                          RTS     PC
4985
4986
4987
4988
4989
4990
4991
4992
4993
4994
4995
4996
4997
4998
4999
5000
5001
5002
5003  025676                          T,PARITY1
5004  025676  017627  000000                  MOV     @(SP),(PC)+     ;FETCH ADDRESS OF SOURCE DATA
5005  025702  000000                  SDAPG:  0                       ;SOURCE DATA ADDRESS
5006  025704  017727  177772                  MOV     @SDAPG,(PC)+    ; FETCH SOURCE DATA
5007  025710  000000                  TDAT:   0                       ;SOURCE DATA
5008  025712  005027                          CLR     (PC)+
5009  025714  000000                  PRTY:   0
5010
5011  025716  106337  025710          PG2:    ASLB    TDAT
5012  025722  102002                          BVC     PG3
5013  025724  005137  025714                  COM     PRTY
5014
5015  025730  106337  025710          PG3:    ASLB    TDAT
5016  025734  001370                          BNE     PG2
5017  025736  005737  025714                  TST     PRTY
5018  025742  100404                          BMI     PG4
5019  025744  052777  000400  177730          BIS     #PAR0,@SDAPG    ;SET PARITY BIT
5020  025752  000403                          BR      PG5
5021  025754  042777  000400  177720  PG4:    BIC     #PAR0,@SDAPG    ;CLEAR PARITY BIT
5022
5023  025762  062716  000002          PG5:    ADD     #2,@SP          ;ADD 2 TO RETURN PC
5024  025766  000002                          RTI
5025
5026                                  ;SETUP SPW TABLE
```

```
5227                                    ;************************ MOD APR 74 ****************************
5228                                    ;*                  ADDRESS RESOLUTION MOD
5229
5230  025774  174400                    MARK1   174400
5231
5232  025772                            SPW,SETUP1
5233  025772  012700  025834                   MOV     #LEGAL,ADRS,R0  ;FETCH ADRS OF LEGAL ADRS LIST
5234  025776  012701  025870                   MOV     #SCALD,ADRS,R1  ;FETCH ADDRS OF SCALED LEGAL ADRS LIST
5235
5236  026002  012011                    SP,01   MOV     (R0)+,@R1       ;MAKE DUPLICATE ADRS LIST
5237  026004  043711  025770                   BIC     #ARK,@R1        ;
5238                                    ;************************ MOD APR 74 ****************************
5239  026010  006311                           ASL     @R1             ;MAKE INDX MOD(2)
5240  026012  063721  001436                   ADD     SPW,(R1)+       ;EQUALS REAL SPW ADRS
5241  026016  021027  177777                   CMP     @R0,#-1         ;TEST FOR TERMINATION
5242  026022  001367                           BNE     SP,0            ;FETCH NEXT ADRS
5243
5244  026024  012721  177777                   MOV     #-1,(R1)+       ;MARK END OF SCALED ADRS LIST
5245
5246  026030  013701  001436                   MOV     SPW,R1          ;ADRS OF SPW
5247  026034  013702  001442                   MOV     DST,R2          ;ADRS OF DST
5248  026040  012700  025870           SP,11   MOV     #SCALD,ADRS,R0
5249  026044  020118                    SP,21   CMP     R1,@R0          ;RUN THRU LIST
5250  026046  001407                           BEQ     SP,3            ;BRANCH ON LEGAL ADRS
5251  026050  005720                           TST     (R0)+
5252  026052  022718  177777                   CMP     #-1,@R0         ;TEST FOR END OF LIST
5253  026056  001372                           BNE     SP,2            ;BRANCH IF NOT ENT
5254  026060  012721  027000                   MOV     #ERRDST,(R1)+   ;LOAD SPW WITH ERROR DST ADRS
5255  026064  000407                           BR      SP,6
5256  026066  013727  025816           SP,31   MOV     @#X,DEV,CU,(PC)+
5257  026072  000000                    SP,41   0
5258  026074  010221                    SP,51   MOV     R2,(R1)+
5259  026076  005337  026072                   DEC     SP,4
5260  026102  001374                           BNE     SP,5
5261  026104  023727  001446           SP,61   CMP     R1,TT           ;TEST FOR END OF SPW
5262  026110  002753                           BLT     SP,1
5263  026112  001405                           BEQ     SP,7
5264  026114  005726                           TST     (SP)+   ;POP STACK
5265  026116  000004  026230                   TYPE    ,IDVN
5266  026122  000137  023930                   JMP     @CON1,0  ;GO BACK TO MONITOR
5267  026126  000207                    SP,71   RTS     PC
5268                                    ;DEVICE STATUS TABLE SETUP
5269
5270
5271  026130                            DST,SETUP:
5272  026130  013701  001442                   MOV     DST,R1
5273  026134  012727  000020                   MOV     #16.,(PC)+
5274  026140  000000                    DS,11   0
5275  026142  012772  025260                   MOV     #CMD,STAT,R2
5276  026146  112221                    DS,21   MOVB    (R2)+,(R1)+
5277  026150  005337  026140                   DEC     DS,1
5278  026154  001374                           BNE     DS,2
5279  026156  000207                           RTS     PC
5280
```

```
                                        ;SUBROUTINE TO CHECK THAT CU ADDRESS AND THE NUMBER OF DEVICES
                                        ;PER CU IS LEGAL
                                        ;
 026160  012738  025034        CKCJAI  MOV     #LEGAL,ADRS,#8  ;
 026164  005027                CKC1:   CLR     (PC)+
 026166  000000                CKC2:   .
 026170  111037  026166                MOVB    @#P,@#CKC2              ;FETCH CU ADDRESS
                                        ;************************** MOD APR 74 ******************************
                                        ;*
                                        ;*                      ADDRESS RANGE MOD
                                        ;
 026174  122737  000020  025016 CKC3:   CMPB    #20,#PMAX,DEV,CU        ;CHECK LIMIT 16.

                                        ;************************** MOD APR 74 ******************************
                                        ;
 026202  103005                        BHIS    CKC4    ;BRANCH IF WITHIN LIMITS
 026204  000004  026230                TYPE    ,IDVN   ;ILLEGAL NUMBER OF DEVICES PER CU
 026212  012716  024174                MOV     #MON5,(SP)      ;CHANGE RETURN PC
 026216                                RTS     PC
 026216  005720                CKC41:  TST     (R2)+
 026220  021027  177777                CMP     @R2,#-1
 026224  001357                        BNE     CKC1
 026226  000207                        RTS     PC
 026230  044537  046114  043505  IDVN:   ,ASCIZ  "?ILLEGAL # OF DEVICES PER CU "
 026236  046171  021440  047440
 026244  020106  042904  044526
 026252  042503  020123  042520
 026260  020122  052503  000040
                                        ,EVEN
                                        ;
                                        ;PRE-INIT SUBROUTINE
                                        ;
 026266  012737  026422  000034 PREI:   MOV     #PREITO,4
 026274  012737  000340  000036         MOV     #LEVEL7,6
 026302  005077  153012                CLR     @#XKS           ;CLEAR MAINT CLK
 026306  004737  026420                JSR     PC,RESRES       ;DX RESET AND RESTORE
                                        ;THE FOLLOWING INSTRUCTION GET MODIFIED UPON THE COMPLETION
                                        ;OF THE SYSTEM RESET TEST,IF SCOPE PROBLEMS DEVELOP BEFORE THIS TEST
                                        ;PASSES THIS INST, CAN BE PATCHED TO A TESET,NOP.
 026312  004737  026420        PREI.11 JSR     PC,@#NOCLR              ;MODIFIED TO CLRMO
 026316  005077  152756                CLR     @#XCS           ;CLR DONE,LOCKO
 026322  004737  026420                JSR     PC,RESRES       ;DX RESET AND RESTORE
 026326  013777  001436  152746        MOV     SPW,@#XDS
 026334  023777  001436  152740        CMP     SPW,@#XDS
 026342  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 026344  104000                        ERROR                   ;
 026346  052777  000010  152744        BIS     #TIMDIS,@#XKS   ;TIMER DISABLE
 026354  032777  000010  152736        BIT     #TIMDIS,@#XKS
 026362  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITIO"
 026364  104000                        ERROR                   ;
 026366  012737  000006  000004        MOV     #6,4
 026374  012737  000000  000006        MOV     #HALT,6
 026402  004737  021332                JSR     PC,ZERDTT       ;ZERO TUMBLE TABLE
 026406  004737  021332                JSR     PC,TTZERO       ;VERIFY TT ZERO
```

```
5135  126412  000207                  RTS     PC
5136
5137
5138
5139
5140
5141
5142  126414  005077  152073  CLRMO1: CLR     @#UXMR  ;DO SYSTEM RESET
5143  126420  000207          ;OCLR1: RTS     PC
5144
5145  126422  104070          PRE;TO: ERROR           ;PRE;NIT TIME OUT ERROR
5146
5147
5148  126424  000002                  RTI
5149
5150
5151                          ;DX RESET AND RESTORE ROUTINE
5152
5153
5154
5155
5156
5157
5158
5159
5160
5161
5162  126426                  RESRES1:
5163
5164  126426  042777  000200  152644          BIC     #DONE,@#DXCS    ;CLEAR LOCKO
5165  126434  012777  000001  152636          MOV     #UXERS,@#DXCS   ;DX RESET
5166  126442  013737  001440  020676          MOV     @#TT,TTRACE     ;RELOAD SOFT TT POINTER
5167  126450  000240                  NOP             ;INSERT RESET I,E,"S" HERE IF REQUIRED
5168  126452  000207                  RTS     PC
5169
5170
5171
5172
5173
5174                          ;REGISTER ADDRESS SETUP ROUTINE
5175
5176  126454                  REG,SETUP:
5177  126454  013700  001262          MOV     DXBASE,R0       ;FETCH BASE ADRS
5178  126460  012701  001274          MOV     #DXDS,R1        ;FETCH ADRS OF DXDS ADRS
5179  126464  010021          RS',11: MOV     R0,(R1)+
5180  126466  062700  000002          ADD     #2,R0           ;INC TO NEXT DX ADRS
5181  126472  020127  001326          CMP     R1,#DXES1+2
5182  126476  001372                  BNE     R5,1
5183
5184  126500  004537  126534          JSR     R5,SBYTL        ;SETUP BYTE REF REG'S
5185
5186  126504  001276                  DXCA
5187  126506  001326                  CUAR
5188
```

```
5189  026510  001342                          .DXCS
5190  026512  001332                          CUSH
5191
5192  026514  001310                          .DXCO
5193  026516  001336                          BUSO
5194
5195  026520  001312                          .DXCI
5196  026522  001342                          BUSI
5197
5198  026524  001320                          .DXES
5199  026526  001346                          MISC
5200
5201  026530  177777                          #1
5202
5203  026532  000207                          RTS     PC
5204
5205  026534                          SBYTE1:
5206  026534  112500                          MOV     (R5)+,R0
5207  026536  112501                          MOV     (R5)+,R1
5208  026540  111021                          MOV     BR0,(R1)+
5209  026542  111011                          MOV     BR0,BR1
5210  026544  005221                          INC     (R1)+
5211  026546  021527  177777                  CMP     BR5,#-1
5212  026552  001370                          BNE     SBYTE
5213  026554  005725                          TST     (R5)+   ;POP OVER TERMINATOR
5214  026556  000205                          RTS     R5
5215
5216                                  ;********************** MOD APR 74 ****************************
5217                                  ;*                  STORAGE RELOCATION MOD
5218  026560  000000                  SAVR61: .WORD
5219  026562  050137  053517  051105  PFLD1   .ASCIZ  "<CR><LF>POWER FAILED<CR><LF>"
5220  026570  043040  044501  042514
5221  026576  035004  000
5222          026602                  .EVEN
5223
5224                                  ;********************** MOD APR 74 ****************************
5225                                  ;*                  RELOCATION MOD
5226                                  ;
5227          027000                  .=.+1377+1
5228
5229                                  ;ILLEGAL OR MALFUNCTIONING CUAR ERROR STATUS TABLE MODULO 8
5230
5231  027000                          ERRDST:
5232  027000     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5233  027001     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5234  027002     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5235  027003     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5236  027004     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5237  027005     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5238  027006     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5239  027007     002                          .BYTE   JC              ;UNIT CHECK ENTRIES
5240
5241                                  ;ACCEPT HEX NUMBER FROM TTY
5242
```

```
5243  027613  005037  027172          GETHEX: CLR     HEXNUM          ;CLEAR HEXADECIMAL NUMBER LOCATION
5244  027616  010246                          MOV     R2,-(SP)        ;SAVE R2
5245  027620  010146                          MOV     R1,-(SP)        ;SAVE R1
5246  027622  010046                          MOV     R0,-(SP)        ;SAVE R0
5247  027624  005001                  ACPTH:  CLR     R1              ;
5248  027626  104006                  ACPTH,1:        KEY,TO,HP       ;FETCH AN ASCII CHAR FROM KEYBOARD
5249  027630  120027  000003                  CMPB    R0,#3           ;CONTROL C?
5250  027634  001002                          BNE     AH,2
5251  027636  000137  023938                  JMP     @#MON1,0
5252  027642  122700  000177          AH',2:  CMPB    #177,R0         ;TEST FOR RUBOUT
5253  027646  001424                          BEQ     RUBOUH
5254  027650  122700  000015                  CMPB    #15,R0          ;TEST FOR <CR>
5255  027654  001424                          BEQ     CARGH
5256  027656  120027  000040                  CMPB    R0,#40          ;EXIT IF SPACE
5257  027662  001421                          BEQ     CARGH
5258  027664  120027  000000                  CMPB    R0,#0           ;TEST FOR VALID HEX NUMBER
5259  027670  002413                          BLT     RUBOUH
5260  027672  120027  000071                  CMPB    R0,#'9
5261  027676  003021                          BGT     AHEX
5262  027700  042700  177760          AH',3:  BIC     #177760,R0      ;CONVERT ASCII TO HEX
5263  027704  006301                          ASL     R1
5264  027706  006301                          ASL     R1
5265  027710  006301                          ASL     R1
5266  027712  006301                          ASL     R1
5267  027714  050001                          BIS     R0,R1           ;CHALK'M UP
5268  027716  000743                          BR      ACPTH,1         ;FETCH NEXT CHAR
5269
5270  027720  000004  035224          RUBOUH: TYPE    ,,QUES          ;TYPE?
5271  027724  000737                          BR      ACPTH
5272  027726  010137  027172          CARGH:  MOV     R1,HEXNUM       ;PLACE HEX NUMBER HERE
5273  027732  012600                          MOV     (SP)+,R0                ;RESTORE R0
5274  027734  012601                          MOV     (SP)+,R1                ;RESTOR R1
5275  027736  012602                          MOV     (SP)+,R2        ;RESTORE R2
5276  027740  000207                          RTS     PC
5277
5278  027742  005002                  AHEX:   CLR     R2
5279  027744  120062  027774          AHEX1:  CMPB    R0,ATBL(R2)     ;LOOK THRU ASCII TABLE
5280  027750  001406                          BEQ     AHEX1           ;BRANCH ON MATCH
5281  027752  005202                          INC     R2
5282  027754  126227  027774  000000          CMPB    ATBL(R2),#0     ;LOOK FOR END OF TABLE
5283  027762  001370                          BNE     AHEX1           ;BRANCH IF NOT END
5284  027764  000755                          BR      RUBOUH          ;ERROR ON NO MATCH
5285  027766  116270  027720'         AHEX11: MOVB    HTBL(R2),R0     ;LOAD BINARY OF FIND
5286  027772  000742                          BR      AH,3
5287
5288
5289  027774  000000                  HEXNUM: 0                       ;HEX NUMBER
5290  027776  041101  042103  043105  ATBL:   ,ASCII  'ABCDEF'
5291  030002  000000                  ,WORD   0
5292  030004     012     013     014  HTBL:   ,BYTE   10.,11.,12.,13.,14.,15.
5293  030007     015     016     017
5294
5295                                  ;ACCEPT OCTAL NUMBER FROM TTY
5296  030012                          T,ACCEPTO:
```

```
5297  ?27212  ?05?37  ?25?12          CLR     OCTNUM          ;CLEAR OCTAL NUMBER LOCATION
5298  ?27216  ?10146                  MOV     R1,-(SP)        ;SAVE R1
5299  ?27220  ?10046                  MOV     R0,-(SP)        ;SAVE R0
5300  ?27222  ?05001          ACPTO:  CLR     R1              ;
5301  ?27224  104026          ACPTO,1:        <EV,TO,R?       ;FETCH AN ASCII CHAR FROM KEYBOARD
5302  ?27226  120027  ?00003           CMPB    R0,#3           ;CONTROL C?
5303  ?27232  ?01002                  BNE     A0,2
5304  ?27234  ?00137  ?23930          JMP     @#MON1,0
5305  ?27240  122?00  ?00177  A0,2:    CMPB    #177,R?         ;TEST FOR RUBOUT
5306  ?27244  ?01423                  BEQ     RUBOJT
5307  ?27246  122?00  ?00015          CMPB    #15,R0          ;TEST FOR <CR>
5308  ?27252  ?01423                  BEQ     CARG
5309  ?27254  120027  ?00040          CMPB    R0,#40          ;EXIT IF SPACE
5310  ?27260  ?01420                  BEQ     CARG
5311  ?27262  120?27  ?00060          CMPB    R0,#?           ;TEST FOR VALID OCTAL NUMBER
5312  ?27266  ?02412                  BLT     RUBOJT
5313  ?27270  120027  ?00067          CMPB    R0,#'7
5314  ?27274  ?03007                  BGT     RUBOJT
5315  ?27276  ?427?0  177770          BIC     #177770,R0      ;CONVERT ASCII TO OCTAL
5316  ?27302  ?06?71                  ASL     R1
5317  ?27304  ?06?71                  ASL     R1
5318  ?27306  ?06?71                  ASL     R1
5319  ?27310  ?50001                  BIS     R0,R1           ;CHALK'M UP
5320  ?27312  ?00744                  BR      ACPTO,1         ;FETCH NEXT CHAR
5321
5322  ?27314  ?00004  ?35224  RUBOUT: TYPE    ,,QUES          ;TYPE?
5323  ?27320  ?00740                  BR      ACPTO
5324  ?27322  ?10137  ?25?12  CARG:   MOV     R1,OCTNUM       ;PLACE OCTAL NUMBER HERE
5325  ?27326  ?12600                  MOV     (SP)+,R0                ;RESTORE R0
5326  ?27330  ?12601                  MOV     (SP)+,R1                ;RESTOR R1
5327  ?27332  ?00002                  RTI                     ;RETURN
5328
5329                          ;FETCH AN ASCII CHARACTER FROM KEYBOARD
5330
5331  ?27334                  T,KEY,TO,R?:
5332  ?27334  105777  152?30          TSTB    @TKS            ;TEST FOR DONE
5333  ?27340  100375                  BPL     .-4             ;WAIT FOR KEYBOARD
5334  ?27342  117700  152?32          MOVB    @TKB,R0         ;FETCH CHAR
5335  ?27346  117777  152?26  152?30  MOVB    @TKB,@TPR       ;ECHO
5336  ?27354  ?04737  ?27366          JSR     PC,TTYFLG       ;WAIT FOR DONE
5337  ?27360  ?42700  177600          BIC     #177600,R0      ;7 BIT ASCII
5338  ?27364  ?00002                  RTI
5339                          ;TEST FOR TRANSMITTER DONE
5340
5341  ?27366                  TTYFLG:
5342  ?27366  105777  152?10  2$:     TSTB    @TPS
5343  ?27372  100375                  BPL     2$
5344  ?27374  ?00207                  RTS     PC
5345                          .SBTTL  TTY ASCII OUTPUT ROUTINE
5346
5347
5348  ?27376  ?32737  ?20000  177570  .IOT:   BIT     #BIT13,@#  ;TEST FOR INHIBIT PRINT
5349  ?27404  ?01002                  BNE     .IOT2
5350  ?27406  ?10537  ?27?14          MOV     TTY,,SAV        ;SAVE TTY
```

