DX11B

DIAGNOSTIC (MAINTENANCE

MD-11-DZDXF-D

CLOCK #2)

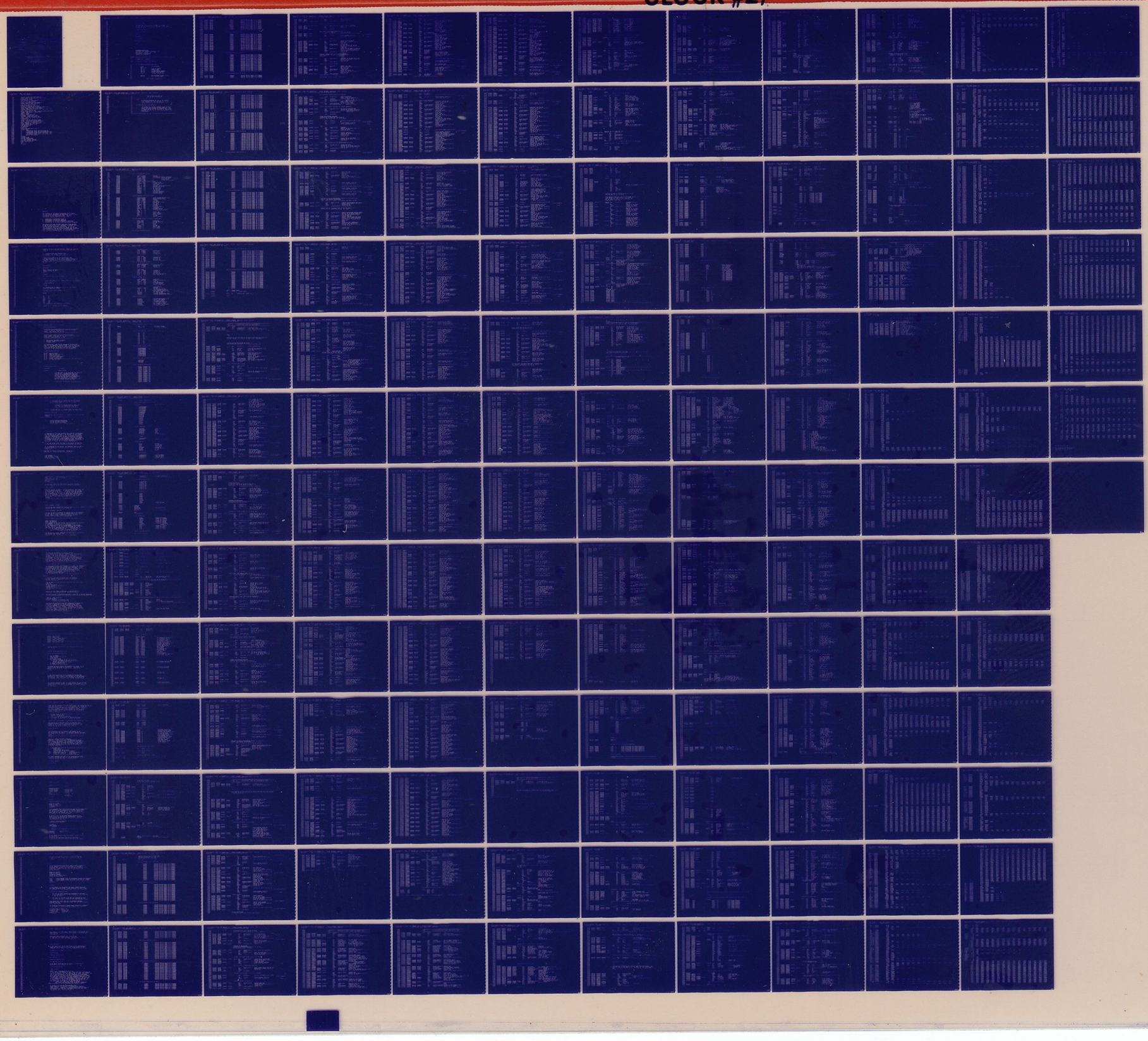
EP-DZDXF-D-DL

FICHE 1 OF 1

JUN 1978

digital

MADE IN USA



IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZDXF-D-D
PRODUCT NAME:	DX11B DIAGNOSTIC (MAINTENANCE CLOCK #2)
DATE CREATED:	JUNE 21, 1974
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	J. FRIEDRICH

  632 DYNAMIC SWITCH SETTINGS (SWR #1)
  667 CLOCK, ISSUE N MAINTENANCE CLOCK PULSES
  668 SS,SELECTION MACRO
  669 SHORT,SHORT TT TRACE UPDATE AND SELECT
  670 DEFINE, EMT DEFINITIONS
  671 ESAVE, SAVE REGISTER FOR ERROR PRINT
  672 ERSTOR, RESTOR ERROR REGISTERS
  673 SAVE, SAVE ARG ON STACK
  674 RESTOR, RESTOR ARG FROM STACK
  675 SCOPELOOP, SUBROUTINE TO EXECUTE SCOPE CODE
  676 CLEAR, CLEAR FROM ARG1,ARG2 WORDS
  677 CLRSUB, SUBROUTINE TO CLEAR FROM ARG1,ARG2 WORDS
  678 DUMP, OCTAL DUMP OF ARG
  679 SDUMP, OCTAL DUMP OF ARG, LEADING ZEROS SURPRESSED
  680 NUMBER, TEST NUMBER INCREMENTER
  681 SCOPEM, SCOPE
  682 ERCALL, ERROR CALL EMT
  683 STEPTSSF, SINGLE STEP TSSF
  684 CHECKFOR, CHECK FOR PHASE ARG
  685 CHECK, CHECK FOR PHASE,STATE ARG
  686 SNAPSHOTPH,?
  687 LDNLK, LOAD AND LOCK MCLK MACRO
  688 CLKCHK, CLOCK AND CHECK PHASE+STATE
  689 LOAD, LOAD BIT IN REGISTER + MAP
  690 REMOV, REMOVE BIT FROM REGISTER + MAP
  854 MISCELLANEOUS DEFINITIONS
  956 TRAP DEFINITIONS
 1219 DX REGISTERS
 1119 POWER FAIL
 1173 STATUS POINTER WORD TABLE
 1485 TUMBLE TABLE
 1494 T1 MAINTENANCE CLOCK ISS SPW(15:08)=0
 1617 T2 MAINTENANCE CLOCK ISS SPW(15:08)NOT ZERO
 2590 T3 MAINTENANCE CLOCK OUTPUT (IBM READ TEST
 3279 T4 MAINTENANCE CLOCK INPUT (IBM WRITE) TEST
 3858 T5 END OF TEST STRING
 4521 MONITOR
 4785 MONITOR FILES
 5218 MONITOR SUBROUTINES
 5392 TTY ASCII OUTPUT ROUTINE
 5427 SAVE AND RESTORE REGISTERS
 5457 OCTAL DUMP ROUTINE
 5543 ODT
 6247 MESSAGES

;CLK2',P11

```
                                ,REM

                                ,REM

                                ,RE

                                !
                                ,REM    !

                                1.      ABSTRACT

                                        THE FUNCTION OF THE DX11B DIAGNOSTICS IS TO VERIFY
                                        THAT THE DX11B IMPLEMENTS THE FUNCTIONAL FLOW DIAGRAMS
                                        ILLUSTRATED IN THE DX11B PRINT SET