```
5351  *27412  *17605  *00020                MOV     @(4),TTY        ;GET ADDRESS TO BE TYPED
5352  *27416  122715  *00044        ,MORE:  CMPB    #'$,(TTY)       ;TERMINATOR?
5353  *27422  *01425                BEQ     ,TERM
5354  *27424  105715                TSTB    (TTY)           ;TERMINATOR?
5355  *27426  *01423                BEQ     ,TERM
5356  *27433  122715  000001               CMPB    #1,(TTY)        ;RESTORE OLD SEQUENCE
5357  *27434  *01416                BEQ     ,REST
5358  *27436  122715  *00137               CMPB    #'*,(TTY)       ;SET UP CR LF
5359  *27442  *01426                BEQ     ,CRLF
5360  *27444  105777  151732               TSTB    @TPS
5361  *27450  100*75                BPL     .-4
5362  *27452  112577  151720               MOVB    (TTY)+,@TPB
5363  *27456  *00757                BR      ,MORE
5364  *27463  *05235        ,CRLF:  INC     TTY
5365  *27462  *10546                MOV     TTY,-(6)
5366  *27464  *12705  *27516                MOV     #,CAR,TTY
5367  *27470  *00752                BR      ,MORE
5368  *27472  *12635        ,REST:  MOV     (6)+,TTY
5369  *27474  *00750                BR      ,MORE
5370  *27476  *04737  *27360        ,TERM:  JSR     @C,TTYFLG       ;WAIT FOR DONE
5371  *27502  *13705  *27514                MOV     ,SAV,TTY
5372  *27506  *62716  *00002        ,IOTE:  ADD     #2,(6)  ;POP
5373  *27512  *00002                RTI
5374
5375  *27514  *00000        ,SAV:   0
5376  *27516  *05015  001002  001002  ,CAR:   ,ASCII  <CR><LF><2><2><2><2><2><2><1>
5377  *27524  *01002     001
5378          *27530                ,EVEN
5379  *27530  *00000                ,TYPE:  0
5380                                ,SBTTL  SAVE AND RESTORE REGISTERS
5381                                ;SAVE REGS 0 TO 4 SUBROUTINE,
5382  *27532  *12637  *27570        T,SAVRG: MOV    (6)+,SVRPC      ;SAVE PC AND PSW,
5383  *27536  *12637  *27572                MOV     (6)+,SVRPSW
5384  *27542  *10546                MOV     %5,-(6)
5385  *27544  *10446                MOV     %4,-(6) ;SAVE REGS 0 - 4
5386  *27546  *10346                MOV     %3,-(6)         ;IN STACK,
5387  *27550  *10246                MOV     %2,-(6)
5388  *27552  *10146                MOV     %1,-(6)
5389  *27554  *10046                MOV     %0,-(6)
5390  *27556  *13746  *27572                MOV     SVRPSW,-(6)     ;RESTORE PC AND PSW,
5391  *27562  *13746  *27570                MOV     SVRPC,-(6)
5392  *27566  *00002                RTI                     ;EXIT,
5393  *27570  000000                SVRPC:  0
5394  *27572  000000                SVRPSW: 0
5395                                ;RESTORE REGS 0 TO 4 SUBROUTINE,
5396  *27574  *12637  *27632        T,RSTRG: MOV    (6)+,RSTPC      ;SAVE PC AND PSW,
5397  *27600  *12637  *27634                MOV     (6)+,RSTPSW
5398  *27604  *12600                MOV     (6)+,%0         ;RESTORE REGS 0 - 4
5399  *27606  *12601                MOV     (6)+,%1         ;FROM STACK,
5400  *27610  *12602                MOV     (6)+,%2
5401  *27612  *12603                MOV     (6)+,%3
5402  *27614  *12604                MOV     (6)+,%4
5403  *27616  *12605                MOV     (6)+,%5
5404
```

```
5425  ?27620  ?13746  ?27634          MOV     RSTPSW,-(6)     ;RESTORE PC AND PSW.
5426  ?27624  ?13746  ?27632          MOV     RSTPC,-(6)
5427  ?27630  ?000?2                  RTI                     ;EXIT
5428  ?27632  ?000??0         RSTPC:  ?
5429  ?27634  ?000??0         RSTPSW: ?
5430                          .SBTTL  OCTAL DUMP ROUTINE
5431
5432  ?27636  ?0?3?0  000000  000000  PRINT2: .WORD   ?,?,?,?
5433  ?27644  ?0?3?0
5434  ?27646     3?0     000          PRINT3: .BYTE   ?,?
5435
5436  ?27650  112737  000001  027646  PRINTR: MOVB    #1,@#PRINT3     ;SET ZERO FILL SWITCH
5437  ?27656  ?004?2                  BR      .+6
5438  ?27660  005037  ?27646         PRINTS: CLR     @#PRINT3        ;SUPRESS LEADING ZEROES
5439  ?27664  112737  177772  027647          MOVB    #-6,@#PRINT3+1  ;SET COUNT
5440  ?27672  ?32737  ?20000  177570          BIT     #BIT13,@#PS
5441  ?27700  ?01341                          BNE     .+42            ;BYTE
5442  ?27702  ?10446                          MOV     R4,-(6)         ;SAVE R4
5443  ?27704  ?12704  ?27636                  MOV     #PRINT2,R4      ;SET POINTER TO FIRST ASCII CHAR.
5444  ?27710  105014                          CLRB    (4)             ;CLEAR FIRST BYTE
5445  ?27712  ?006?5                          RR      @#PRINTF        ;ROTATE FIRST BIT
5446  ?27714  105014          PRINTL: CLRB    (4)             ;CLEAR BYTE OF CHARACTER
5447  ?27716  ?06?05                  ROL     TTY             ;ROTATE BIT INTO C
5448  ?27720  106114                  ROLB    (4)             ;PACK IT
5449  ?27722  ?06?05                  ROL     TTY             ;ROTATE BIT INTO C
5450  ?27724  106114                  ROLB    (4)             ;PACK IT
5451  ?27726  ?06?05          PRINTF: ROL     TTY             ;ROTATE BIT INTO C
5452  ?27730  106114                  ROLB    (4)             ;PACK IT
5453  ?27732  105714                  TSTB    (4)
5454  ?27734  ?01402                  BEQ     .+6
5455  ?27736  105237  ?27646         INCB    @#PRINT3
5456  ?27742  105737  027646         TSTB    @#PRINT3        ;CHECK FILL SWITCH
5457  ?27746  ?01402                  BEQ     .+6
5458  ?27750  152724  ?00060         BISB    #'?,(4)+        ;MAKE INTO ASCII CHAR
5459  ?27754  105237  ?27647         INCB    @#PRINT3+1
5460  ?27760  ?01355                  BNE     PRINTL          ;REPEAT
5461  ?27762  ?22704  ?27636         CMP     @#PRINT2,R4
5462  ?27766  ?01?02                  BNE     .+6
5463  ?27770  112724  ?00060         MOVB    #'?,(4)+
5464  ?27774  105014                  CLRB    (4)
5465  ?27776  ?00004  ?27636         TYPE    ,PRINT2         ;TYPE IT
5466  ?3?002  ?12604                  MOV     (6)+,R4         ;RESTORE R5
5467  ?3?004  ?00207          PRTEI:  RTS     R7
5468                          ;TTY WATCH DOG FOR CONTROL C
5469          000003          CNTLC=3                         ;ASCII CONTROL C
5470
5471  ?3?006  117727  151366  TTYI:   MOVB    @TKB,(PC)+      ;SAVE CHAR
5472  ?3?012  ?00?00  SCHAR:  ?                               ;HERE
5473  ?3?014  ?42737  ?00200  033012          BIC     #200,@#SCHAR    ;SEVEN LEVEL ASCII
5474  ?3?022  122737  000003  033012          CMPB    @#CNTLC,@#SCHAR ;CHECK FOR CONTROL C
5475  ?3?030  ?01004                          BNE     TTYI?
5476  ?3?032  ?00004  ?30050                  TYPE    ,ACLC   ;TYPE CONTROL C
5477  ?3?036  ?00137  023530                  JMP     @#MON1,0
5478  ?3?042  ?04737  ?27300  TTYIE:  JSR     PC,TTYFLG
```

```
5459  "3P446  113777  "3P612  191330          "OVB    @@SCHAR,@TPB    ;ECHO CHARACTER
5460  "3P454  "2P3P2                         "TI
5461
5462  "3P4?6  "41536     428          ACLOG  ,ASCIZ  <13@><183>
5463          "3P362                  ,EVE'
5464
5465          "3P4P8                  ,#',1377+1                     ;FORM MOD(4@P) BOUNDRY
5466
5467          "3P4@8                  DSTADRS=,                      ;DEFAULT DST
5468
5469  "3P4P3     3P@                          ,BYTE   '              ;TIO
5470  "3P4P1     3P@                          ,BYTE   '              ;WRITE
5471  "3P4P2     3P@                          ,BYTE   '              ;READ
5472  "3P4P3     814                          ,BYTE   CE!DE          ;NOP
5473  "3P4P4     3P@                          ,BYTE   '              ;SENSE
5474
5475  "3P4P5     3P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5476  "3P4P6     @32                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5477  "3P4P7     3P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5478  "3P410     3P2                          ,BYTE   .C             ;ILLEGAL ,UNIT CHECK
5479  "3P411     3P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5480  "3P412     3P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5481  "3P413     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5482  "3P414     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5483  "3P415     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5484  "3P416     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5485  "3P417     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5486  "3P420     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5487  "3P421     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5488  "3P422     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5489  "3P423     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5490  "3P424     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5491  "3P425     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5492  "3P426     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5493  "3P427     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5494  "3P430     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5495  "3P431     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5496  "3P432     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5497  "3P433     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5498  "3P434     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5499  "3P435     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5500  "3P436     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5501  "3P437     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5502  "3P440     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5503  "3P441     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5504  "3P442     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5505  "3P443     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5506  "3P444     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5507  "3P445     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5508  "3P446     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5509  "3P447     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5510  "3P450     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5511  "3P451     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
5512  "3P452     @P2                          ,BYTE   JC             ;ILLEGAL ,UNIT CHECK
```

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5513  P3P453  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5514  P3P454  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5515  P3P455  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5516  P3P456  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5517  P3P457  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5518  P3P460  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5519  P30461  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5520  P3P462  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5521  P3P463  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5522  P3P464  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5523  P3P465  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5524  P30466  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5525  P30467  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5526  P30470  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5527  P30471  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5528  P30472  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5529  P30473  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5530  P30474  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5531  P30475  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5532  P30476  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5533  P30477  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5534  P30500  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5535  P30501  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5536  P30502  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5537  P30503  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5538  P30504  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5539  P30505  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5540  P30506  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5541  P30507  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5542  P30510  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5543  P30511  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5544  P30512  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5545  P30513  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5546  P30514  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5547  P30515  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5548  P30516  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5549  P30517  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5550  P30520  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5551  P30521  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5552  P30522  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5553  P30523  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5554  P30524  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5555  P30525  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5556  P30526  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5557  P30527  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5558  P30530  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5559  P30531  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5560  P30532  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5561  P30533  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5562  P30534  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5563  P30535  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5564  P30536  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5565  P30537  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5566  P30543  002                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
```

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5587  "3P541   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5588  "3P542   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5589  "3P543   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5590  "3P544   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5591  "3P545   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5592  "3P546   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5593  "3P547   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5594  "3P550   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5595  "3P551   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5596  "3P552   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5597  "3P553   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5598  "3P554   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5599  "3P555   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5600  "3P556   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5601  "3P557   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5602  "3P560   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5603  "3P561   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5604  "3P562   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5605  "3P563   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5606  "3P564   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5607  "3P565   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5608  "3P566   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5609  "3P567   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5610  "3P570   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5611  "3P571   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5612  "3P572   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5613  "3P573   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5614  "3P574   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5615  "3P575   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5616  "3P576   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5617  "3P577   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5618  "3P600   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5619  "3P601   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5620  "3P602   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5621  "3P603   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5622  "3P604   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5623  "3P605   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5624  "3P606   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5625  "3P607   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5626  "3P610   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5627  "3P611   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5628  "3P612   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5629  "3P613   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5630  "3P614   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5631  "3P615   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5632  "3P616   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5633  "3P617   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5634  "3P620   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5635  "3P621   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5636  "3P622   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5637  "3P623   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5638  "3P624   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5639  "3P625   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
5640  "3P626   8"2                    ,BYTE   JC      ;ILLEGAL ,UNIT CHECK
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5621  "3P627   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5622  "3P633   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5623  "3P631   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5624  "3P632   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5625  "3P633   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5626  "3P634   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5627  "3P635   322                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5628  "3P636   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5629  "3P637   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5630  "3P643   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5631  "3P641   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5632  "3P642   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5633  "3P643   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5634  "3P644   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5635  "3P645   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5636  "3P646   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5637  "3P647   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5638  "3P653   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5639  "3P651   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5640  "3P652   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5641  "3P653   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5642  "3P654   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5643  "3P655   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5644  "3P656   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5645  "3P657   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5646  "3P663   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5647  "3P661   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5648  "3P662   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5649  "3P663   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5650  "3P664   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5651  "3P665   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5652  "3P666   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5653  "3P667   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5654  "3P673   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5655  "3P671   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5656  "3P672   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5657  "3P673   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5658  "3P674   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5659  "3P675   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5660  "3P676   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5661  "3P677   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5662  "3P7?3   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5663  "3P7?1   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5664  "3P7?2   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5665  "3P7?3   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5666  "3P7?4   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5667  "3P7?5   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5668  "3P7?6   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5669  "3P7?7   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5670  "3P713   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5671  "3P711   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5672  "3P712   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5673  "3P713   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5674  "3P714   3?2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
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5675  *3P715    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5676  *3P716    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5677  *3P717    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5678  *3P720    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5679  *3P721    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5680  *3P722    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5681  *3P723    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5682  *3P724    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5683  *3P725    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5684  *3P726    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5685  *3P727    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5686  *3P730    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5687  *3P731    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5688  *3P732    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5689  *3P733    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5690  *3P734    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5691  *3P735    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5692  *3P736    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5693  *3P737    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5694  *3P740    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5695  *3P741    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5696  *3P742    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5697  *3P743    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5698  *3P744    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5699  *3P745    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5700  *3P746    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5701  *3P747    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5702  *3P750    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5703  *3P751    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5704  *3P752    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5705  *3P753    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5706  *3P754    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5707  *3P755    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5708  *3P756    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5709  *3P757    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5710  *3P760    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5711  *3P761    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5712  *3P762    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5713  *3P763    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5714  *3P764    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5715  *3P765    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5716  *3P766    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5717  *3P767    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5718  *3P770    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5719  *3P771    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5720  *3P772    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5721  *3P773    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5722  *3P774    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5723  *3P775    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5724  *3P776    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5725  *3P777    8P2                    ,BYTE   JC      ILLEGAL ,UNIT CHECK
5726                           ,EVEN
5727
5728  *31000                 T,PCH11
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5729  ?31?F?  ?00012                          ,BLKW   10,
5730
5731  ?31?24                                T,PCH2:
5732  ?31?24  ?00012                          ,BLKW   10,
5733
5734  ?31?5?                                T,PCH3:
5735  ?31?5?  ?00012                          ,BLKW   10,
5736
5737                                        ,SBTTL  ODT
5738
5739                                        ;   ODT-11X -- V?06A
5740
5741                                        ; COPYRIGHT 1969,197?, DIGITAL EQUIPMENT CORPORATION
5742
5743          ?00000                        R0      =       %0      ; REGISTER
5744          ?00001                        R1      =       %1      ;  NAMING
5745          ?00002                        R2      =       %2      ;   CONVENTIONS
5746          ?00003                        R3      =       %3
5747          ?00004                        R4      =       %4
5748          ?00005                        R5      =       %5
5749          ?00006                        SP      =       %6
5750          ?00007                        PC      =       %7
5751          177776                        ST      =       177776          ;STATUS REGISTER
5752          ?31?74                        0,TMP   =       .
5753          ?31?74                        .       =       0,TMP
5754
5755          000016                        0,BKP   =       16              ;NUMBER OF BREAKPOINTS*1 MULT. BY 2
5756          ?00014                        0,TVEC  =       14              ;TRT VECTOR LOCATION
5757          ?00340                        0,STM   =       340             ;PRIORITY MASK = STATUS REGISTER
5758          ?00020                        0,TBT   =       20              ;T-BIT MASK = STATUS REGISTER
5759          ?00023                        TRT     =       00023           ;TRT INSTRUCTION
5760
5761
5762          177562                        0,RDB   =       177562  ;R DATA BUFFER
5763          177560                        0,RCSR  =       177560  ;R C/SR
5764          177566                        0,TDB   =       177566  ;T DATA BUFFER
5765          177564                        0,TCSR  =       177564  ;T C/SR
5766                                        ; INITIALIZE ODT
5767                                        ;  USE 0,ODT FOR A NORMAL ENTRY
5768                                        ;  USE 0,ODT+2 TO RESTART ODT - WIPING OUT ALL BREAKPOINTS
5769                                        ;  USE 0,ODT+4 TO RE-ENTER (I.E. - FAKE A BREAKPOINT)
5770
5771          ?31214                        .=.+120                 ;SAVE ROOM FOR ODT STACK
5772
5773  ?31214  ?12777  ?00010  150076  0,ODT:  MOV     #TIMDIS,@DXES   ;DISABLE TIMER
5774  ?31222  ?00421                          BR      0,STRT          ;NORMAL ENTRY
5775  ?31224  ?00425                          BR      0,RST           ;RESTART
5776  ?31226  ?13737  177776  031114  0,ENTR:  MOV     ST,0,UST        ;RE-ENTER -- SAVE STATUS
5777  ?31234  ?13737  000016  177776          MOV     #.,TVEC+2,ST    ;SET UP LOCAL STATUS
5778  ?31242  ?12737  ?31214  031112          MOV     #0$,ODT,0,UPC   ;FAKE THE PC
5779  ?31250  112737  177777  034133          MOVB    #-1,0,P         ;DISALLOW PROCEED
5780  ?31256  105037  ?34131                  CLRB    0,S
5781  ?31262  ?00137  033114                  JMP     0,BK1
5782
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5783  031266  012706  031874          0,STRT: MOV     #0,JRB,SP       ;SET UP STACK
5784  031272  010637  031110                  MOV     SP,0,USP        ;FAKE THE SAVED STACK
5785  031276  000413                         BR      0,RST1
5786  031300  004237  033410          0,RST:  JSR     5,0,SVR         ;SAVE REGISTERS
5787  031304  004537  033624                  JSR     5,0,RLM         ;REMOVE ALL BREAKPOINTS
5788  031310  113704  031110                  MOVB    @,PRI,R4        ;GET OUT PRIORITY
5789  031314  120004                         RORB    R4              ;SHIFT
5790  031316  106004                         RORB    R4              ; INTO
5791  031320  106004                         RORB    R4              ;  POSITION
5792  031322  110437  177776                 MOVB    R4,ST           ;STORE IN STATUS
5793  031326  105037  034131          0,RST1: CLRB    @,S             ;DISABLE SINGLE INSTRUCTION FOR NOW
5794  031332  112737  177777  034133        MOVB    #-1,@,P         ;DISALLOW PROCEED
5795  031340  012737  000340  000016        MOV     #0,STM,0,TVEC+2 ;STATUS WORD TO TRT VECTOR+2
5796  031346  012737  033070  000014        MOV     #0,BRK,0,TVEC   ;PC TO TRT VECTOR
5797  031354  000137  032332                JMP     0,RALL          ;CLEAR BREAKPOINT TABLES
5798
5799
5800                                  ; SPECIAL NAME HANDLER
5801                                  ;  DEPENDS UPON THE EXPLICIT ORDER OF THE TWO TABLES 0,TL AND 0,JRB
5802
5803  031360  004537  033704          0,REGT: JSR     5,0,GET         ;SPECIAL NAME, GET ONE MORE CHARACTER
5804  031364  012704  034170                  MOV     #0,T-,R4        ;TABLE START ADDRESS
5805  031370  122024          0,RSP:  CMPB    R0,(R4)+        ;IS THIS THE CORRECT CHARACTER?
5806  031372  001413                         BEQ     0,SP            ;JUMP IF YES
5807  031374  022704  034176                 CMP     #0,T-+0,LG,R4   ;IS THE SEARCH DONE?
5808  031400  101373                         BHI     0,RSP           ;BRANCH IF NOT
5809  031402  042700  177770                 BIC     #177770,R0      ;MASK OFF OCTAL
5810  031406  010004                         MOV     R0,R4
5811  031410  006304          0,SP1:  ASL     R4
5812  031412  062704  031070                 ADD     #0,URB,R4       ;GENERATE ADDRESS
5813  031416  005202                         INC     R2              ;SET FOUND FLAG
5814  031420  000471                         BR      0,SCAN          ;GO FIND NEXT CHARACTER
5815  031422  162704  034161          0,SP:   SUB     #0,T-+7,R4      ;GO FIND NEXT CHARACTER
5816  031426  000770                         BR      0,SP1
5817
5818                                  ; * HANDLER - OPEN INDEXED ON THE PC
5819
5820  031430  004537  031504          0,ORPC: JSR     5,0,TCLS        ;TEST WORD MODE AND CLOSE
5821  031434  061202                         ADD     @R2,R2          ;COMPUTE
5822  031436  005202                         INC     R2
5823  031440  005202                         INC     R2              ;  NEW ADDRESS
5824  031442  010237  034122          0,PCS:  MOV     R2,0,CAD        ;UPDATE CAD
5825  031446  000137  032124                 JMP     0,OP2A          ;GO FINISH UP
5826  031452  004537  031504          0,ORAB: JSR     5,0,TCLS                ;TEST WORD MODE AND CLOSE
5827  031456  011202                         MOV     @R2,R2          ;GET ABSOLUTE ADDRESS
5828  031460  000770                         BR      0,PCS
5829  031462  004537  031504          0,ORRB: JSR     5,0,TCLS        ;TEST AND CLOSE
5830  031466  011201                         MOV     @R2,R1          ;COMPUTE NEW ADDRESS
5831  031470  110101                         MOVB    R1,R1           ;EXTEND THE SIGN
5832  031472  006301                         ASL     R1              ;R2=2(@R2)
5833  031474  005201                         INC     R1              ;  +2
5834  031476  005201                         INC     R1
5835  031500  060102                         ADD     R1,R2           ;  +PC
5836  031502  000757                         BR      0,PCS
```

M9

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5877  "31504  "24737  "34042          0,TCLS1 JSR     PC,0,CLSE       ;CLOSE CURRENT CELL
5878  "31510  "22737  "00002  034120           CMP     #2,0,WW         ;ONLY WORD MODE ALLOWED
5879  "31516  "21003                          BNE     0,TCL1          ;BRANCH IF ERROR
5880  "31520  "13702  "34122                  MOV     0,CA0,R2        ;CURRENT ADDRESS IN R2
5881  "31524  "00205                          RTS     R5
5882  "31526  "05726                  0,TCL1: TST     (SP)+
5883  "31530  "01411                          BR      0,ERR           ;POP A WORD AND SHOW THE ERROR
5884
5885                                   ;       PROCESS S = SINGLE INSTRUCTION MODE
5886
5887  "31532  "05702                  0,SNGL: TST     R2              ;SEE IF TURN ON OR TURN OFF
5888  "31534  "01003                          BNE     0,S11           ;BRANCH IF TURNING IT ON
5889  "31536  105037  "34131                  CLRB    0,S             ;CLEAR THE FLAG
5890  "31542  "00410                          BR      0,DCD           ;CONTINUE THE SCAN
5891  "31544  112737  177777  034131 0,S11:  MOVB    #-1,0,S ;SET THE FLAG
5892  "31552  "00404                          BR      0,DCD
5893                                   ; COMMAND DECODER - "DT11X
5894
5895                                   ;  ALL REGISTERS MAY BE USED (R0-R5),
5896
5897  "31554  "12700  "00077          0,ERR:  MOV     #'?,R0          ;  ? TO BE TYPED
5898  "31560  "04537  "33750                  JSR     5,0,PTYP        ; OUTPUT ?
5899  "31564  "05037  "34120          0,DCD:  CLR     0,KW            ;CLOSE ALL
5900  "31570  "04537  "34102                  JSR     5,0,CRLF        ;TYPE  <CR><LF>
5901  "31574  "05003                  0,DCD2: CLR     R3              ;R3 IS A SAVE REGISTER FOR R2
5902  "31576  "05005                          CLR     R5              ;R5 IS A SAVE REGISTER FOR R4
5903  "31600  "05004                  0,DCD1: CLR     R4              ; R4 CONTAINS THE CONVERTED OCTAL
5904  "31602  "05002                          CLR     R2              ; R2 IS THE NUMBER FOUND FLAG
5905  "31604  "04537  "33764          0,SCAN: JSR     5,0,GET         ;GET A CHAR, RETURN IN R0
5906  "31610  "22700  "00060                  CMP     #'0,R0          ;COMPARE WITH ASCII 0
5907  "31614  101013                          BHI     0,CLGL          ;CHECK LEGALITY IF NON-NUMERIC
5908  "31616  "22700  "00067                  CMP     #'7,R0          ;COMPARE WITH ASCII 7
5909  "31622  103410                          BLO     0,CLGL          ;CHECK LEGALITY IF NOT OCTAL
5910  "31624  "42700  177770                  BIC     #177770,R0      ;CONVERT TO BCD
5911  "31630  "06304                          ASL     R4              ; MAKE ROOM
5912  "31632  "06304                          ASL     R4              ;  IN
5913  "31634  "06304                          ASL     R4              ;    R4
5914  "31636  "60004                          ADD     R0,R4           ;PACK THREE BITS IN R4
5915  "31640  "05202                          INC     R2              ;R2 WAS NUMERIC FLAG
5916  "31642  "00760                          BR      0,SCAN          ;   AND TRY AGAIN
5917  "31644  "05001                  0,CLGL: CLR     R1              ;CLEAR INDEX
5918  "31646  120061  "34145          0,LGL1: CMPB    R0,0,LGCH(R1)   ;DO THE CODES MATCH?
5919  "31652  "01405                          BEQ     0,LGL2          ;JUMP IF YES
5920  "31654  "05201                          INC     R1              ; SET INDEX FOR NEXT SEARCH
5921  "31656  "20127  "00023                  CMP     R1,#0,CLGT      ;IS THE SEARCH DONE?
5922  731662  103334                          BHIS    0,ERR           ;   OOPS!
5923  "31664  "00770                          BR      0,LGL1          ;RE-LOOP
5924  "31666  "06301                  0,LGL2: ASL     R1              ;MULTIPLY BY TWO
5925  "31670  "00171  "31674                  JMP     @0,LGDR(R1)     ;GO TO PROPER ROUTINE
5926
5927  "31674  "31742          0,LGDR: 0,SEMI  ;
5928  "31676  "31758                  0,WRD   ;  /    OPEN WORD
5929  "31700  "31762                  0,BYT   ;  \    OPEN BYTE
5930  "31702  "32044                  0,CRET  ;  CARRIAGE RETURN    CLOSE
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5891  731734  031360                          0,REGT  ; $  REGISTER OPS
5892  731736  032670                          0,GO    ; G  GO TO ADDRESS W
5893  731710  032056                          0,OP1   ; <LF>  MODIFY, CLOSE, OPEN NEXT
5894  731712  031430                          0,ORPC  ; =  OPEN RELATED, INDEX = PC
5895  731714  032052                          0,OLD   ; <  RETURN TO OLD SEQUENCE AND OPEN
5896  731716  032204                          0,BACK  ; ^  OPEN PREVIOUS
5897  731720  032370                          0,OFST  ; O  OFFSET
5898  731722  032574                          0,WSCH  ; W  SEARCH WORD
5899  731724  032500                          0,EFF   ; E  SEARCH EFFECTIVE ADDRESS
5900  731726  032226                          0,BKPT  ; B  BREAKPOINTS
5901  731730  033000                          0,PROC  ; P  PROCEED
5902  731732  031452                          0,ORAB  ; @  OPEN RELATED, ABSOLUTE
5903  731734  031462                          0,ORRB  ; >  OPEN RELATED, REL, BRANCH
5904  731736  031532                          0,SNGL  ; S  SINGLE INSTRUCTION MODE
5905  731740  023530                          MON1,0                  ;RETURN TO DIAGNOSTIC MONITOR
5906          000046                  0,LGL   =       .-0,LGOR        ;LGL MUST EQUAL 2X CHLGT ALWAYS
5907
5908                                  ; SEMI-COLON PROCESSOR
5909
5910  731742  010203                  0,SEMI: MOV     R2,R3   ;A SEMI-COLON HAS BEEN RECEIVED
5911  731744  010405                          MOV     R4,R5   ;NUMERIC FLAG TO R3, CONTENTS TO R5
5912  731746  000714                          BR      0,DCD1          ;GO BACK FOR MORE
5913
5914                                  ; PROCESS / AND \ = OPEN WORD OR BYTE
5915
5916  731750  012737  000002  034120  0,WRD1: MOV     #2,0,BW         ;OPEN WORD
5917  731756  000424                          BR      0,WB1
5918  731760  006104                  0,BYT1: ROL     R4              ;GET THE ADDRESS BACK
5919  731762  012737  000001  034120  0,BYT1: MOV     #1,0,BW         ;OPEN BYTE
5920  731770  005702                  0,WB11: TST     R2              ;GET VALUE IF R2 IS NON-ZERO
5921  731772  001404                          BEQ     0,WRD1          ;SKIP OTHERWISE
5922  731774  210437  034124                  MOV     R4,0,DOT        ;PUT VALUE IN DOT
5923  732000  010437  034122                  MOV     R4,0,CAD        ;    ALSO IN CAD
5924  732004  022737  000001  034120  0,WRD1: CMP     #1,0,BW         ;CHECK BYTE MODE
5925  732012  001407                          BEQ     0,WRD2          ;JUMP IF BYTE
5926  732014  013704  034122                  MOV     0,CAD,R4
5927  732020  006204                          ASR     R4              ;MOVE ONE BIT TO CARRY
5928  732022  103756                          BCS     0,BYT1          ;JUMP IF ODD ADDRESS
5929  732024  017700  002072                  MOV     @0,CAD,R0       ;GET CONTENTS OF WORD
5930  732030  000402                          BR      0,WRD3
5931  732032  117700  002064          0,WRD2: MOVB    @0,CAD,R0       ;GET CONTENTS OF BYTE
5932  732036  004537  033056          0,WRD3: JSR     5,0,CADV        ;GO GET AND TYPE OUT @CAD
5933  732042  000654                          BR      0,DCD2          ;GO BACK TO DECODER
5934
5935                                  ; PROCESS CARRIAGE RETURN
5936
5937  732044  004737  034042          0,CRET: JSR     PC,0,CLSE       ;CLOSE LOCATION
5938  732050  000645                  0,DCDA: BR      0,DCD           ;RETURN TO DECODER
5939
5940                                  ; PROCESS <LF>, OPEN NEXT WORD
5941
5942  732052  105237  034136          0,OLD:  INCB    0,SEQ           ;SET NEED 0,DOT TO 0,CAD MOVE
5943  732056  005737  034120          0,OP1:  TST     0,BW            ;<LF> RECEIVED
5944  732062  001634                  0,ERR2: BEQ     0,ERR           ;ERROR IF NOTHING IS OPEN
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5945  032064  004737  034042                  JSR     PC,0,CLSE       ;CLOSE PRESENT CELL
5946  032070  105737  034136                  TSTB    0,SEQ           ;SEE IF < COMMAND
5947  032074  001403                          BEQ     0,OP5           ;BRANCH IF NOT
5948  032076  013737  034124  034122          MOV     0,DOT,0,CAD     ;GO TO THE FORMER STREAM
5949  032104  105037  034136          0,OP5:  CLRB    0,SEQ           ;CLEAR THE FLAG
5950  032110  063737  034120  034122          ADD     0,BW,0,CAD      ;GENERATE NEW ADDRESS
5951  032116  013737  034122  034124  0,OP2:  MOV     0,CAD,0,DOT     ;INITIALIZE DOT
5952  032124  004537  034074          0,OP2A: JSR     5,0,CRLF        ;<CR><LF>
5953  032130  013746  034120                  MOV     0,RW,-(SP)      ;SAVE RW
5954  032134  012737  000002  034120          MOV     #2,0,BW         ;SET TO TYPE FULL WORD ADDRESS
5955  032142  013700  034122                  MOV     0,CAD,R0        ;NUMBER TO TYPE
5956  032146  004537  033056                  JSR     5,0,CADV        ; TYPE OUT ADDRESS
5957  032152  011637  034120                  MOV     @SP,0,BW        ;RESTORE BW
5958  032156  022726  000001                  CMP     #1,(SP)+        ;IS IT BYTE MODE?
5959  032162  001405                          BEQ     0,OP3           ;JUMP IF YES
5960  032164  012700  000057                  MOV     #'/,R0          ;TYPE A /
5961  032170  004537  033700          0,OP4:  JSR     5,0,PTYP
5962  032174  000403                          BR      0,WRD1          ;GO PROCESS IT
5963  032176  012700  000134          0,OP3:  MOV     #'\,R0          ;TYPE A \
5964  032202  000772                          BR      0,OP4
5965
5966                                  ; PROCESS ^, OPEN PREVIOUS WORD
5967
5968  032204  005737  034120          0,BACK: TST     0,BW            ; ^ RECEIVED
5969  032210  001724                          BEQ     0,ERR2          ;ERROR IF NOTHING OPEN
5970  032212  004737  034042                  JSR     PC,0,CLSE
5971  032216  163737  034120  034122          SUB     0,BW,0,CAD      ;GENERATE NEW ADDRESS
5972  032224  000734                          BR      0,OP2           ;GO DO THE REST
5973
5974                                  ; B HANDLER - SET AND REMOVE BREAKPOINTS
5975
5976  032226  012700  034176          0,BKPT: MOV     #0,TRTC,R0
5977  032232  006304                          ASL     R4              ;MULTIPLY NUMBER BY TWO
5978  032234  005703                          TST     R3
5979  032236  001423                          BEQ     0,REMB          ;IF R3 IS ZERO GO REMOVE BREAKPOINT
5980  032240  006205                          ASR     R5              ;GET ONE BIT TO CARRY
5981  032242  103514                          BCS     0,ERR1          ;BADNESS IF ODD ADDRESS
5982  032244  006305                          ASL     R5              ;RESTORE ONE BIT
5983  032246  062704  031126                  ADD     #0,ADR1,R4
5984  032252  005702                          TST     R2
5985  032254  001007                          BNE     0,SET1          ;JUMP IF SPECIFIC CELL
5986  032256  020014          0,SET:  CMP     R0,@R4          ;IS THIS CELL FREE?
5987  032260  001405                          BEQ     0,SET1          ;JUMP IF YES
5988  032262  020427  031144                  CMP     R4,#0,BKP+0,ADR1        ;ARE WE AT THE END OF OUR ROPE
5989  032266  103002                          BHIS    0,ERR1          ;YES, THERE IS NOTHING FREE
5990  032270  005724                          TST     (R4)+           ;INCREMENT BY TWO
5991  032272  000771                          BR      0,SET
5992  032274  020427  031144          0,SET1: CMP     R4,#0,BKP+0,ADR1
5993  032300  101075                          BHI     0,ERR1          ;ERROR IF TOO LARGE
5994  032302  010514                          MOV     R5,@R4          ;SET BREAKPOINT
5995  032304  000661                          BR      0,DCDA          ;RETURN
5996
5997  032306  005702          0,REMB: TST     R2
5998  032310  001410                          BEQ     0,RALL          ;GO REMOVE ALL
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  5999  032312  020427  000010                  CMP     R4,#0,BKP
  6000  032316  101066                          BHI     0,ERR1          ;JUMP IF NUMBER TOO LARGE
  6001  032320  010064  031120                  MOV     R0,0,ADR1(R4)   ;CLEAR BREAKPOINT
  6002  032324  005064  031130                  CLR     0,CT(R4)        ;CLEAR COUNT ALSO
  6003  032330  000647                  0,DCOB: BR      0,DCOA
  6004  032332  005004                  0,RALL: CLR     R4
  6005  032334  012700  034170                  MOV     #0,TRTC,R0
  6006  032340  020427  000020          0,RM1:  CMP     R4,#0,BKP+2     ;ALL DONE?
  6007  032344  101241                          BHI     0,DCOA          ;JUMP IF YES
  6008  032346  010064  031126                  MOV     R0,0,ADR1(R4)   ;RESET BKPT
  6009  032352  012764  000003  031172          MOV     #TRT,0,UIN(R4)  ;RESET CONTENTS OF TABLE
  6010  032360  005064  031130                  CLR     0,CT(R4)        ;CLEAR COUNT
  6011  032364  005724                          TST     (R4)+           ;INCREMENT BY TWO
  6012  032366  000764                          BR      0,RM1

                                        ; PROCESS 0, COMPUTE OFFSET

  6016  032370  022737  000002  034120  0,OFST: CMP     #2,0,BW         ;CHECK WORD MODE
  6017  032376  001036                          BNE     0,ERR1          ;ERROR IF NOT CORRECT MODE
  6018  032400  012700  000040                  MOV     #' ,R0          ;TYPE ONE BLANK
  6019  032404  004537  033790                  JSR     5,0,PTYP        ;  AS A SEPARATOR
  6020  032410  005723                          TST     R3              ;WAS SEMI-COLON TYPED?
  6021  032412  001430                          BEQ     0,ERR1          ;NO, CALL IT AN ERROR
  6022  032414  163705  034122          0,OF2:  SUB     0,CAD,R5        ;COMPUTE
  6023  032420  005305                          DEC     R5
  6024  032422  005305                          DEC     R5              ;    16 BIT OFFSET
  6025  032424  010500                          MOV     R5,R0
  6026  032426  004537  033696                  JSR     5,0,CADV        ;NUMBER IN R0 = WORD MODE
  6027  032432  010500                          MOV     R5,R0
  6028  032434  006200                          ASR     R0              ;DIVIDE BY TWO
  6029  032436  103414                          BCS     0,OF1           ;ERROR IF ODD
  6030  032440  022700  177600                  CMP     #-200,R0        ;COMPARE WITH -200
  6031  032444  003011                          BGT     0,OF1           ;DO NOT TYPE IF OUT OF RANGE
  6032  032446  022700  000177                  CMP     #177,R0         ;COMPARE WITH +177
  6033  032452  002406                          BLT     0,OF1           ;DO NOT TYPE IF OUT OF RANGE
  6034  032454  005337  034120                  DEC     0,BW            ;SET TEMPORARY BYTE MODE
  6035  032460  004537  033696                  JSR     5,0,CADV        ;NUMBER IN R0 = BYTE MODE
  6036  032464  005237  034120                  INC     0,BW            ;RESTORE WORD MODE
  6037  032470  000137  031574          0,OF1:  JMP     0,DCO2          ;ALL DONE
  6038
  6039  032474  000137  031554          0,ERR1: JMP     0,ERR           ;INTERMEDIATE HELP
  6040
  6041                                  ; SEARCHES - $MSK   HAS THE MASK
  6042                                  ;            $MSK+2 HAS THE FWA
  6043                                  ;            $MSK+4 HAS THE LWA
  6044
  6045  032500  005201                  0,EFF:  INC     R1              ;SET EFFECTIVE SEARCH
  6046  032502  000401                          BR      0,WDS
  6047  032504  005001                  0,WSCH: CLR     R1              ;SET WORD SEARCH
  6048  032506  005703                  0,WDS:  TST     R3              ;CHECK FOR OBJECT FOUND
  6049  032510  001771                          BEQ     0,ERR1          ;ERROR IF NO OBJECT
  6050  032512  012737  000002  034120          MOV     #2,0,BW         ;SET WORD MODE
  6051  032520  013702  031122                  MOV     0,MSK+2,R2      ;SET ORIGIN
  6052  032524  013704  031120                  MOV     0,MSK,R4        ;SET MASK
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6253  ?32530  ?05?74                    CO?     R4
6254  ?32532  ?26237  ?31124    0,WDS2: CMP     @2,0,MSK+4      ; IS THE SEARCH ALL DONE?
6255  ?32536  101274                    BHI     0,?C?B          ;  YES
6256  ?32540  ?11200                    MOV     @R2,R0          ; GET OBJECT
6257  ?32542  ?05?21                    TST     R1              ;NO
6258  ?32544  ?01027                    BNE     0,EFF1          ;BRANCH IF EFFECTIVE SEARCH
6259  ?32546  ?10046                    MOV     R0,@(SP)
6260  ?32550  ?10503                    MOV     R5,R3           ;EXCLUSIVE OR
6261  ?32552  ?40500                    BIC     R5,R?           ; I$ DONE
6262  ?32554  ?42603                    BIC     (SP)+,R3                ;  IN A VERY
6263  ?32556  ?50003                    BIS     R0,R?           ;    FANCY MANNER HERE
6264  ?32560  ?40403                    BIC     R4,R3           ;AND RESULT WITH MASK
6265  ?32562  001016                    BNE     0,WDS4          ;RE-LOOP IF NO MATCH
6266  ?32564  ?10446                    MOV     R4,@(SP)        ;REGISTERS R2,R4, AND R5 ARE SAFE
6267  ?32566  ?04537  ?34674           JSR     5,0,CRLF
6268  ?32572  010200                    MOV     R2,R?           ;GET READY TO TYPE
6269  ?32574  ?04537  ?33696           JSR     5,0,CADV        ;  TYPE ADDRESS
6270  ?326?0  ?12700  000057           MOV     @'/,R0          ;SLASH TO R0
6271  ?326?4  ?04537  ?33750           JSR     5,0,PTYP        ;TYPE IT
6272  ?32613  ?11200                    MOV     @R2,R0          ;GET CONTENTS
6273  ?32612  ?04537  ?33696           JSR     5,0,CADV        ;TYPE CONTENTS
6274  ?32616  ?12604                    MOV     (SP)+,R4        ; RESTORE R4
6275  ?32620  005722                    TST     (R2)+           ;INCREMENT TO NEXT CELL AND
6276  ?32622  ?00743                    BR      0,WDS2          ;    RETURN
6277  ?32624  ?20005            0,EFF1: CMP     R0,R5           ; I$ (X)=K?
6278  ?32626  ?01755                    BEQ     0,WDS3          ;TYPE IF EQUAL
6279  ?32630  ?10003                    MOV     R0,R3           ;(X) TO R3
6280  ?32632  ?60203                    ADD     R2,R3           ;(X)+X
6281  ?32634  005203                    INC     R3
6282  ?32636  005203                    INC     R3              ;(X)+X+2
6283  ?32640  ?20305                    CMP     R3,R5           ;IS (X)+X+2=K?
6284  ?32642  ?01747                    BEQ     0,WDS3          ;BRANCH IF EQUAL
6285  ?32644  ?42700  177400            BIC     @177400,R0      ;WIPE OUT EXTRANEOUS BITS
6286  ?32650  110000                    MOVB    R0,R?
6287  ?32652  000257                    CCC
6288  ?32654  006300                    ASL     R0              ;MULTIPLY BY TWO
6289  ?32656  ?05200                    INC     R0
6290  ?32660  ?05200                    INC     R0
6291  ?32662  ?60200                    ADD     R2,R?           ;ADD PC
6292  ?32664  ?20005                    CMP     R0,R5           ;IS THE RESULT A PROPER REL, BRANCH?
6293  ?32666  ?00735                    BR      0,WDS3
6294
6295                          ; PROCESS G - GO
6296
6297  ?32670  ?05733            0,GO1:  TST     R3              ;WAS K1 TYPED?
6298  ?32672  001400                    BEQ     0,ER?1          ; TYPE ?<CR,LF> IF NOT
6299  ?32674  112737  000021  034133    MOVB    @0,B<P+3,0',P   ;CLEAR PROCEED
6300  ?32702  ?06205                    ASR     R5              ;CHECK LOW ORDER BIT
6301  ?32704  103673                    BCS     0,ER?1          ;ERROR IF ODD NUMBER
6302  ?32706  006305                    ASL     R5              ;RESTORE WORD
6303  ?32710  ?10537  ?31112           MOV     R5,0,UPC        ;SET UP NEW PC
6304  ?32714  112737  000340  177776    MOVB    @0',STM,ST              ;SET HIGH PRIORITY
6305  ?32722  ?04537  ?33556           JSR     5,0,?STT        ;RESTORE TELETYPE
6306  ?32726  105037  034132    0,TBIT1: CLRB   0,T             ;CLEAR
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6117                                    ;*                          TRACE TRAP MOD
6118  032774  000002                    YESRTI: RTI
6119  032776  000002                    RTX:    RTI                 ;MODIFIED FOR 11/40,11/45 TO RTT
6120                                    ;********************************* MOD APR 74 ******************************
6121                                    ;
6122
6123                                    ; PROCESS P - PROCEED
6124                                    ;   ONLY ALLOWED AFTER A BREAKPOINT
6125
6126
6127  033072  113700  034133            0,PROC: MOVB    @P,R0
6128  033074  105700                            TSTB    R0                  ;CHECK LEGALITY OF PROCEED
6129  033076  002032                            BLT     0,ERR1              ;NOT LEGAL
6130  033100  005702                            TST     R2                  ;CHECK FOR ILLEGAL COUNT
6131  033102  001030                            BNE     0,ERR1              ;JUMP IF ILLEGAL
6132  033104  005703                            TST     R3                  ;WAS COUNT SPECIFIED?
6133  033106  001402                            BEQ     0,PR1               ;NO
6134  033110  010560  031150                    MOV     R5,0,CT(R0)         ;YES, PUT AWAY COUNT
6135  033114  112737  000340  177776    0,PR1:  MOVB    #0,STM,ST           ;FORCE HIGH PRIORITY
6136  033122  004537  033550                    JSR     5,0,RSTT            ;RESTORE TTY
6137  033126  123727  034133  000016    0,C1:   CMPB    @P,#0,BKP           ;SEE IF A REAL ONE OR A FAKE
6138  033134  003330                            BGT     0,TBIT              ;BRANCH IF FAKE
6139  033136  105737  034131                    TSTB    @S                  ;SEE IF SINGLE INSTRUCTION MODE
6140  033142  001325                            BNE     0,TBIT              ;IF SO EXIT NOW
6141  033144  112737  000340  177776            MOVB    #0,STM,ST           ;SET HIGH PRIORITY
6142  033152  105237  034132                    INCB    @T                  ;SET T-BIT FLAG
6143  033156  052737  000020  031114            BIS     #0,TST,0,UST        ;SET T-BIT
6144  033164  000731                            BR      0,GO2
6145
6146                                    ; BREAKPOINT HANDLER
6147  033166  012637  031112            0,BRK:  MOV     (SP)+,0,UPC         ;PRIORITY IS 7 UPON ENTRY
6148  033172  012637  031114                    MOV     (SP)+,0,UST         ;SAVE STATUS AND PC
6149  033176  112737  000021  034133            MOVB    #0,BKP+3,0,P        ;TELL IP THAT WE CAN CONTINUE
6150  033204  004037  033410            0,BK1:  JSR     R,0,SVR             ;SAVE VARIOUS REGISTERS
6151  033210  105737  034132                    TSTB    @T                  ;CHECK FOR T-BIT SET
6152  033214  001300                            BNE     0,TBIT              ;JUMP IF SET
6153  033216  004537  033624                    JSR     5,0,REM             ;REMOVE BREAKPOINTS
6154  033222  105737  031116                    TSTB    @PRI                ;CHECK IF PRIORITY
6155  033226  100003                            BPL     0,BK2               ; IS AS SAME AS USER PGM
6156  033230  113705  031114                    MOVB    @JST,R5             ;PICK UP USER JST IF SO
6157  033234  000407                            BR      0,BK3
6158  033236  113705  031116            0,BK2:  MOVB    @PRI,R5             ;OTHERWISE PICK UP ACTUAL PRIORITY
6159  033242  000257                            CCC                         ;CLEAR CARRY
6160  033244  106005                            RORB    R5                  ;SHIFT LOW ORDER BITS
```

```
6141  033156  106005                  MOVB    R5              ;  IT'S
6142  033160  106005                  MOVB    R5              ;     HIGH ORDER
6143  033162  106005                  MOVB    R5              ;       POSITION
6144  033164  116537  177776    0,8K31 MOVB    R5,ST           ;PUT THE STATUS AWAY WHERE IT BELONGS
6145  033170  013705  031112          MOV     2,UPC,R5        ;GET PC, IT POINTS TO THE TNT
6146  033174  105737  034131          TSTB    2,S             ;SEE IF IT WAS SINGLE INSTRUCTION MO
6147  033200  100432                  BMI     2,94            ;IF SO HANDLE THEME
6148  033202  005745                  TST     -(R5)
6149  033204  010537  031112          MOV     R5,0,UPC
6150  033210  012704  000010          MOV     #0,B<P,R4       ;GET A COUNTER
6151  033214  020564  031126    0,811 CMP     R5,0,ADR1(R4)   ;COMPARE WITH LIST
6152  033220  001427                  BEQ     2,92            ;JUMP IF FOUND
6153  033222  005304                  DEC     R4
6154  033224  005304                  DEC     R4
6155  033226  002372                  BGE     2,91            ;RE-LOOP UNTIL FOUND
6156  033230  004537  033530          JSR     5,0,SVTT        ;SAVE TELETYPE STATUS
6157  033234  004537  034074          JSR     5,0,CRLF
6158  033240  012704  034140          MOV     #0,BD,R4        ;ERROR, NOTHING FOUND
6159  033244  012703  034141          MOV     #0,BD+1,R3
6160  033250  004537  034020          JSR     5,0,TYPE        ;OUTPUT "BE" FOR BAD ENTRY
6161  033254  010500                  MOV     R5,R0
6162  033256  062737  000002  031112  ADD     #2,0,UPC        ;POP OVER THE ADJUSTMENT ABOVE
6163  033264  000445                  BR      2,93            ; OK CONTINUE
6164  033266  112704  000020    0,841 MOVB    #0,B<P+2,R4     ;SET BREAK POINT HIGH + 1
6165  033272  010564  031126          MOV     R5,0,ADR1(R4)   ;STORE NEXT PC VALUE FOR TYPE OUT
6166  033276  000470                  BR      2,92
6167  033300  112437  034133    0,821 MOVB    R4,0,P          ;ALLOW PROCEED
6168  033304  005364  031150          DEC     2,CT(R4)
6169  033310  003252                  BGT     2,81            ;JUMP IF REPEAT
6170  033312  012764  000001  031150  MOV     #1,0,CT(R4)     ;RESET COUNT TO 1
6171  033320  004537  033530          JSR     5,0,SVTT        ;SAVE TELETYPE STATUS, R4 IS SAFE
6172  033324  012700  000102          MOV     #'B,R0
6173  033330  004537  033790          JSR     5,0,PTYP        ;TYPE "B"
6174  033334  113700  034133          MOVB    0,P,R0          ;CONVERT BREAKPOINT NUMBER TO ASCII
6175  033340  062700  000140          ADD     #140,R0
6176  033344  006200                  ASR     R0
6177  033346  004537  033790          JSR     5,0,PTYP
6178  033352  012700  000073          MOV     #';,R0
6179  033356  004537  033790          JSR     5,0,PTYP        ; TYPE
6180  033362  012737  000002  034120  MOV     #2,0,BW         ; SET WORD MODE
6181  033370  113704  034133          MOVB    0,P,R4
6182  033374  016400  031126          MOV     0,ADR1(R4),R0   ;GET ADDRESS OF BREAK
6183  033400  004537  033656    0,831 JSR     5,0,OADV        ;TYPE ADDRESS
6184  033404  000137  031564          JMP     0,DCD           ;GO TO DECODER
6185                                  ; SAVE REGISTERS R0-R6
6186                                  ;   INTERNAL STACK
6187
6188  033410  012637  034126    0,SVR1 MOV     (SP)+,0,XXX     ;PICK REGISTER FROM STACK AND SAVE
6189  033414  013706  031110          MOV     SP,0,USP        ;SAVE USER STACK ADDRESS
6190  033420  012706  031110          MOV     #0',USP,SP      ;SET TO INTERNAL STACK
6191  033424  010546                  MOV     R5,-(SP)        ;SAVE
6192  033426  010446                  MOV     R4,-(SP)        ; REGISTERS
6193  033430  010346                  MOV     R3,-(SP)        ;1
6194  033432  010246                  MOV     R2,-(SP)        ; THRU
```

```
6215  ?33434  ?1?146                    ?OV     R1,-(SP)        ;     ?
6216  ?33436  ?13746  ?34120            ?OV     ?,XXX,-(SP)     ;PUT SAVED REGISTER ON STACK
6217  ?33442  ?05746                    TST     -(SP)
6218  ?33444  ?0?2?0                    RTS     R0
6219
6220                                  ; RESTORE REGISTERS R0-R6
6221
6222  ?33446  ?05726                  0,RSR:  TST     (SP)+           ;POP THE EXTRA CELL
6223  ?33450  ?12637  ?34120                  ?OV     (SP)+,0,XXX     ;GET R? FROM STACK
6224  ?33454  ?1267?                          ?OV     (SP)+,R1        ;RESTORE
6225  ?33456  ?1267?                          ?OV     (SP)+,R2        ; REGISTERS
6226  ?33460  ?1267?                          ?OV     (SP)+,R3        ;  1
6227  ?33462  ?1267?                          ?OV     (SP)+,R4        ;  THRU
6228  ?33464  ?1267?                          ?OV     (SP)+,R5        ;    5
6229  ?33466  ?137?6  ?31110                  ?OV     0,US?,SP        ;RESTORE USER STACK
6230  ?33472  ?13746  ?34120                  ?OV     ?,XXX,-(SP)     ;PUT R? ON USER STACK
6231  ?33476  ?0?2?0                          RTS     R0
6232
6233                                  ; RESTORE BREAKPOINTS 0-7
6234
6235  ?335??  ?12?74  ?0?010          0,RSB:  ?OV     #0,B<P,R4       ;RESTORE ALL BREAKPOINTS
6236  ?335?4  ?17464  ?31126  031172  0,RS1:  ?OV     #0,ADR1(R4),0,U1?(R4)   ;SAVE CONTENTS
6237  ?33512  ?13774  ?34170  031126          ?OV     ?,TRTC,#0,ADR1(R4)      ;REPLACE WITH TRAP
6238  ?33520  ?05?24                          DEC     R4
6239  ?33522  ?05?24                          DEC     R4
6240  ?33524  ?02367                          BGE     0,RS1           ;RE-LOOP UNTIL DONE
6241  ?33526  ?0?2?5                          RTS     R5              ;  THEN QUIT
6242
6243                                  ; SAVE TELETYPE STATUS
6244
6245  ?33530  113737  177?60  034134  0,SVTT: MOVB    0,RCSR,0,CSR1   ;SAVE R C/SR
6246  ?33536  113737  177?64  034135          MOVB    0,TCSR,0,CSR2   ;SAVE T C/SR
6247  ?33544  105037  177?60                  CLRB    0,RCSR          ;CLEAR ENABLE AND MAINTENANCE
6248  ?33550  105037  177?64                  CLRB    0,TCSR          ;  BITS IN BOTH C/SR
6249  ?33554  ?0?2?5                          RTS     R5
6250
6251                                  ; RESTORE TELETYPE STATUS
6252
6253  ?33556  ?04537  ?34074          0,RSTT: JSR     5,0,CRLF
6254  ?33562  105737  177?64                  TSTB    0,TCSR          ;WAIT READY
6255  ?33566  10?375                          BPL     .-4             ;  ON PRINTER
6256  ?33570  ?32737  004000  177?60          BIT     #4??0,0,RCSR    ;CHECK BUSY FLAG
6257  ?33576  ?01403                          BEQ     0,RSE1          ;SKIP READY LOOP IF NOT BUSY
6258  ?336?0  125737  177?60                  TSTB    0,RCSR          ;WAIT READY
6259  ?336?4  10?375                          BPL     .-4             ;    ON READER
6260  ?336?6  113737  ?34134  177?60  0,RSE1: MOVB    0,CS?1,0,RCSR   ;RESTORE
6261  ?33614  113737  ?34135  177?64          MOVB    0,CS?2,0,TCSR   ;  THE STATUS REGISTERS
6262  ?33622  ?0?2?5                          RTS     R5
6263
6264                                  ; REMOVE BREAKPOINTS 0-7
6265                                  ;   IN THE OPPOSITE ORDER OF SETTING
6266
6267  ?33624  105737  ?34131          0,REM:  TSTB    0,S             ;SEE IF SINGLE INSTRUCTION IS GOING
6268  ?3363?  ?01?11                          BNE     0,R2            ;EXIT IF SO
```

```
6269  *33632  *05*4                    CLR     R4              ;REMOVE ALL BREAKPOINTS
6270  *33634  *16474  *31172  *31126  0,R11   MOV     0,JIN(R4),R0,ADR1(R4)   ;CLEAR BREAKPOINT
6271  *33642  *052*4                    INC     R4
6272  *33644  *052*4                    INC     R4
6273  *33646  *2*427  *00010            CMP     R4,#0,BKP
6274  *33652  *03778                    BLE     0,R1            ;RE-LOOP UNTIL DONE
6275  *33654  *002*5            0,R21   RTS     R5              ;THEN QUIT
6276
6277                                    ; TYPE OUT CONTENTS OF WORD OR BYTE WITH ONE TRAILING SPACE
6278                                    ; WORD IS IN R0
6279
6280  *33656  *12703  000000    0;CADV1 MOV     #0,R3           ;# OF DIGITS
6281  *33662  *12704  177776            MOV     #-2,R4          ;# OF BITS FIRST-3
6282  *33666  *22737  *00001  *34128    CMP     #1,0,BW         ;SEE IF WORD MODE
6283  *33674  *01804                    BNE     0,SPC           ;BRANCH IF SO
6284  *33676  162703  *00003            SUB     #3,R3           ;ONLY DO 3 DIGITS
6285  *33702  *052*4                    INC     R4              ;DO 2 BITS FIRST
6286  *33704  *00300                    SWAB    R0              ;AND TURN R0 AROUND
6287  *33706  *17046            0,SPC1  MOV     R0,-(SP)        ;SAVE R0
6288  *33710  *62704  000003    0,V01   ADD     #3,R4           ;COMPUTE THE NUMBER OF BITS TO DO
6289  *33714  *05002                    CLR     R2
6290  *33716  *06116            0,V11   ROL     (SP)            ;GET A BIT
6291  *33720  *00170                    ROL     R0              ;STORE IT AWAY
6292  *33722  *053*4                    DEC     R4              ;DECREMENT COUNTER
6293  *33724  *03374                    BGT     0,V1            ;LOOP IF MORE BITS NEEDED
6294  *33726  *62702  *00060            ADD     #'0,R2          ;CONVERT TO ASCII
6295  *33732  *04537  *33750            JSR     R5,0,PTYP       ;TYPE IT
6296  *33736  *053*3                    DEC     R3              ;SEE IF MORE DIGITS TO DO
6297  *33740  *03363                    BGT     0,V0            ;LOOP IF SO
6298  *33742  112700  *00040            MOVB    #' ,R0          ;SET UP FOR TRAILING SPACE
6299  *33746  *05726                    TST     (SP)+           ;GET RID OF JUNK AND FALL THRU TO PTYP
6300
6301                                    ; TYPE ONLY ONE CHARACTER (CONTAINED IN R0)
6302
6303  *33750  105737  177564    0;PTYP: TSTB    0,TCSR
6304  *33754  100375                    BPL     .-4
6305  *33756  110037  177566            MOVB    R0,0,TDB
6306  *33762  *00205            0,TYP1: RTS     R5
6307                                    ; GENERAL CHARACTER INPUT ROUTINE -- DDT11X
6308                                    ; CHARACTER INPUT GOES TO R0
6309
6310  *33764  105737  177560    0,GET:  TSTB    0,RCSR          ;WAIT FOR
6311  *33770  100375                    BPL     .-4             ;  INPUT FROM KBD
6312  *33772  113700  177562            MOVB    0,RDB,R0        ;GET CHARACTER - STRIP OFF PARITY
6313  *33776  *42700  177600            BIC     #177600,R0      ;STRIP OFF PARITY FROM CHARACTER
6314  *34002  120027  000012            CMPB    R0,#212         ;SEE IF A <LF>
6315  *34006  001426                    BEQ     0,GET1          ;IF SO SAVE THE PAPER
6316  *34010  *04537  033750            JSR     5,0,PTYP        ;ECHO CHARACTER
6317  *34014  001763                    BEQ     0,GET           ;IGNORE NULLS
6318  *34016  122700  000040            CMPB    #40,R0          ;CHECK FOR SPACES
6319  *34022  001760                    BEQ     0,GET           ;IGNORE SPACES
6320  *34024  *00205            0;GET1: RTS     R5
6321
6322                                    ; GENERAL CHARACTER OUTPUT ROUTINE - DDT11X
```

```
6323                                    ;  ADDRESS OF FIRST BYTE IN R4,
6324                                    ;  ADDRESS OF LAST BYTE IN R3, (R3)>(R4)
6325
6326  *34026  *20374                    O,TYPE: CMP     R3,R4           ;CHECK FOR COMPLETION
6327  *34032  103754                            BLO     O,TYP1          ; EXIT WHEN DONE
6328  *34032  112400                            MOVB    (R4)+,R0        ;GET A CHARACTER
6329  *34034  004537  *33750                    JSR     5,O,PTYP        ;TYPE ONE CHARACTER
6330  *34040  *00772                            BR      O,TYP1          ;LOOP UNTIL DONE
6331
6332                                    ; CLOSE WORD OR BYTE AND EXIT,
6333                                    ; UPON ENTERING, R2 HAS NUMERIC FLAG, R4 HAS CONTENTS
6334
6335  *34042  *05702                    O,CLSE: TST     R2              ;IF NO NUMBER WAS TYPED THERE IS
6336  *34044  *01412                            BEQ     O,CLS1          ;NO CHANGE TO THE OPEN CELL
6337  *34046  *22737  *00001  *34120            CMP     #1,O,BW
6338  *34054  *01404                            BEQ     O,CLS2          ;JUMP IF BYTE MODE
6339  *34056  101005                            BHI     O,CLS1          ;JUMP IF ALREADY CLOSED
6340  *34060  *10477  *00030                    MOV     R4,@O,CAD       ;STORE WORD
6341  *34064  *00402                            BR      O,CLS1
6342  *34066  110477  *00030            O,CLS2: MOVB    R4,@O,CAD       ;STORE BYTE
6343  *34072  *00207            O,CLS1: RTS     PC
6344
6345  *34074  *12703  *34143            O,CRLF: MOV     #O,CR+1,R3      ;LWA <CR,LF>
6346  *34100  *00402                            BR      O,CRS
6347  *34102  *12703  *34144            O,CRLS: MOV     #O',CR+2,R3     ;LWA <CR,LF>+
6348  *34106  *12704  *34142            O,CRS:  MOV     #O',CR,R4       ;FWA
6349  *34112  004537  *34026                    JSR     5,O,TYPE        ;TYPE SOMETHING
6350  *34116  000205                            RTS     R5
6351
6352  *34120  000000            O,BW:   .       .                       ; *0 = ALL CLOSED,
6353                                                                    ; *1 = BYTE OPEN,
6354                                                                    ; *2 = WORD OPEN
6355  *34122  000000            O',CAD: .                               ; CURRENT ADDRESS
6356  *34124  *00*00            O',ORG: .                               ; ORIGIN ADDRESS
6357  *34126  000000            O',XXX: ,WORD   .                       ;TEMPORARY STORAGE
6358  *34133     000            O,WDFG: ,BYTE   .                       ;SEARCH FLAG = 1 = EFFECTIVE
6359                                                                    ;              = 0 = WORD
6360  *34131     000            O,SI:   ,BYTE   .                       ;SINGLE INSTRUCTION FLAG
6361                                                                    ;0 IF NOT ACTIVE
6362                                                                    ;*1 IF ACTIVE
6363                                                                    ;NO BREAK POINTS MAY BE SET WHILE IN
6364                                                                    ;SINGLE INSTRUCTION MODE
6365  *34132     000            O',T:   ,BYTE   .                       ;  T-BIT FLAG
6366  *34133     000            O',P:   ,BYTE   .                       ;PROCEED FLAG = -2 IF MANUAL ENTRY
6367                                                                    ;                -1 IF NO PROCEED ALLOWED
6368                                                                    ;                0-7 IF PCEED ALLOWED
6369  *34134     000            O,CSR1: ,BYTE   .                       ;SAVE CELL = R C/SR
6370  *34135     000            O,CSR2: ,BYTE   .                       ;SAVE CELL = T C/SR
6371  *34136     000            O,SEQ:  ,BYTE   .                       ;FLAG FOR < COMMAND
6372
6373             *34140                    ,EVEN
6374  *34140  *425*2            O,BD:   ,WORD   *BE
6375
6376  *34142     015            O,CR:   ,BYTE   *15     ;  <CR>
```

```
6377  ?34143   012                        ,BYTE   ?12     ; <LF>
6378  ?34144   052                        ,BYTE   '*      ; *
6379
6380  ?34145   073              O.LGCH1:  ,BYTE   ':      ;
6381  ?34146   057                        ,BYTE   '/      ; /
6382  ?34147   134                        ,BYTE   '\      ; \
6383  ?34150   015                        ,BYTE   ?15     ; CARRIAGE RETURN
6384  ?34151   044                        ,BYTE   '$      ; $
6385  ?34152   107                        ,BYTE   'G      ; G
6386  ?34153   012                        ,BYTE   ?12     ; <LF>
6387  ?34154   137                        ,BYTE   '_      ; _
6388  ?34155   074                        ,BYTE   '<      ; <
6389  ?34156   136                        ,BYTE   '^      ; ^
6390  ?34157   117                        ,BYTE   'O      ; O
6391  ?34160   127                        ,BYTE   'W      ; W
6392  ?34161   105                        ,BYTE   'E      ; E
6393  ?34162   102                        ,BYTE   'B      ; B
6394  ?34163   120                        ,BYTE   'P      ; P
6395  ?34164   100                        ,BYTE   '@      ; @
6396  ?34165   076                        ,BYTE   '>      ; >
6397  ?34166   123                        ,BYTE   'S      ; S
6398  ?34167   003                        ,BYTE   ?03             ;CONTROL C
6399           ?000023             O.CLGT  =       .-O.LGCH        ;TABLE LENGTH
6400
6401  ?34170   123              O.TLI     ,BYTE   'S      ;DO     1
6402  ?34171   120                        ,BYTE   'P      ;NOT    2
6403  ?34172   115                        ,BYTE   'M      ;CHANGE 3
6404  ?34173   000                        ,BYTE   .       ;THE    4
6405  ?34174   070                        ,BYTE   ?       ;ORDER  5
6406  ?34175   102                        ,BYTE   'B      ;WHERE  6
6407           ?000006             O.LG    =       .-O.TL
6408                               ,EVEN
6409  ?34176   ?00073              O.TRTC: TRT                     ;TRACE TRAP PROTOTYPE
6410
6411                               ;THE ORDER OF THE FOLLOWING ENTRIES IS CRITICAL
6412
6413           ?34230              O.ASMB  =       .               ;SAVE PC
6414           ?31074              .       =       O.ODT-12.       ;ODT'S STACK IMMEDIATELY PRECEDES ODT
6415
6416  ?31074   ?00000              O.URP:  ?       ;USER R0
6417  ?31076   ?00000                      ?       ;     R1
6418  ?31100   ?00000                      ?       ;     R2
6419  ?31102   ?00000                      ?       ;     R3
6420  ?31104   ?00000                      ?       ;     R4
6421  ?31106   ?00000                      ?       ;     R5
6422  ?31110   ?00000              O.USP:  ?       ;USER SP
6423  ?31112   ?00000              O.UPC:  ?       ;USER PC
6424  ?31114   ?00000              O.UST:  ?       ;USER ST
6425  ?31116   ?00007              O.PRI:  7       ;ODT PRIORITY
6426  ?31120   ?00000              O.MSK:  0       ;MASK
6427  ?31122   ?00000                      ?       ;LOW LIMIT
6428  ?31124   ?00000                      ?       ;HIGH LIMIT
6429
6430                               ; BREAK POINT LISTS, ADR1 = ADDRESS OF BREAKPOINT,CT = COUNT,
```

```
6431                                    ;   UIM = ?ONTENTS
6432
6433  ?31126                            0,ADR1!
6434            ?31150                  ;       =       ,+0,3K?+4
6435  ?31150                            0,CT!
6436            ?31172                  ;       =       ,+0,3K?+4
6437  ?31172                            0,JIN!
6438            ?31214                  ;       =       ,+0,3K?+4
6439            ?34278                  ;       =       0,AS?B          ;RESTORE PC
6440
6441                                    ,SBTTL  ?ESSAGES
6442            ?00012                  LF=12
6443            ?00015                  CR=15
6444  ?34283                            HEADER!
6445                                    ;*                      HEADER TEXT ?OD
6446                                    ;********************** ?OD APR 74 **********************************
6447                                    ,NLIST  BEX
 (1)  ?3427?  ?46537  ?44981  042116            ,ASCII  "=MAINDEC-11-D2DXA-D-D MAINTENANCE CLOCK 1 (AUG 74) "
 (1)                                    ;*                      HEADER TEXT ?OD
 (1)                                    ;********************** ?OD APR 74 **********************************
 (1)                                    ;*                      HEADER TEXT ?OD
 (1)  ?34263     137  047506  020122            ,ASCII  "=FOR DYNAMIC SWITCH REGISTER SETTINGS"
 (1)  ?34332  ?51537  042505  053040            ,ASCII  "=SEE PROGRAM LISTING PAGE #1"
 (1)  ?34364  ?57537  054524  042520            ,ASCII  "==TYPE!   <D>,DEFAULT PARAMETERS"
 (1)  ?34424  ?20137  020040  020040            ,ASCII  "=         <P>,PREVIOUS PARAMETERS"
 (1)  ?34464  ?20137  020040  020040            ,ASCII  "=         <S>,SELECT PARAMETERS"
 (1)  ?34522  ?20137  020040  020040            ,ASCII  "=         <N>,START THIS TEST NUMBER"
 (1)                                    ;*                      HEADER TEXT ?OD
 (1)                                    ;********************** ?OD APR 74 **********************************
 (1)                                    ;*                      HEADER TEXT ?OD
 (1)                                    ;********************** ?OD APR 74 **********************************
 (1)  ?34566  ?57537  020404  020120    FSTART! ,ASCIZ  "==D,P,S,N? "
 (1)
 (1)  ?34622  ?41137  051501  020105    MSG2!   ,ASCIZ  "=BASE ADDRESS! "
 (1)  ?34622  ?42137  053105  041511    MSG3!   ,ASCIZ  "=DEVICES PER CU! "
 (1)  ?34644  ?52137  051505  020124    MSG5!   ,ASCIZ  "=TEST NUMBER! "
 (1)  ?34663     137  ?54524  042520    MSG4!   ,ASCIZ  "=TYPE CU ADRS'S IN HEX <CR><LF>! <CR><CR> TERMINATES LIST"
 (1)  ?34755     137  042101  051522    MSG6!   ,ASCIZ  "=ADRS! "
 (1)  ?34765     137  042523  020124    MSG7!   ,ASCIZ  "=SET SWITCHES="
 (1)  ?35004  ?46137  051911  020124    MSG9!   ,ASCIZ  "=LIST ALL LEGAL COMMANDS"
 (1)  ?35035     137  047503  040515    MSG10!  ,ASCIZ  "=COMMAND!"
 (1)  ?35047     137  ?54104  050040    MSG12!  ,ASCIZ  "=DX PRIORITY LEVEL! "
 (1)  ?35074  ?20137  ?20075  046111    MSG13!  ,ASCIZ  "= = ILLEGAL ?"
 (1)
 (1)
 (1)  ?35112  ?51137  ?43505  052123    ROM!    ,ASCIZ  "=REGSTR = SHOULD BE  =  WAS"
 (1)  ?35146  ?17435     000            HOME!   ,ASCIZ  <35><37>
 (1)  ?35151     207     000            BELL!   ,ASCIZ  <207>
 (1)  ?35153     137  ?47105  020104    ENDTST! ,ASCIZ  "=END TEST=SET SW3=1?"
 (1)  ?35203  ?20137  ?51105  047522    ECM!    ,ASCIZ  "= ERRORS DETECTED! "
 (1)  ?35224  ?57477     000            ,QUES!  ,ASCIZ  "?="
 (1)  ?35227     040  ?20040  020040    SPAC4!  ,ASCIZ  <40><40><40><40><40><40>
 (1)  ?35236  ?00040                    SPACE!  ,ASCIZ  <40>
 (1)  ?35240  000137                    CRLF!   ,ASCIZ  "="
 (1)  ?35242  ?52137  050131  020105    STALL!  ,ASCIZ  "=TYPE IN STALL COUNT! "
 (1)  ?35271     137  ?42537  051122    ERPC!   ,ASCIZ  "==ERROR PC! "
```

```
(1)
(1)  035376  042137  042130  039123  ADXDS1  ,ASCIZ  "-DX-S1"
(1)  035315     137  054174  040503  ADXCA1  ,ASCIZ  "-DXCA1"
(1)  035324  042137  041530  039123  ADXCS1  ,ASCIZ  "-DX-S1"
(1)  035333     137  054174  051517  ADXDS1  ,ASCIZ  "-DX-S1"
(1)  035342  042137  041130  039101  ADXBA1  ,ASCIZ  "-DXBA1"
(1)  035351     137  054174  041502  ADXBC1  ,ASCIZ  "-DXBC1"
(1)  035360  042137  040530  039117  ADXMD1  ,ASCIZ  "-DXMD1"
(1)  035367     137  054174  040515  ADXMI1  ,ASCIZ  "-DXMI1"
(1)  035376  042137  041530  039102  ADXCB1  ,ASCIZ  "-DXCB1"
(1)  035405     137  054174  042116  ADXND1  ,ASCIZ  "-DXND1"
(1)  035414  042137  042530  039123  ADXES1  ,ASCIZ  "-DXES1"
(1)  035423     137  054174  051505  ADXES11 ,ASCIZ  "-DXES11 "
(1)                                  ;************************** MOD APM 74 ******************************
(1)                                  ;*                        ERROR TEXT MOD
(1)
(1)  035434  042137  052503  042101  MSG26$  ,ASCIZ  "- CJADMS/MOD"
(1)                                  ;************************** MOD APM 74 ******************************
(1)  035451     137  042520  052103  MSG28$  ,ASCIZ  "-VECTOR ADDRESS$ "
(1)  035473     137  052123  052101  MSG31$  ,ASCIZ  "-STATUS$ "
(1)  035505     137  051105  047522  MSG35$  ,ASCIZ  "-ERROR IN TEST$ "
(1)  035526  047537  044522  044507  MSG36$  ,ASCIZ  "-ORIGIN OF MAP ERROR$ "
(1)  035555     137  052124  052040  TRCM1$  ,ASCIZ  "-TT TRACE ERROR IN TEST$ "
(1)  035607     137  051117  043511  TRCM$   ,ASCIZ  "-ORIGN OF LAST TT TRACE UPDATE$ "
(1)  035653  041240  051525  020131  ABSYM$  ,ASCIZ  " BUSY ENABLE  "
(1)  035667     115  046125  044524  AMUXM$  ,ASCIZ  "MULTIPLEXER  CH"
(1)  035737     137  047105  051124  TRC1$   ,ASCIZ  "-ENTRY WAS      $"
(1)  035751     137  047105  051124  TRC2$   ,ASCIZ  "-ENTRY SHOULD BE$"
(1)  035773     137  047105  051124  TTDS$   ,ASCIZ  "-ENTRY WAS FROM DXDS"
(1)  036013  042537  052110  050522  TTCA$   ,ASCIZ  "-ENTRY WAS FROM DXCA"
(1)                                  ,LIST   BEX
6448
6449                                 ,SBTTL  DATA BUFFERS
6450
6451                                 ;DATA BUFFER -- CONTAINS 0 - 255 IN ONE BYTE ITEMS
6452
6453                                 ;DATA FILE FOR CHANNEL SIMULATOR WRITE CMDS
6454          036026                 ,EVEN
6455
6456  036026                         DATA$:
6457
6458
6459
6460          000001                 %%1
6461  036026  000001                 ,WORD   %
6462          000002                 %%1+2
6463  036030  000002                 ,WORD   %
6464          000004                 %%1+2
6465  036032  000004                 ,WORD   %
6466          000010                 %%1+2
6467  036034  000010                 ,WORD   %
6468          000020                 %%1+2
6469  036036  000020                 ,WORD   %
6470          000040                 %%1+2
```

```
6471  036042  000042          ,WORD   .
6472                          .BYTE
6473  036042  000042          ,WORD   .
6474                          .BYTE
6475  036044  000042          ,WORD   .
6476                          .BYTE
6477  036046  000040          ,WORD   .
6478                          .BYTE
6479  036050  000040          ,WORD   .
6480                          .BYTE
6481  036052  000040          ,WORD   .
6482                          .BYTE
6483  036054  000042          ,WORD   "
6484                          .BYTE
6485  036056  000042          ,WORD   "
6486                          .BYTE
6487  036060  000042          ,WORD   "
6488                          .BYTE
6489  036062  000042          ,WORD   "
6490                          .BYTE
6491  036064  000040          ,WORD   .
6492                          .BYTE
6493                          .EVEN
6494  036066  177775          ,WORD   -W-1
6495                          W-W-W
6496  036070  177773          ,WORD   -W-1
6497                          W-W-W
6498  036072  177767          ,WORD   -W-1
6499                          W-W-W
6500  036074  177757          ,WORD   -W-1
6501                          W-W-W
6502  036076  177737          ,WORD   -W-1
6503                          W-W-W
6504  036100  177677          ,WORD   -W-1
6505                          W-W-W
6506  036102  177577          ,WORD   -W-1
6507                          W-W-W
6508  036104  177377          ,WORD   -W-1
6509                          W-W-W
6510  036106  176777          ,WORD   -W-1
6511                          W-W-W
6512  036110  175777          ,WORD   -W-1
6513                          W-W-W
6514  036112  173777          ,WORD   -W-1
6515                          W-W-W
6516  036114  167777          ,WORD   -W-1
6517                          W-W-W
6518  036116  157777          ,WORD   -W-1
6519                          W-W-W
6520  036120  137777          ,WORD   -W-1
6521                          W-W-W
6522  036122  177777          ,WORD   -W-1
6523                          W-W-W
6524  036124  177777          ,WORD   -W-1
```

```
                000000          W=W+W
                000001          N=1
        036126  000001          .WORD   N
                000002          N=N*2
        036130  000002          .WORD   N
                000004          N=N*2
        036132  000004          .WORD   N
                000010          N=N*2
        036134  000010          .WORD   N
                000020          N=N*2
        036136  000020          .WORD   N
                000040          N=N*2
        036140  000040          .WORD   N
                000100          N=N*2
        036142  000100          .WORD   N
                000200          N=N*2
        036144  000200          .WORD   N
                000400          N=N*2
        036146  000400          .WORD   N
                001000          N=N*2
        036150  001000          .WORD   N
                002000          N=N*2
        036152  002000          .WORD   N
                004000          N=N*2
        036154  004000          .WORD   N
                010000          N=N*2
        036156  010000          .WORD   N
                020000          N=N*2
        036160  020000          .WORD   N
                040000          N=N*2
        036162  040000          .WORD   N
                100000          N=N*2
        036164  100000          .WORD   N
                000000          N=N*2
                000002          W=2
        036166  177775          .WORD   -W-1
                000004          W=W+W
        036170  177773          .WORD   -W-1
                000010          W=W+W
        036172  177767          .WORD   -W-1
                000020          W=W+W
        036174  177757          .WORD   -W-1
                000040          W=W+W
        036176  177737          .WORD   -W-1
                000100          W=W+W
        036200  177677          .WORD   -W-1
                000200          W=W+W
        036202  177577          .WORD   -W-1
                000400          W=W+W
        036204  177377          .WORD   -W-1
                001000          W=W+W
        036206  176777          .WORD   -W-1
                002000          W=W+W
        036210  175777          .WORD   -W-1
```

```
 6579             004000              W=W+W
 6580   036212    173777              .WORD   -W-1
 6581             010000              W=W+W
 6582   036214    167777              .WORD   -W-1
 6583             020000              W=W+W
 6584   036216    157777              .WORD   -W-1
 6585             040000              W=W+W
 6586   036220    137777              .WORD   -W-1
 6587             100000              W=W+W
 6588   036222    077777              .WORD   -W-1
 6589             000000              W=W+W
 6590   036224    177777              .WORD   -W-1
 6591             000000              W=W+W
 6592             000001              N=1
 6593   036226    000001              .WORD   N
 6594             000002              N=N+N
 6595   036230    000002              .WORD   N
 6596             000004              N=N+N
 6597   036232    000004              .WORD   N
 6598             000010              N=N+N
 6599   036234    000010              .WORD   N
 6600             000020              N=N+N
 6601   036236    000020              .WORD   N
 6602             000040              N=N+N
 6603   036240    000040              .WORD   N
 6604             000100              N=N+N
 6605   036242    000100              .WORD   N
 6606             000200              N=N+N
 6607   036244    000200              .WORD   N
 6608             000400              N=N+N
 6609   036246    000400              .WORD   N
 6610             001000              N=N+N
 6611   036250    001000              .WORD   N
 6612             002000              N=N+N
 6613   036252    002000              .WORD   N
 6614             004000              N=N+N
 6615   036254    004000              .WORD   N
 6616             010000              N=N+N
 6617   036256    010000              .WORD   N
 6618             020000              N=N+N
 6619   036260    020000              .WORD   N
 6620             040000              N=N+N
 6621   036262    040000              .WORD   N
 6622             100000              N=N+N
 6623   036264    100000              .WORD   N
 6624             000000              N=N+N
 6625             000002              W=2
 6626   036266    177775              .WORD   -W-1
 6627             000004              W=W+W
 6628   036270    177773              .WORD   -W-1
 6629             000010              W=W+W
 6630   036272    177767              .WORD   -W-1
 6631             000020              W=W+W
 6632   036274    177757              .WORD   -W-1
```

```
 6633                 000040                    W=W+W
 6634     036276      177737                    .WORD    -W-1
 6635                 000100                    W=W+W
 6636     036300      177677                    .WORD    -W-1
 6637                 000200                    W=W+W
 6638     036302      177577                    .WORD    -W-1
 6639                 000400                    W=W+W
 6640     036304      177377                    .WORD    -W-1
 6641                 001000                    W=W+W
 6642     036306      176777                    .WORD    -W-1
 6643                 002000                    W=W+W
 6644     036310      175777                    .WORD    -W-1
 6645                 004000                    W=W+W
 6646     036312      173777                    .WORD    -W-1
 6647                 010000                    W=W+W
 6648     036314      167777                    .WORD    -W-1
 6649                 020000                    W=W+W
 6650     036316      157777                    .WORD    -W-1
 6651                 040000                    W=W+W
 6652     036320      137777                    .WORD    -W-1
 6653                 100000                    W=W+W
 6654     036322      077777                    .WORD    -W-1
 6655                 000000                    W=W+W
 6656     036324      177777                    .WORD    -W-1
 6657                 000000                    W=W+W
 6658                 000001                    N=1
 6659     036326      000001                    .WORD    N
 6660                 000002                    N=N*2
 6661     036330      000002                    .WORD    N
 6662                 000004                    N=N*2
 6663     036332      000004                    .WORD    N
 6664                 000010                    N=N*2
 6665     036334      000010                    .WORD    N
 6666                 000020                    N=N*2
 6667     036336      000020                    .WORD    N
 6668                 000040                    N=N*2
 6669     036340      000040                    .WORD    N
 6670                 000100                    N=N*2
 6671     036342      000100                    .WORD    N
 6672                 000200                    N=N*2
 6673     036344      000200                    .WORD    N
 6674                 000400                    N=N*2
 6675     036346      000400                    .WORD    N
 6676                 001000                    N=N*2
 6677     036350      001000                    .WORD    N
 6678                 002000                    N=N*2
 6679     036352      002000                    .WORD    N
 6680                 004000                    N=N*2
 6681     036354      004000                    .WORD    N
 6682                 010000                    N=N*2
 6683     036356      010000                    .WORD    N
 6684                 020000                    N=N*2
 6685     036360      020000                    .WORD    N
 6686                 040000                    N=N*2
```

```
6687  ?36362  ?4?8?8                  ,WORD   ?
6688          18?3?8                  ?=?=2
6689  ?36364  18?000                  ,WORD   ?
6690          ?8?3?8                  ?=?=2
6691          ?8?2?2                  W=2
6692  ?36366  177775                  ,WORD   -W=1
6693          ?8?3?4                  W=W+W
6694  ?36370  177773                  ,WORD   -W=1
6695          ?8?818                  W=W+W
6696  ?36372  177767                  ,WORD   -W=1
6697          ?8?828                  W=W+W
6698  ?36374  177757                  ,WORD   -W=1
6699          ?88848                  W=W+W
67?0  ?36376  177737                  ,WORD   -W=1
67?1          ?80188                  W=W+W
67?2  ?364?0  177677                  ,WORD   -W=1
67?3          ?82?28                  W=W+W
67?4  ?3647?  177577                  ,WORD   -W=1
67?5          ?8?4?8                  W=W+W
67?6  ?364?4  177377                  ,WORD   -W=1
67?7          ?81828                  W=W+W
67?8  ?364?6  176777                  ,WORD   -W=1
67?9          ?82?28                  W=W+W
6710  ?3641?  175777                  ,WORD   -W=1
6711          ?84828                  W=W+W
6712  ?36412  173777                  ,WORD   -W=1
6713          ?1?828                  W=W+W
6714  ?36414  167777                  ,WORD   -W=1
6715          ?2?828                  W=W+W
6716  ?36416  157777                  ,WORD   -W=1
6717          ?4?828                  W=W+W
6718  ?3642?  137777                  ,WORD   -W=1
6719          18?828                  W=W+W
6720  ?36422  ?7777                   ,WORD   -W=1
6721          ?8?828                  W=W+W
6722  ?36424  177777                  ,WORD   -W=1
6723          ?82828                  W=W+W
6724
6725          ?36426                  .=.             ;INDICATE ADDRESS OF END OF BUFFER
6726  ?36426  ?8?8?8                  WDATA1: ?               ;BEGINNING OF WRITE DATA FILE
6727          ?37426                  ?PRDATA=WDATA+512.      ;NPR INPUT DATA FILE
6728                                  ;WDATA AND NPROAT OVER WRITE ASCII TEXT
6729          ?82?71                  .END
```

```
ABSV"   #35053          6447#
ACCEPT* 104005           932#  4499    4512    4522    4529    4538    4603    4619    4625
ACLC    #30056          5456   5462#
ACPT.   #27022          5247#  5271
ACPT-.  #27024          5248#  5260
ACPTC   #27222          5300#  5323
ACPTC.  #27224          5301#  5326
ACUA    #25002          4658*  4659    4669    4697*   4699    4699*   4747#
ADRA    #23413          4351   4429#
ADRAE   #23476          4306   4440#
ADREAM  #21643          4126#
ADRBCM  #21642          4127#
ADRCAM  #21632          4123#
ADRCOM  #21653          4130#
ADRCSM  #21634          4124#
ADRCSM  #21637          4122#  4353
ADRECC* #00002          708#   2519    2522    2802    2805    3271    3274    3309    3312    3312    3316    3440    3449
                        3477   3488
ADRECD* #00001          709#   2523    2526    2806    2809    3207    3275    3279    3305    3319    3457    3453    3481
ADRESM  #21654          4132#
ADRI  * #10003          747#   2819    2818    2853    2856
ADRMIM  #21646          4129#
ADRMOM  #21644          4128#
ADRMOM  #21652          4131#
ADRO  * #04003          739#   2509    2512    2515    2518    2787    2790    2795    2798    3239    3241    3244    3417
                        3423   3426    3844    3846    3907    3909
ADRCSM  #21636          4125#
ADXBA   #35342          4433   6447#
ADXBC   #35351          4434   6447#
ADXCA   #35315          443#   6447#
ADXCC   #35376          4437   6447#
ADXCS   #35324          4431   6447#
ADXES   #35306          4429   6447#
ADXES   #35414          4439   6447#
ADXES1  #35423          4440   6447#
ADXII   #35367          4436   6447#
ADXIO   #35362          4435   6447#
ADXIS   #35475          4438   6447#
ADXIS   #35333          4432   6447#
AHEX    #27142          5261   5279#
AHEX-   #27142          5279#  5283
AHEX1   #27164          5280   5289#
AH'.2   #27043          5258   5252#
AH'.3   #27076          5262#  5280
AMUX"   #35067          6447#
ANYB    #14662          3204*  3289#   3218*   3212    3211    3216    3390    3392
AO'.2   #27243          5303   5309#
ATBL    #27174          5279   5282    5292#
ATTE' * #00200          717#
ATT   * #00203          878#
BA    * #00013          793#
BABC    #04574          1782#  1787
BALP  * #00013          706#
BAMAP   #21442          1908*  2184*   2676*   2987*   2991*   2995*   3053*   3074*   4074#   4124    4175*
```

```
BC      = 000012            7948
BCBC      004436            1601#   1967
BCMAP     021454            4078#   4127    41760
BCNT      017434            3602#   3568#   3695#
BEGIN     001132             902     960#    998    4416    4467    4481
BELL      005151            4602    6447#
BGN1      001216             988     992#
BGN1      001230             993     999#
BGN2      001244             996     998#
BIT0    = 000001             858#    2882    2192
BIT1    = 000002             859#    4294
BIT10   = 000400             840#     978    3979
BIT11   = 004000             849#     987    4246
BIT12   = 010000             848#     988    4323
BIT13   = 020000             847#     987    4313    5348    5427
BIT14   = 040000             846#     986    4244
BIT15   = 100000             845#     985
BIT2    = 000004             854#    3374    3377
BIT3    = 000010             853#    3281
BIT4    = 000020             852#
BIT5    = 000040             851#
BIT6    = 000100             850#
BIT7    = 000200             849#
BIT8    = 000400             848#
BIT9    = 001000             847#    2883    2917    2178    2984    2987    3018    4379
BOOT      004224            1597#   1884
BSY     = 000020             728#    881#
BSYEN   = 004003             708#    2988
BSYS    = 000040             684#    2932    2935
BUSI      001342            1843#   1178    1558    2756    2995    3854    5196
BUSO      001336            1838#   1949    1597#   1626#   1687    1813#   1814    1818    2494    2633    3664#   5193
BUSOR     001352            1892#
BYPAS   = 000100             703#    2841    2612    2743    2745    2874    3059    3942
CA      = 000002             798#
CAMAP     021454            1876#   2467#   2636#   2868#   3218#   3386#   4002#   4123    4171#
CARG      027322            5308    5318    5324#
CARGM     027124            5295    5257    5272#
CARRY     024772            3537#   3558#   3551    3588    3582#   4738#
CB      = 000020             797#
CBMAP     021544            1935#   1983#   2334#   2853#   2857#   2898#   2188#   2209#   2212#   2222#   2522#   2528#   2683#
                            2688#   2829#   2693#   2698#   2719#   2746#   2778#   2805#   2809#   3037#   3042#   3046#   3058#
                            3062#   3098#   3188#   3128#   3141#   3145#   3149#   3274#   3278#   3449#   3453#   4098#   4188#
                            4118#   4138    4181#
CBMAPS    021656            1189#   1139#   1143#   3267    3298#   3308    3318    3349#   3488#   4098    4118    4119#   4139#
                            4183#
CE      = 000010             879#    1178    4835    5472
CHDEAD  = 000040             687#
CHEAD   = 000010             721#    3957
CHEADS  = 001000             683#    2938    2939
CHIS    = 000002             689#    2847    2845    2871    3689
CHKEAD    021614            4111    4118#
CHKPNS    020713            3937#
CHKREG    021366            1918    1938    1987    2187    2185    2213    2231    2478    2481    2487    2501    2584    2527
                            2538    2548    2548    2589    2615    2678    2711    2723    2732    2774    2783    2818    2819
```

```
                        2826    2837    2861    2978    2994    2952    2954    2966    2996    3051    3079    311F    3121
                        3128    3194    3161    3164    3227    3223    3232    3289    3397    3393    3414    3484    348B
                        351B    4897#   415*
CKC.A   *26163          4681    4849    5384#
CKC1    *26164          5085#   5182
CKC2    *26166          5066#   5887*
CKC3    *26174          5892#
CKC4    *26216          5896    5182#
CKRG1   *21516          4887    4892#
CLK     *21074          1911    1939    1988    2088    2097    2107    2214    2232    2246    2267    2476    2485    2497
                        2502    2513    2528    2539    2545    2559    2593    2619    2684    2712    272B    2733    2775
                        2779    2791    2811    2827    2824    2831    2847    2849    2864    2887    2905    2927    2953
                        2978    3884    3955    3964    3985    3113    3124    3134    3157    3162    3221    3236    3328
                        3341    3391    3418    349F    3583    3975#
CLKC    *21476          3976#   3977    3992*
CLKE    *21273          3978    3994#
CLKC  = *21473           798#   2833    2836    4911    4912    4914    4915
CLKS    *21164          3988    3991#   3993
CLRCXD  *27453          3797    3789    3795#
CLR'C   *26414          2307    5142#
CL1     *25622          4984#   4966
CMD     *24776          2828*   2929    2838    2857    2887    3543*   3644*   3848    3852    3852    3871    3873    4734#
CMDCHN# *23304           698#
CMDC  = *23473           736#   2939    284F    2845    2845    2918    2919    2926    2929    3884    3849    3849    3851
                        3872    3874
CMDREJ# *27371           692#   2886    2889
CMD,AC  *25223          4616    4953#   4918
CMD,ST  *25263          4615    4874#   4927    5775
CNTLC = *23303          5449#   5454
CONI    *21344          1844#
CONO    *21343          1839#
CONCF   *21354          1853#
COPARO  *21234          2500    3231    3347    3401    3509    4089#   4149
COU.T   *25432          3536*   3548*   3554*   3577*   3579*   3583*   4758#
CR    = *23415          4562    4628    5376    6443#
CRLF    *35248          3981    4372    6447#
CS    = *23474           791#
CSMAP   *21416          1893*   1950*   2115*   2964    3104*   4866#   4124    4172*
CS12  = *22303           701#
CS12  = *21423           699#
CUADRS  *25374          4659*   4664*   4698*   4788    4701    4743#
CUAR    *21326          1828#   1129    1132    1535    1869    1972*   1873    1876    2463*   2464    2633    2662    2758
                        3212*   3213    3382*   3383    3964*   3965*   5187
CUBSY = *23443           703#   1953    1956    2578    2637
CUCR    *21333          1829#   1948    2857
CUDE'D# *23423           688#
CUDX  = *23473           759#
CUE   = *23443           887#
CUE D = *23443           719#
CUFB* = *24423           697#
CUOR    *21334          1834#
CUSR    *21332          1833#   2752    2755    5197
DATA    *36226          6456#
DE    = *23424          876#    1178    4835    5472
```

```
DXFIS  =  %000001   7698#  1996   1617   1634   1675   1715   2307   2331   3176   3299   3293   3400   3408
                    3592   3642   3736   4145   4427   5169
DXFST  =  %000177   7128#
DXGO      %20373    3763   3903#
DXIS      %01266    1907#  1987*  2351*  3647*  3759*  4934*  4717*  4917*
DXIV      %01244    1706#  1989*  2127*  2124*  2135*  2337*  2392*  2901*  2902*  3639*  3691*  3795*  4532*
                    4712*  4926*
DXMI      %01512    1817#  1164   1167   2577   2972   2049   2697   2759   2815   2833   2853   2808   2988
                    2947   2979   3323   3484   3545   3557   4904   4869   5195
DXMO      %01510    1710#  1113   1132   1136   1102   1591   1598   1625*  1627*  1628   1635   1800   1989*
                    1919   1939*  1943   2202   2353   2301*  2404*  2405   2493*  2598*  2918   2919   2535*
                    2536   2941   2555*  2550   2501   2787*  2788   2795   2822*  2829*  2839*  2844   2845
                    2912   2918*  2919   2920   2967*  2972   3832*  3226*  3227   3235*  3238   3274   3327*
                    3333   3348*  3343   3396*  3397   3417*  3427   3469   3489*  3495   3502*  3505   3506*
                    3501*  3502*  3665*  3666*  3702*  3806*  3807*  3809*  3539*  3543*  3844*  3845*  3846*
                    3847*  3548*  3849*  3857*  3851*  3856*  3857*  3859*  3860*  3867*  3868*  3869*  3879*
                    3871*  3872*  3873*  3874*  3875*  3876*  4799   4881   4419*  5142*  5192
DXMOP     %01322    1721#
DXNI      %01316    1019#  2827   2153   2706   3824   3989   3997   4112
DXOS      %01302    1713#  1181*  2087   2181   2665   3989   3641*  4869   5123*  5124   5189
DXOUT     %20036    3798#
DXPRT     %01272    1008#  1987   2121   2351   3642   3759   4546*  4713   4911*
DXRES     %21663    1858   2462   3211   3381   3533   3563   3796   4149#
DXTO   =  %000023   777#   3559   3564   3565   3585
DXTC.1    %10004    3548#  3550
DXTC.2    %10036    3549   3559#
DXTC.3    %10032    3554#
DXTC.4    %10756    3578#  3579   3584
DXTC.5    %17006    3581   3589#
DXTC.6    %17034    3535   3591#
D.DEVL    %25012    4913   4953#
D.DXBA    %25003    4908   4948#
D.DXIS    %25014    4918   4954#
D.DXIV    %25002    4909   4949#
D.DXPR    %25004    4911   4958#
D.FIPS    %25576    4907   4947#
D.LEGA    %25013    4914   4952#
D.MAXL    %25006    4912   4951#
E      =  %00013    922#   927#   928#   929#   938#   931#   932#   933#   934#   935#   936#   937#
EABIYS    %17520    3623   3719#
EC     =  %00001    1519#
ECM       %35203    4601   6447#
EMTABL=   %22246    923#   927#   928#   929#   938#   931#   932#   933#   934#   935#   936#   937#
EMTAC     %22223    923    4228   4231#
EMTDFC    %22156    953    4217#
EMTDM     %22203    4222   4224#
ENDEN  =  %00003    698#
ENDSYR=   %01776    1202#
ENDTST    %35153    4688   6447#
ENDTT  =  %00003    1518#  4963
ENTRY1    %20536    2959*  3898#  3901   3903*  4155*  4899*
ENTRY2    %20576    2908*  3907#  3912   3914*  4157*  4908*
ERFLG     %23406    4208*  4273*  4305*  4325   4343   4426#
ERPC      %35271    4315   6447#
```

```
E.R1     *23446           4368#    4469     4453#
E.R2     *23453           4369#    4417     4454#
E.R3     *23462           4370#    4411     4455#
E.R4     *23464           4311#    4412     4456#
E.R5     *23466           4312#    4413     4457#
FALSE    *22074           2337     2961     4193#    4712
FASTCU#  *02003           7578
FASTIS   *20222           3576     3942#
FCT'  #  *00006           708#
FIRST,   *25014           4499#    4517#    4714     4716#    4717     4748#    4984#
FISS0    *17352           3639     3679#
FISS1    *20324           3893     3950#
FISS2    *20332           3895     3957#
FIVESE#  *00001           3534     3591     4728#
FLG'"    *17104           3617#    3923#    3652     3713
FSTART   *34566           4483     6447#
GETHEX   *27013           4598     5243#
GO    #  *00001           713#     3003
H        *23516           4479#    4478#
HEADER   *34203           4475     6444#
HERE  #  *00003           857#
HEX'UM   *27172           4599     4508     4568     5243#    5272#    5289#
HLDO  #  *40003           738#     2939     2536     2541     2544     3235     3241     3244     3417     3423     3426     350?     3666
                          3886     3887     3845     3856     3869
HLTS' #  10?003           885#     4368
HOME     *35146           4473     6447#
HTBL     *27204           5285     5292#
IBA2     *13516           3818#    3811#    3817#    3?18#    3?27     3?3?     3?33
IBMRST#  *34003           681#     2919
ICOU'T   *22414           1526#    1972#    1644#    1686#    1725#    1777#    1845#    2314#    2419#    3192#    3364#    3523#    3598#
                          3750#    3824#    4249     4258#
IDV'     *26233           5065     5097     5134#
IIS#  #  *04003           889#
ILLC  #  *00475           866#     4813
ILLEGI   *07043           2128#    2134#
IMAGRA   *11576           2663#    2664#    2665#    2669#    2673     2676     2786     2789     2752     2895     2898     2899
IMAGOS   *11526           2667#    2668#    2669
INDX     *13532           3813#    3814#    3815#    3?16#    3?17
INFOSC#  *04003           688#     681
INITB    *01154           973      983#
INITC    *01160           979      981#
INITZ    *01144           976      978#
INTE' #  *00103           709#     1889     1898     2341     2342     2963     2964     3645     3762     448?
INTEPR   *22132           4208#
INTOK #  10?003           878#     4208     4239     4212
INTRAS   *22133           4208#    4203#    4289     4212#
INT'     *22103           4196#
INT'EQ#  *00203           779#     2118     2142     3105     3109
IOD   #  *00203           768#     1932     1935     2237     2251
IRR      *22154           4218     4213#
IRR2     *22142           4211#
IRS   #  *00001           783#     2047
ISS'EJ#  *00013           689#
KEY,TO#  104006           933#     4484     4561     4627     4639     5248     5301
```

```
KIPARA  017432          3622    3893#
LARG    001444          1109#   3269    3337    4487
LEGAL.  025034          1112    4959    4658    4697    4767#   4914#   4919#   5833    5884
LESS1   001272          1P69#   2129    2349    2967    4427    4549#
LEVEL0# 00P3P2           894#
LEVEL1# 00P043           895#
LEVEL2# 00P103           896#
LEVEL3# 00P143           897#   1389
LEVEL4# 00P293           898#   1388    4472    4057
LEVEL5# 00P243           899#
LEVEL6# 00P3P3           90P#
LEVEL7# 00P343           901#    944     947     957     953     956     987     999    1533    1888    3619    4408    4482
                        5114
LF    # 00P312          5376    6442#
LIMP    017144          3618    3829#
LOCAL   001532          1138#   1131#   1139#   114P
LOCK? # 100P03           799#   1983    1983    2944    228?    229P    2299    2388    2398    28?P    2883    5173    5283
                        3498
LOCK?   001464          1114#   1119#   1119'   1130#   1137#   1138#   114P
LOGICA  024003           958    4692#
LOPSW # 04P003           886#   4414
LPC'TL  024472          3838    4062#
LPCS    024446          4056#
LPC1    024632          4668    4867    4788#
LPC2    024616          4678    4898#
LPC3    024672          4784    4787#
LPC4    024703          4786    4788#
LPC5    024613          4698    4897#
L4      017072          3613#   3738
L6      017103          3615#   3739
MAPERR# 104001           928#   4868    4864    4768    4772    4878    4888    4884    4891    4182    4188    4119
MARK    025773          5838#   5837
MAX,DE  025016          3305    4889#   4666    4783    4749#   4912#   5P58    5P92
MCCS. # 002003           898#
MCLKEN# 00P002           774#   1749    1748    1749    1752    1753    1758    1757    1761    179P    1791    1838    1894
                        1895    1898    2284    2468    2469    3165    3166    3217    3218    3292    334P    3367    3388
                        3407    3911    4118    414P    4419
MCLKP # 00P001           773#   1818    1813    1817    192?    183P    1965    3991    4088
MC1,SM# 00P001            2#      9     143     146     342     345     65?    1182    1196    241P    2741    2828    3852
                        5216    5223    5288    6447
MC2,SM# 00P003            2#     19     146     345    2461    2747    2829    2849    2861    2932    3852    4979    5479
                        5728    6444    6447
MDXX    024234          4593#   4594#   4595#   4596#
MEM,SM# 00P003            2#     19     371     378     929    1882    1284    1519    4266    4975    4978    6447
MI    # 00P016           796#
MIMAP   021513          2852#   2858#   2765#   2766#   2919#   2836#   2856#   2898#   2983#   2958#   2979#   3328#   3339#
                        3487#   3981#   4011#   4114#   4789#   4129    4179#
MISC    001346          1047#   1999    5199
MO    # 00P014           795#
MOMAP   021466          1918#   1949#   2499#   2518#   2544#   2564#   2798#   2823#   2838#   2848#   2929#   2979#   3853#
                        3238#   3244#   3297#   3336#   3344#   3489#   3426#   3472#   3498#   3588#   4082#   4128    4178#
                        4333#   4339
MONDFL  025003          4469    4489    4589    4898#
MONITO  023463           994    4462#
```

```
MON1     *23712           4494     4529#
MON1,6   *23757           4497     4249     4478#    4496     4442     5*6*     5250     5324     5457     5049
MON1     *24356           1*87     4492     4621     4655#
MON11    *2441*            991     4541     4647#
MON12    *24774           4711#
MON13    *24776           4715     4717#
MON14    *24762           4721#
MON2     *25452           4927#    4922
MON2,0   *25472           4925#    4929#
MON2,1   *25574           4928#    4936
MON2,2   *25544           4937#    4943
MON2,3   *25574           4938     4944#
MON3     *23773           4516     4519#
MON4     *23752           4525     4529#
MON4,1   *24013           4531     4537#
MON5     *24174           4582#    4587     5798
MON5,1   *24244           4621#
MON6     *24076           4547     4559#
MON7     *24176           4557#    4563     4574
MON8     *24273           4615#
MON9     *24374           4618#    4529
MSG1*    *35*75           4618     6447#
MSG12    *35*47           4537     6447#
MSG13    *35274           4573     4589     6447#
MSG1     *34572           4519     6447#
MSG2*    *35434           4332     6447#
MSG2*    *35451           4528     6447#
MSG3     *34622           4582     6447#
MSG3*    *35473           4624     6447#
MSG3*    *35575           4327     6447#
MSG**    *35526           4342     6447#
MSG4     *34663           4595     6447#
MSG5     *34644           4497     4514     6447#
MSG6     *34755           4557     6447#
MSG7     *34745           4638     6447#
MSG9     *35*74           4617     6447#
M      * *3*0**           1207#    1238     1227#    1246#    1265#    1284#    13*7#    1322#    1341#    136*#    1379#    1398#    1417#
                          1436#    1455#    1474#    1493#    1512#    1519#    1527     1537#    1568     1576#    164*     1648#    1682
                          169*#    1722     1738#    1773     1781#    1941     1849#    2319     2318#    2419     2423#    3188     3196#
                          3368     3368#    3519     3527#    3594     3682#    3744     3754#    3828     382*#    6469#    6461     6462#
                          6463     6464#    6465     6466#    6467     6468*#   6469     6472#    6471     6472#    6473     6474#    6475
                          6476#    6477     6478#    6479     6487*#   6481     6482#    6483     6484#    6485     6486#    6487     6488#
                          6489     6498#    6491     6492#    6526#    6527     6528*#   6529     6538#    6531     6532#    6533     6534#
                          6535     6536#    6537     6538#    6539     6548*#   6541     6542#    6543     6544#    6545     6546#    6547
                          6548#    6549     6558*#   6551     6552#    6553     6554#    6555     6556#    6557     6558#    6592#    6593
                          6594#    6595     6596#    6597     6595#    6599     6688*#   6681     6682#    6683     6684#    6685     6686#
                          6687     6688#    6689     6618#    6611     6612#    6613     6614#    6615     6616#    6617     6618#    6619
                          6628#    6621     6622#    6623     6624#    6658#    6659     6667#    6661     6662#    6663     6664#    6665
                          6666#    6667     6668#    6669     6677#    6671     6672#    6673     6674#    6675     6676#    6677     6678#
                          6679     6688#    6681     6682#    6683     6684#    668*     6686#    6687     668*#    6689     669*#
ND       * *3*622         7988
NDMAP    *21676           2838*    2789*    3827*    3792*    411*#    4131     4182*
NOCLR    *2642*           5128     5143#
NOM1     *215**           4812*    4819*    4817#    4*86     4982*
```

```
NOP     = 000240          917#    3985    4374
NOPC    = 000403          864#    3943    4811
NPRC.   017542            3714    3720#
NPRCX   017623            3725    3734#
NPRC1   017676            3674    3734    3736#
NPRC2   017704            3664#   3669
NPRDAT= 037426            3781    3799    3803    6727#
NPRINT  017443            3691    3699#
NPRT    = 000023          765#    2854    2857    2248    2254    3047    3050    3146    3149
NPRTO   = 000043          778#    2719    3775
NPRX    = 000043          764#    1973    2058    2253    2293    2096    2205    2208    2219    2222    2690    2693    2719
                          2718    2998    3043    3046    3059    3062    3097    3103    3117    3128    3142    3145
NPR,CA  017066            3607#
NXM     = 000020          677#    3722    3727    3730    3731
NXTADR  016444            3473    3912#
NXT11   015556            3299    3351    3353#
OCT,IM  025012            4499    4519    4517    4524    4525    4530    4532    4533*   4534    4539    4541*   4542*   4543*
                          4544*   4549*   4546    4547*   4549*   4549    4584    4589    4628    4626    4622    4623    4626
                          4747#   5297*   5324*
ODAT    025034            4653    4973#
ODAT1   025044            4977#   4978    4979    4980*   4981*
ODAT2   025046            4978#   4982
OEF     022672            4209    4388    4386#
OFFSET  025013            4746#   4932    4933
OLE,SM= 000003            2#      19      152#    4649    5169    6447
ONES.0  024766            998*    3374    3377*   3534    3591*   4251*   4417*   4636*   4729#   4903*
ONLI'A= 001003            702#
ONLI'B= 000004            707#
OPLI    = 100003          742#    1164    2649    2652    3545    3557
OPLO    = 130003          729#    1991    1595    1635    1866    1989    1938    1943    1940    2353    2361    2484    2485
                          3241    3294    3297    3343    3346    3423    3469    3472    3525    3508    4178
OS      = 000006          792#
OSMAP   021433            2795*   2899*   4078#   4125    4173*   4174*
OUTST   001626            1123    1141    1144#
OVRISR  007113            2132    2139    2145    2147#
OVRTBA  010474            2367    2400    2404#
O.ADR1  031126            3989*   4379*   4939*   5983    5989    5992    6081*   6085*   6171    6185*   6202    6230    6237*
                          6278*   6433#
O.ASMB= 034203            6413#   6439
O.BACK  032004            5896    5965#
O.BD    034143            6178    6179    6374#
O.BKP   = 000016          4937    5759#   5988    5992    5999    6006    6099    6137    6149    6179    6184    6239    6273
                          6434    6436    6438
O.BKPT  032226            5900    5970#
O.BK1   033114            5781    6158#
O.BK2   033146            6159    6158#
O.BK3   033164            6157    6164#
O.BRK   033076            944     5796    6147#
O.B-    034123            5838    5959*   5916*   5919*   5924    5943    5958    5953    5954*   5957*   5968    5971    6010
                          6034*   6036*   6058*   6208*   6282    6337    6352#
O.BYT   031762            5889    5919#
O.BYT1  031763            5918#   5928
O.B1    033214            6171#   6179
O.B2    033303            6172    6180    6187#
```

```
0.B3    #33473          6183    6203#
0.B4    #33266          6187    6184#
0.CA    #34122          5824*   5848    5923*   5926    5929    5931    5948*   5958*   5951    5959    5971*   6022    6347*
                        6342*   6359#
0.CARV  #33656          5932    5956    6026    6035    6069    6073    6203    6203#
0.CLGL  #31644          5867    5869    5877#
0.CLGT* #00023          5881    6399#
0.CLSE  #34042          5837    5937    5945    5977    6335#
0.CLS1  #34072          6336    6339    6341    6343#
0.CLS2  #34066          6338    6342#
0.CR    #34142          6345    6347    6348    6376#
0.CRET  #32044          5898    5937#
0.CRLF  #34074          5952    6067    6177    6253    6345#
0.CRLS  #34102          5868    6347#
0.CRS   #34106          6346    6348#
0.CSR1  #34134          6249*   6268    6369#
0.CSR2  #34135          6248*   6261    6377#
0.CT    #31153          4941*   6382*   6318*   6134*   6185*   6197*   6435#
0.C1    #33076          6137#   6189
0.DCD   #31564          5858    5852    5859#   5938    6204
0.DCDA  #32053          5938#   5999    6003    6007
0.DCDB  #32333          6003#   6059
0.DCD1  #31673          5863#   5912
0.DCD2  #31574          5861#   5933    6037
0.DCY   #34124          5922*   5948    5951*   6356#
0.EFF   #32543          5899    6049#
0.EFF1  #32624          6058    6077#
0.E.YR  #31226          5776#
0.ERR   #31554          5843    5857#   5882    5944    6239
0.ERR1  #32474          5981    5989    5993    6008    6017    6021    6039#   6049    6098    6141    6129    6131
0.ERR2  #32062          5944#   5969
0.FTYP  #33753          5858    5961    6019    6071    6193    6197    6199    6295    6303#   6316    6329
0.GET   #33764          5863    5869    6318#   6317    6319
0.GET1  #34024          6315    6328#
0.GC    #32673          5892    6397#
0.GC1   #32754          6111#
0.GC2   #32763          6109    6112#   6144
0.LG    #00026          5867    6407#
0.LGCH  #34145          5878    6384#   6399
0.LGCR  #31674          5885    5887#   5906
0.LGL   #00046          5906#
0.LGL1  #31646          5878#   5883
0.LGL2  #31666          5879    5884#
0.MSK   #31123          6051    6052    6054    6426#
0.ODT   #31214          5773#   5778    6414
0.OFST  #32373          5897    6016#
0.OF1   #32473          6029    6031    6033    6137#
0.OF2   #32414          6022#
0.OLD   #32052          5895    5942#
0.OP1   #32056          5893    5943#
0.OP2   #32116          5951#   5972
0.OP2A  #32124          5825    5952#
0.OP3   #32176          5959    5963#
0.OP4   #32173          5961#   5964
```

```
0,DPR   #32174          5947    5949#
0,DRAB  #31452          5826#   5902
0,DRPC  #31433          5827#   5894
0,DRRB  #31462          5829#   5903
0,P     #34133          5779#   5794#   6099#   6127    6137    6149#   6187#   6194    6221    6366#
0,PCS   #31442          5624#   5928    5836
0,PRI   #31116          5788    6154    6158    6425#
0,PRCC  #33073          5901    6127#
0,PRI   #33024          6133    6139#
0,RALL  #32332          5797    5998    6384#
0,RCSR# 177563          5763#   6249    6247#   6256    6259    6267#   6319
0,RCR = 177562          5762#   6312
0,REGT  #31363          5803#   5991
0,REM   #33624          5787    6153    6267#
0,REMB  #32376          5979    5997#
0,RI1   #32343          6006#   6012
0,RSR   #33573          6111    6239#
0,RSE1  #33676          6237    6268#
0,RSP   #31373          5805#   5885
0,RSP   #33446          6112    6222#
0,RST   #31303          5775    5780#
0,RSTT  #33556          6105    6130    6253#
0,RST1  #31326          5785    5793#
0,RS1   #33574          6236#   6248
0,R1    #33634          6278#   6274
0,R2    #33654          6208    6279#
0,S     #34131          5788#   5793#   5849#   5851#   6109    6139    6166    6267    6362#
0,SCAN  #31674          5814    5869#   5876
0,SEM1  #31742          5887    5918#
0,SEQ   #34136          5942#   5948    5949#   6371#
0,SET   #32256          5906#   5991
0,SET1  #32274          5985    5987    5992#
0,SIR   #31544          5848    5951#
0,SNGL  #31532          5847#   5984
0,SP    #31422          5806    5819#
0,SPC   #33736          6203    6287#
0,SP1   #31413          5811#   5810
0,STK = 000342          5757#   5799    6104    6135    6141
0,STRT  #31266          5774    5783#
0,SVR   #33413          5786    6154    6208#
0,SVTT  #33533          6176    6191    6245#
0,T     #34132          6106#   6142#   6151    6365#
0,TBIT  #32726          6106#   6138    6148    6152
0,TBT = 000020          5758#   6107    6118    6143
0,TCLS  #31574          5828    5826    5829    5837#
0,TCL1  #31526          5839    5842#
0,TCSR# 177564          5765#   6240    6248#   6254    6261#   6303
0,TDR = 177566          5764#   6309#
0,TL    #34173          5804    5907    5815    6401#   6407
0,TMP = #31074          5752#   5753
0,TRTC  #34176          4936    5979    6305    6237    6409#
0,TVEC= 000014          5756#   5777    5795#   5796#
0,TYPE  #34026          6102    6329#   6332    6349
0,TYP1  #33762          6306#   6327
```

```
0.UI'   731172          3988#   4374#   4942#   6239#   6236#   627?    6437#
0.UP?   731112          5778#   6183#   6114    6147#   6165    6169#   6187#   6423#
0.US.   731074          5783    5812    6416#
0.USP   731113          5784#   6289#   6217    6229    6422#
0.UST   731114          5776#   6187#   6117#   6113    6143#   6148#   6156    6424#
0.V'    733712          6288#   6297
0.V1    733716          6298#   6293
0.WB1   731773          5917    5928#
0.WDFC  734133          6358#
0.WDS   732506          6846    6849#
0.WDS2  732532          6894#   6878
0.WDS3  732562          6869#   6878    6884    6893
0.WDS4  732623          6865    6879#
0.WR?   731753          5888    5918#
0.WR?1  732034          5921    5924#   5962
0.WR?2  732032          5925    5931#
0.WR?3  732036          5938    5932#
0.WSCH  732574          5898    6847#
0.XXX   734126          6288#   6218    6223#   6238    6357#
PARA    724414          4648#
PARE?   =100003          876#
PARI    =100403          791#   2953    2656    2908    2903    4179
PARITY= 104007          934#   3207    3388    4559    4622    478?    4768    4978
PARO    =100403          738#   4289    4985    5219    5821
PARSTP= 100003          696#
PAST    717146          3624    3627#
PC      =X?0?007         914#   1118#   1113#   1116#   1129#   1145#   1102#   1103#   1794#   189?#   191?#   1913#   1938#
                        1941#   1967#   1987#   1991#   1997#   2007#   2007#   2073#   2079#   2087#   209?#   2099#   2185#
                        2189#   2127#   2156#   2181#   2184#   2213#   2216#   2223#   2231#   2234#   2248#   2278#   2302#
                        2408#   2462#   2478#   2481#   2487#   2488#   2500?   2501#   2504#   2509#   2527#   2538#   2531#
                        2545#   2548#   2581#   2589#   2595#   2615#   2621#   2662#   2666#   2678#   2686#   2711#   2723#
                        2725#   2738#   2732#   2735#   2759#   2774#   2777#   2781#   2783#   2793#   281?#   2813#   2819#
                        2826#   2837#   2851#   2861#   2866#   2878#   2882#   2904#   2924#   2952#   2956#   2957#   2966#
                        2988#   2998#   3006#   3009#   3012#   3051#   3057#   3066#   3068#   3079#   3087#   3111#   3115#
                        3121#   3128#   3128#   3136#   3154#   3159#   3161#   3164#   3177#   3185#   3205#   3208#   3211#
                        3219#   3228#   3223#   3224#   3231#   3232#   3238#   3245#   3266#   3289#   3307#   3331#   3347#
                        3378#   3381#   3389#   3390#   3393#   3394#   3401#   3414#   3428#   3427#   3464#   3488#   3493#
                        3509#   3518#   3532#   3538#   3544#   3563#   3576#   3612#   3614#   3616#   3628#   3644#   3715#
                        3718    3756#   3757#   3763#   3789#   3807#   3814#   3859#   3877#   3895#   3897    3905#   3988
                        3928#   3927#   393?#   3937#   3939#   3949#   3952#   3958#   3963#   3966#   3975#   3984#   4084#
                        4016#   4031#   4047#   4057    4061    4065    4069    4073    4077    4081    4088    4092#   4099
                        4103#   4109    4112    4128#   4146#   4147#   4149#   4158#   4151#   4158#   4185#   4213#   4238#
                        4282#   4287#   4292#   4316#   4321#   4336#   4343#   4348#   4361#   4364#   4421#   4469#   4488#
                        4509#   4558#   4568#   4589#   4592#   4681#   4647#   4649#   4658#   4651#   4652#   4653#   4654#
                        4684#   4693#   4711#   4924#   4944#   4967#   4976#   4984#   5084#   5086#   5088#   5090#   5067#
                        5073#   5079#   5085#   5099#   5103#   5116#   5122#   5122#   5133#   5134#   5135#   5143#   5168#
                        5203#   5276#   5336#   5344#   5372#   5451#   545?#   5752#   5837#   5937#   5945#   597?#   6343#
PCH1    = 104013        935#
PCH2    = 104011        936#
PCH3    = 104012        937#
PERR?C  723223          4314    4324    4341    4368#
PFAIL   731634          990     1159#   1187
PFL?    726562          1187    5219#
PG2     725716          5811#   5818
```

```
PG3     *25733          5012    5019#
PG4     *25754          5018    5021#
PG5     *25762          5020    5023#
PHASE0= *25773          803#     920     821    2273
PHASE1= *26003          804#     922     823
PHASE2= *26023          805#     824     825
PHASE3= *26043          806#     926     827
PHASE4= *26063          807#     928     829
PHASE5= *26103          808#     930     831
PHASE6= *26123          809#     932     833
PHASE7= *26143          810#     934     835    2296
PHS   = *26163          798#
PHST    *26744          1913    1941    1991    2197    2299    2189    2216    2223    2234    2248    2488    2505    2531
                        2581    2599    2621    2686    2725    2738    2735    2777    2781    2795    2813    2851    2866
                        2882    2924    2957    2987    3264    3257    3286    3287    3115    3128    3138    3159    3224
                        3215    3331    3394    3427    3493    3949#
PHSTF   *21036          3956    3960#
PHSTFR  *21042          3957    3967#
PHS.1 = *26403          820#    2489    2536    2532    2582    3225    3332    3395    3494
PHS.2 = *26423          821#    1914    2596    3246    3429
PHS11 = *26443          822#    2022    2726
PHS12 = *26463          823#    2987    2731
PHS21 = *26503          824#    2730    2782    2794
PHS22 = *26523          829#    2778    2814    2852
PHS31 = *26543          826#    2967    2883    2925    2958
PHS32 = *26563          827#
PHS41 = *26603          828#    1942    2891    2981    3259
PHS42 = *26623          829#    1992    2120    3107    3967
PHS51 = *26643          830#
PHS52 = *26663          831#
PHS61 = *26703          832#
PHS62 = *26723          833#
PHS71 = *26743          834#    2110    2235    3288    3127    3167    4098
PHS72 = *26763          835#    2217    2224    2249    3115    3137
PNTS  = *27003          807#
PP1     *15352          3306    3311    3316#
PREI    *26266          4421    4711    5113#
PREITC  *26422          5113    5149#
PREI.1  *26312          2307•   5127#
PRI.TF  *27726          5429    5431#
PRI.TL  *27714          5426#   5448
PRI.TR  *27652          3903    3984    4282    4287    4292    4321    4336    4348    4361    4384    4404    5410#
PRI.TS  *27642          4277    4338    5418#
PRI.T2  *27636          5412#   5423    5441    5445
PRI.T3  *27646          5414#   5416•   5418•   5419•   5435•   5436    5439•
PRTE    *30074          5421    5447#
PRTY    *25714          5009#   5013•   5017
PS    = 177776           918#    967•    999•   1194•   1869•   2121•   2126•   2349•   3628    3643•   3749•   3781•   4253•
                        4422•   4468•   4482•
PSEUI   *16244          3448    3477#
PSEUI1  *15352          3298    3309#
PST.P   *21013          3959#   3960•   3962
PSWS    *17126          3621#   3744
PWR.P   *01723          1101    1177#
```

F12

```
PX       *16276          3484#
PXX1     *15326          3208    3316#
PX1      *15364          3315    3319#
P1X      *15316          3368#
RANGE    *01526          1127    1129#
RDH      *35112          4392    6447#
RDMF0    *23143          4354#   4367
RDMF1    *23156          4354#   4359#
RDMF2    *23213          4356    4369#
RDXX     *24222          1131    1137    4487#   4591#   4591#   4994
REALC =  *20472           803#   4918
REGTT    *01406          1079#
REG.SE   *20454          4654    5178#
REG.     *01356          1097#
REG1     *01363          1098#
REG2     *01362          1099#
REG3     *01364          1100#
REG4     *01366          1101#
REG5     *01373          1102#
REG6     *01372          1103#
REG7     *01374          1104#
RELOP    *23652          4478    4982#
REQI =   *20403           744#
RESMAP   *21776          4147    4176#
RESRES   *20426          1182    5110    5122    5162#
RETURN   *22423          1195    1920#   1974#   1646#   1689#   1728#   1779#   1847#   2316#   2397#   2421#   3194#   3360#
                         3525#   3000#   3752#   3826#   4254    4259#   4209#   4423    4719#   4728#   4987#
RFR3     *34124          1532    1962#
RR6      *34133          1508    1964#
RSTRT    *27632          5396#   5400    5408#
RSTRTSW  *27674          5397#   5405    5409#
RSTRT =  *34074           931#   1179
RS.1     *20464          5179#   5182
RTX      *32776           972#    978#    981    3651    6119#
RUBOUTH  *27116          5253    5259    5278#   5284
RUBOUT   *27314          5306    5312    5314    5322#
R0       =XP0P4P3         905#   1118    1112#   1116    1121    1144#   3678#   3671#   4387    4488#   4485    4498#   4493
                         4495    4502    4628    4648    4689#   4693    4714#   4718#   4719    4721    4917#   4928    4921
                         4926#   4928    4936#   4939    4974    4975#   4979#   4983#   5033#   5038    5041    5048#   5049
                         5051    5052    5084#   5087    5107    5101    5177#   5179    5188#   5206#   5208    5209    5246
                         5249    5252    5254    5256    5259    5267    5269#   5267    5273#   5279    5285#   5299    5302
                         5309    5307    5389    5311    5313    5315#   5319    5325#   5334#   5337#   5743#   5805    5889#
                         5817    5857#   5866    5968    5879#   5874    5878    5929#   5931#   5955#   5968#   5903#   5970#
                         5986    6001    6005#   6008    6019#   6025#   6027#   6029#   6038    6032    6056#   6059    6061#
                         6063    6069#   6078#   6172#   6177    6179    6185#   6186#   6288#   6189#   6197#   6191#   6192
                         6127#   6128    6134#   6181#   6192#   6194#   6195#   6196#   6198#   6222#   6218#   6231#   6286#
                         6287    6289#   6291#   6294#   6299#   6305    6312#   6313#   6314    6318    6328#
R1       =XP0P4P1         908#   1939#   1536    1537#   1538    1548#   1541    1542#   1543    1545#   1546    1547#   1548
                         1550#   1551    1552#   1553    1555#   1556    1557#   1559    2458#   3294#   3295#   3296#   3297
                         3436#   3437#   3438#   3439    3687#   3688    3724#   3727    3732#   3731    3791#   3795#   3797#
                         3803    3804#   3805    3891    3894    3895    3904#   3905    3915#   3918    3918#   3924    3927
                         3929#   4022    4024#   4026#   4037#   4038    4038#   4047    4046#   4294    4308    4351#   4354
                         4366    4409#   4918#   4928#   4923#   4927#   4928#   4963#   4964#   4965    5034#   5038#   5037#
                         5039#   5044#   5044#   5046#   5049    5054#   5058#   5061    5072#   5078#   5178#   5179#   5181
```

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                        5207#   5209#   5239#   5215#   5245    5247#   5253#   5264#   5265#   5266#   5267#   5272    5274#
                        5298    5338#   5316#   5317#   5319#   5319#   5324    5326#   5344#   5345#   5351#   5357#   5333#
                        5334#   5339    5377#   5378    5387#   5381    5384#   5385    6245#   6247#   6257    6219    6224#
R2      =%^3P3^2         987#   2457#   3797#   3796#   3799#   4323    4425#   4427#   4429#   4437    4439#   4443#   4445#
                        4369    4352#   4355    4367    4365    4417#   5047#   5058    5075#   5077    5244    5279#   5278#
                        5279    5281#   5282    5285    5745#   5913#   5821#   5822#   5823#   5824    5827#   5758#   5835#
                        5847#   5947    5864#   5875#   5919    5927    5984    5997    6251#   6254    6256    6268    6272
                        6275    6288    6291    6137    6214    6225#   6335
R3      =%^3P3^3         988#   4314    4353#   4355    4369    4365    4411#   4596#   4562#   4575#   4616#   4623#   4635#
                        5746#   5961#   5917#   5978    6227    6248    6265#   6262#   6263#   6264#   6279#   6288#   6281#
                        6282#   6283    6297    6132    6179#   6213    6226#   6287#   6284#   6296#   6328    6349#   6347#
R4      =%^3P3^4         989#   4311    4412#   4615#   4625#   4935#   4937    4939#   4947#   4941#   4942    5747#   5788#
                        5789#   5798#   5791#   5792    5884#   5885    5887    5818#   5811#   5812#   5815#   5863#   5871#
                        5872#   5873#   5874#   5911    5919#   5922    5929    5926#   5927#   5977#   5983#   5988    5988
                        5998    5992    5994#   5999    6281#   6282#   6284#   6286    6288#   6289#   6218#   6211    6252#
                        6253#   6264    6266    6274#   6177#   6171    6173#   6174#   6178#   6184#   6185#   6187    6188#
                        6192#   6281#   6282    6212    6227#   6235#   6236#   6237#   6238#   6239#   6269#   6279#   6271#
                        6272#   6273    6281#   6285#   6288#   6292#   6326    6328    6348    6342    6344#
R5      =%^3P3^5         918#   1911#   1939#   1988#   2889#   2897#   2187#   2214#   2232#   2244#   2267#   2478#   2485#
                        2497#   2582#   2513#   2528#   2539#   2546#   2559#   2593#   2619#   2684#   2712#   2728#   2733#
                        2779#   2779#   2791#   2811#   2827#   2824#   2831#   2843#   2849#   2864#   2888#   2959#   2922#
                        2993#   2978#   3884#   3755#   3764#   3885#   3113#   3124#   3134#   3157#   3162#   3221#   3236#
                        3328#   3341#   3391#   3418#   3497#   3583#   3937    3945#   3975    3983    3994#   4312    4413#
                        5184#   5288    5287    5211    5213    5214#   5748#   5841#   5862#   5911#   5987#   5982#   5994
                        6822#   6823#   6824#   6825    6827    6868    6881    6877    6883    6892    6182#   6182#   6183
                        6134    6158#   6158#   6168#   6161#   6162#   6163#   6164    6165#   6168    6169    6171    6181
                        6185    6211    6228#   6241#   6249#   6262#   6275#   6295#   6386#   6327#   6357#
R6      =%^3P3^6         912#   1168    1178#   4218#   4219#   4227#   4221    4224#   4225#   4226#   4227#   4228
S       = ^3P3P1        1519#
SAVLEV  ^25326          4736#
SAVRG = 104083           938#   1159
SAVR6   ^26562          1168#   1178    5218#
SBA1    ^06172          1999#   2888    2383    2^86#   2811    2821#   2822#   2823#   2824
SBA2    ^06576          2888#   2882
SBA3    ^07242          2185#   2186#   2187
SBC6    ^076^4          2271#   2272#   2273
SBYTE   ^26534          5184    5289#   5212
SCALL   ^25076          4783#   5834    5848
SCA2    ^06522          2888#   2878
SCB     ^20723          3948#   3941#   3942
SCB1    ^20762          3953#   3954#   3955
SCB8    214556          3178#   3179#   3188
SCHAR   ^30612          5452#   5453#   5454    5459
SCOPE = 104403           839#   1529    1571    1643    1685    1725    1776    1844    2313    241^    3191    3393    3522
                        3597    3749    3823
SCOPEA  ^22406          4247    4258#
SCOPEB  ^22362          4249    4251#
SCOPEC  ^22273           996    4238#
SCOPEE  ^22416          4248#   4249    4256#   4259#
SCOPEG  ^22402          4258    4253#
SCOPEH  ^22326          4237    4242    4244#
SCP1    ^04024          1528    1529#
SCP1^   ^10323          2316    2317#
SCP11   ^10453          2421    2422#
```

```
SP*2    *26044          5049#   5053
SP*3    *26066          5058    5059#
SP*4    *26072          5057#   5059*
SP*5    *26074          5058#   5060
SP*6    *26174          5059    5061#
SP*7    *26126          5063    5067#
SR    = 177570          928#    999     4244    4246    4317    4323    4367    4377    4414    5347    5427
SRCS*T  *25022          1594*   1597    1622*   1662*   1661    1662    1665*   1666    1781*   1782    1783    1786*   4754#
SRSTL   *1F214          2363#   2364*   2365
SRTT*   *07456          1686    2124    2136    2139#
SRVI  = *02*F*          749#
SRVO  = *01*F*          737#    2912    2967    2972    2975    3052    3097    3501    3502    3665    3666    3657    3658
                        3879    3970
SSTAT   *25023          4793#
ST    = 177776          5791#   5770    5777*   5792*   6164*   6135*   6141*   6104*
STAI  = *04*F*          748#    1167    2868    2947    295*    2976    297*    3557
STALL   *35242          6447#
STA*CC= *0F1*           718#
START   *0F2*           902#
STKSTA= *0F*4           786#    2197
STKSTB= *0F*2           691#
STT1    *14042          3869#   3873*   3971    3974
STT2    *07126          2197#   2198*   2159
SUPC  = *1F*           732#    1929
SVRP*   *27573          5382*   5391    5393#
SVRP*M  *27572          5383*   5398    5394#
SWR   = 177573          919#    3281    3979    4647
SYNC  = *01*F*          758#    1888    1977    2731    2734    2165    210*    22d9    2212    2243    2685    2688    2826
                        2629    2699    2698    2767    2772    3881    3934    3937    3893    3896    3138    3141    328*
                        3459
SYS*ST= *1F*           679#    681     1877    1923    1925    1969    2*27    2838    2835    2245    2257    2378
S1    = *27216          1538#   1576#   1648#   169F#   173*#   1781#   1849#   2315#   2423#   3196#   3308#   3527#   3682#
                        3754#   3928#
TADRS   *15646          3379#   3383    3382    3383    3385    3396    3397    348#    3436    3512*   3513    3519
TADRS1  *14653          3286#   3287    3288    3226    3227    323*    3294    335#    3353*   3354    3356
TAS*D   *1*033          3421#   3422*   3423
TAS*D1  *15044          3239#   3248*   3241
TDAT    *25712          5887#   5811*   5815*
TDXBA   *01416          1868#
TDXCA   *01412          1877#
TDXCR   *01424          1883#
TDXCS   *01412          1878#
TDXDS   *014*6          1876#
TDXES   *01438          1885#
TDXES1  *01432          1886#
TDX*I   *01422          1882#
TDX*S   *01423          1881#
TDX*R   *01426          1884#
TDXOS   *01414          1879#
TERR*   *22534          4278#   4281
TESTAB= *22463          1519#   1938#   1576#   1648#   169*#   173*#   1781#   1849#   2318#   2423#   3196#   3308#   3527#
                        3682#   3754#   3828#
TETAC   *11676          2711#
TES     *14443          3156#
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TIM.IS#  *0F013      776#    1741    1742    1784    1894    1899    189*    3539    3542    3577    3573    4148    4184
                     5127    5129    5773
TIMS1    *21272      3219    3389    3998#
TIOC   # *0F4*3       861#    2829    4938
TKB      *01473      1809#    4239    4479    5334    5*39    5491
TKS      *01376      1808#    4238    448F#   5332
TMP      *24772      4731#
TPB      *01474      1871#    5339#   5362#   5459#
TPS      *01472      1873#    5342    5365
TRACER#  104072       929#    3989    3893    3922    3913    3928
TRA.*X   *1F232      2335#    2372#   2374#   2375
TRASFV   *1F234      2392     2374#
TRATT    *1F233      2336#    2371#   2378    2381#   2387    2385#   2393    2395#
TRA1     *1F364      2394     2398#
TRC      *35647      4279     6447#
TRC*1    *35555      4274     6447#
TRC1     *35747      4284     6447#
TRC2     *35731      4289     6447#
TRT    # *00*03      4948     5759#   6329    6489
TSSF   # *04*03       814#    1928    1831    1933    1936    2474    2478    3179    3998    4F81
TSSFT    *25038      1889#    1914    1821#   1822#   1923    4757#
TSTABL   *22422      1919     4261#   4719    4721
TST1     *04*03      1525#    1938    2393    3918    4287    4947
TST1*    *07774      2313#    2318
TST11    *1F424      2418#    2423
TST12    *146*2      3191#    3196
TST13    *15576      3303#    3308
TST14    *16464      3522#    3927
TST15    *17*42      3597#    3682
TST16    *17636      3749#    3754
TST17    *2F172      3823#    3828
TST2     *04144      1571#    1578
TST3     *04496      1643#    1648
TST4     *04544      1685#    1698
TST5     *04672      1725#    1738
TST6     *05*72      1778#    1781
TST7     *05363      1844#    1849
TS1    # *04*3        815#     82#     822     824     825     828     83*     832     834    2273
TS2    # *0F*3        816#     821     823     825     827     829     831     833     835
TT       *01442      1896#    1957    196F    2*35    2156.   2336    2395    2992    3068    3638    3687    3728    3885
                     3918     3923    4024    4*3F    4152    4981    4933#   4934#   4963    5*81    5168
TTCA     *36J*3      4298     6447#
TTDS     *35753      4296     6447#
TTNBX    *01357      1848#    1963    2*17    2*2F    2172    2175    2384    2352    2375    3*12    3838    392F    4153
TTRACE   *2F676      3884     3928#   4152#   4981#   5166#
TTS*.*U  *2F7*6      3981#    3912#   3932#   4291
TTT.*X   *01434      1887#
TTTGT    *10172      2398     2353#
TTWAS    *2F7*4      398F#    3911#   3931#   4288
TTY    #*0F*F5       911#    3961    3962#   3964#   3982    3983#   398*#   4275    4278#   4278#   428F    4281#   4283#
                     4285     4288#   4288#   4298    4291#   4293#   4319    4328#   4322#   4328    4329#   4331#   4334
                     4335#    4337#   4346    4347#   4349#   436F#   436*#   4682    4683#   4685#   535F    5351#   5352
                     5354     5356    5358    5362    5364#   5365    5366#   5368#   5371#   5427#   5429#   5431#
TTYFLG   *27346      5336     5341#   537F    5458
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TTZ1      021346        4840#  4844
TT.CLR    025616        4851   4962#
TT.TRA    020472        3881#
TT.T      020602        3910#
TT.T1     020643        3917   3919#
TT.T2     020653        3919*  3921#  3922*  3923*  3924
TYPE    = 030074         916#  1107   3957   3981   3985   4274   4279   4284   4289   4296   4298   4315   4327
                        4332   4342   4350   4357   4359   4367   4372   4473   4475   4483   4497   4510   4519
                        4528   4537   4555   4557   4573   4582   4586   4617   4618   4624   4639   4662   4680
                        4681   5209   5397   5277   5327   5445   5456
T.ACCE    027212         932   5290#
T.ERRO    022666         927   4384#
T.KEY.    027334         933   5331#
T.MAPE    027572         928   4267#
T.PAPI    025676         934   5083#
T.PCH1    031003         935   5728#
T.PCH2    031024         936   5731#
T.PCH3    031053         937   5734#
T.RSTR    027574         931   5395#
T.SAVR    027532         930   5382#
T.TRAC    022536         929   4272#
UC      = 000002         877#  4537   4838   4839   4840   4841   4842   4843   4844   4845   4846   4847   5232
                        5233   5234   5235   5236   5237   5238   5239   5475   5476   5477   5478   5479   5480
                        5481   5482   5483   5484   5485   5486   5487   5488   5489   5490   5491   5492   5493
                        5494   5495   5496   5497   5498   5499   5500   5501   5502   5503   5504   5505   5506
                        5507   5508   5509   5510   5511   5512   5513   5514   5515   5516   5517   5518   5519
                        5520   5521   5522   5523   5524   5525   5526   5527   5528   5529   5530   5531   5532
                        5533   5534   5535   5536   5537   5538   5539   5540   5541   5542   5543   5544   5545
                        5546   5547   5548   5549   5550   5551   5552   5553   5554   5555   5556   5557   5558
                        5559   5560   5561   5562   5563   5564   5565   5566   5567   5568   5569   5570   5571
                        5572   5573   5574   5575   5576   5577   5578   5579   5580   5581   5582   5583   5584
                        5585   5586   5587   5588   5589   5590   5591   5592   5593   5594   5595   5596   5597
                        5598   5599   5600   5601   5602   5603   5604   5605   5606   5607   5608   5609   5610
                        5611   5612   5613   5614   5615   5616   5617   5618   5619   5620   5621   5622   5623
                        5624   5625   5626   5627   5628   5629   5630   5631   5632   5633   5634   5635   5636
                        5637   5638   5639   5640   5641   5642   5643   5644   5645   5646   5647   5648   5649
                        5650   5651   5652   5653   5654   5655   5656   5657   5658   5659   5660   5661   5662
                        5663   5664   5665   5666   5667   5668   5669   5670   5671   5672   5673   5674   5675
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                        5689   5690   5691   5692   5693   5694   5695   5696   5697   5698   5699   5700   5701
                        5702   5703   5704   5705   5706   5707   5708   5709   5710   5711   5712   5713   5714
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UCHECK= 000002           723#  3957
UCHKS = 002002           682#  2943   2946
UEXCFP= 000001           724#
UNREAD    011204        2571   2970#
VLUHEX    024142        4569#  4570*  4571   4592
VPSX      005632        1904   1909#
VPS1      005302        1828#
VPS2      005332        1829   1934#
W       = 030002        6493#  6494   6495#  6496   6497#  6498   6499#  6500   6501#  6502   6503#  6504   6505#
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L12

M12

MCL 1,P11 CROSS REFERENCE TABLE

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        2192 2199 2202 2289 2239 2219 2237 224* 2243 2251 2254 2257 2262 2277 228F
        2287 229* 2293 2296 2299 2338 2342 2353 2386 2398 2396 2489 2474 2478 251F
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        2649 2653 26VF 2699 272F 2715 2719 2743 2767 2788 2795 2882 28*A 2819 2833
        2847 2845 2853 2969 2871 2874 2985 2*8F 2912 2915 2919 292A 2932 2936 2943
        2947 2964 2972 2978 2984 2998 3*81 3*34 3*3* 3843 3847 3859 3893 3897 3181
        3185 3117 3138 3142 3146 3166 3177 3173 3281 3287 3271 3279 328F 3283 331F
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        3775 3811 3979 3998 4*81 4*89 4113 4142 4196 4289 4244 4249 4294 4313 4323
        436R 437* 4414 5128 5348 542* 6259
BLE      4572 4667 6274
BLO      5969 6327
BLOS     4222
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BMI      5018 6167
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        2475 2479 2516 2928 2524 2542 2582 2681 2684 2643 265F 2654 2691 2698 2744
        2789 2816 2834 2848 2872 2875 2987 2981 292* 2933 2937 2944 2948 2973 2985
        3*35 3*44 3*48 3298 3182 3186 3139 3282 325R 3272 3276 3313 3324 3379 344F
        3447 3451 3485 3948 3552 3574 3579 3669 3672 3681 3689 3781 3723 3728 3773
        3787 3799 3812 3986 3917 3993 3999 4*82 4*28 4*44 4111 4197 4242 4249 4247
        4295 4314 4324 4367 4486 4491 4498 4563 4585 4629 4641 467F 4715 4922 493F
        4966 4982 5816 5242 5353 536F 5*79 5182 5129 5182 5212 525F 5283 5383 5349
        5421 544* 5442 5459 5839 5848 5985 6817 685R 6865 6139 6131 614F 6152 6268
        6283
BPL      4237 5333 5343 5361 6155 6255 6259 6384 6311
BPT      3987 399* 4373 4378
BR        979 1123 1588 2132 2367 3299 3315 3473 3584 3624 3725 3769 389* 4813 4297
        43*F 4377 4489 4988 4574 4587 4668 4786 4943 5*2* 5*55 5268 5271 5284 5286
        532* 5323 5363 5367 5369 5417 5425 5774 5775 5785 5814 5818 5828 5838 5843
        585* 5852 5876 5983 5912 5917 593* 5933 593R 5962 5964 5972 5991 5995 6*83
        6*12 6*46 6876 6393 6144 6157 6183 6186 633F 6341 6348
BVC      5*12
CCC      6*87 6159
CLR       975  983  992 1189 1183 166F 1569 1781 178R 1918 2127 2335 2362 3153 3284
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        4156 4157 417R 4171 4172 4175 4176 4181 4182 4183 4256 4385 4419 4637 4899
        49*F 4924 4985 4988 4935 4941 4964 4976 5*8R 5885 5115 5121 5142 5243 5247
        5278 5297 5388 5419 5859 5861 5962 5863 5864 5877 6882 6884 681F 6847 6269
        6289
CLRB     1646 2991 3797 4174 5424 5426 5444 578R 5793 5849 5949 6186 6247 6248
CMP      1121 1591 1598 1628 1635 1662 1565 1673 1783 1712 1566 1895 198A 1943 1957
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        4355 4365 4366 4971 4666 4669 4783 4921 4937 4965 5841 5849 5852 5881 5181
        5124 5181 5211 5441 5827 5838 5966 5868 5881 5924 5958 5986 5988 5992 5999
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        5302  5305  5307  5389  5311  5313  5352  5356  5398  5454  5885  5878  6137  6314  6318
COM     1721  5213  6753
COMB    4595
DEC      992  1185  2129  3814  3578  3668  3671  3784  3798  3992  4027  4243  4547  4591  4729
        5759  5777  6023  6024  6134  6173  6174  6187  6238  6239  6292  6294
EMT      927   928   929   938   931   932   933   934   935   936   937
HALT     674  1173  4484  5132
INC     1537  1542  1547  1992  1557  1665  2304  4248  4386  4665  4716  5218  5281  5304  5813
        5822  5823  5833  5934  5875  5887  6734  6745  6781  6782  6789  6798  6271  6272  6285
INCB    1603  3217  3393  3912  4981  5435  5439  5942  6142
IOT      916
JMP      962   991   994   997  1188  1195  3227  3352  3356  3376  3515  3674  3838  4228  4243
        4254  4269  4423  4492  4642  4721  5764  5251  5304  5457  5781  5797  5829  5885  6037
        6739  6284
JSR     1182  1852  1918  1911  1913  1936  1939  1941  1967  1987  1988  1991  2087  2088  2098
        2097  2099  2185  2187  2189  2213  2214  2216  2223  2231  2232  2234  2246  2248  2267
        2463  2462  2478  2478  2481  2485  2487  2488  2497  2587  2581  2582  2584  2589  2513
        2527  2528  2532  2931  2539  2545  2546  2548  2559  2581  2589  2593  2595  2619  2619
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        6826  6835  6887  6889  6871  6873  6185  6111  6112  6136  6158  6193  6176  6177  6188
        6191  6193  6197  6199  6283  6253  6295  6316  6329  6349
MOV      966   967   972   973   974   976   979   981   982   998   999  1118  1112  1116  1144
        1187  1161  1178  1182  1181  1194  1525  1527  1528  1532  1533  1535  1548  1549  1558
        1555  1564  1565  1572  1573  1574  1594  1595  1625  1627  1644  1645  1646  1661  1672
        1686  1687  1688  1782  1711  1726  1727  1728  1777  1778  1779  1794  1887  1889  1834
        1845  1846  1847  1988  1887  1888  1893  1948  1988  1997  2887  2821  2867  2869  2873
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        2421  2458  2459  2868  2759  2828  2959  2988  2981  2982  2995  3889  3833  3888  3874
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        3524  3525  3543  3983  3598  3599  3687  3612  3614  3618  3619  3628  3623  3638  3639
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        3987  3988  3989  4822  4823  4824  4825  4828  4838  4836  4837  4838  4839  4849  4848
        4892  4183  4152  4178  4179  4184  4218  4228  4227  4238  4251  4293  4295  4288  4273
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          5593  5594  5595  5596  5597  5598  5599  5600  5601  5602  5603  5604  5605  5606  5607
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          5683  5684  5685  5686  5687  5688  5689  5690  5691  5692  5693  5694  5695  5696  5697
          5698  5699  5700  5701  5702  5703  5704  5705  5706  5707  5708  5709  5710  5711  5712
          5713  5714  5715  5716  5717  5718  5719  5720  5721  5722  5723  5724  5725  6358  6360
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          6404  6405  6406
.ENABL       2
.END      6729
.ENDC       15   146   345   370   653   654   930  1002  1191  1196  1204  1519  1520  2401  2747
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          4903  4944  4976  4983  5168  5223  5243  5288  5726  6444  6447
.EVEN     3972  4536  5109  5222  5378  5463  5726  6373  6408  6454
.IF          9    15   143   146   342   345   371   378   651   653   654   920  1002  1102  1196
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.IFF      6447
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.IRP      3883  3929  4022  4029  4036  4045  4307  4408  4974  4983
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          1512  1519  1522  1530  1568  1576  1647  1648  1682  1697  1722  1730  1773  1781  1841
          1849  2310  2318  2419  2423  3188  3195  3360  3368  3519  3527  3594  3602  3746  3754
          3820  3828  6447
.MACRO     674
.MCALL       2
.NLIST       2    34   674   927   928   929   930   931   932   933   934   935   936   937  1227
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          1519  1522  1530  1568  1576  1640  1649  1682  1697  1722  1730  1773  1781  1841  1849
          2310  2318  2419  2423  3188  3196  3360  3368  3519  3527  3594  3602  3746  3754  3820
          3828  6447
.PAGE        2    34   673  1522  1568  1640  1682  1722  1773  1841  2310  2419  3189  3360  3519
          3594  3746  3820  3939
.REM         2     9    15    34   143   146   342   345   371   378   626  1570  1649  1691  1732
          1783  1952  2320  2424  3197  3247  3369  3429  3850  4161  4626
.REPT      674  1208  1211  1230  1249  1268  1287  1306  1325  1344  1363  1382  1401  1420  1439
          1458  1477  1496  4769  4785  4814  4855  4876  5252  5475  6460  6461  6494  6527  6560
          6593  6626  6659  6692
.SBTTL     638   674   837   939  1003  1102  1152  1201  1513  1522  1568  1640  1682  1722  1773
          1841  2310  2419  3189  3360  3519  3594  3746  3820  4459  4724  4957  5345  5380  5410
          5737  6441  6449
.TITLE       2
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.MCLK  4765  4766  4767  4768  4769  477?  4771  4772  4773  4774  4775  4776  4777  4778  4779
       478?  4781  4785  4786  4787  4788  4789  479?  4791  4792  4793  4794  4795  4796  4797
       4798  4799  4833  4861  4955  4956  4957  495?  4959  486?  4861  4862  4863  4864  4865
       4866  4867  4868  4869  487?  5291  5412  6357  6374  6401  6403  6405  6407  6409  6471
       6473  6475  6477  6479  6481  6483  6485  6487  6489  6491  6494  6496  6498  6500  6502
       6504  6506  6508  6510  6512  6514  6515  6519  652?  6522  6524  6527  6529  6531  6533
       6535  6537  6539  6541  6543  6545  6547  6549  6551  6553  6555  6557  656?  6562  6564
       6566  6568  657?  6572  6574  6576  6579  658?  6582  6584  6586  6588  659?  6593  6595
       6597  6599  6601  6603  6605  6607  6609  6611  6613  6615  6617  6619  6621  6623  6626
       662?  663?  6632  6634  6636  6638  664?  6642  6644  6646  6648  665?  6652  6654  6656
       6659  6661  6663  6665  6667  6669  6671  6673  6675  6677  6679  6681  6683  6685  6687
       6689  6692  6694  6696  6698  670?  6722  6784  6786  6788  671?  6712  6714  6716  6718
       672?  6722
```

ERRORS DETECTED: 0

*MCLK1,*MCLK1/SOL/CRF=*MCLK1
RUN-TIME: 1?? 51 12 SECONDS
CORE USED: 49K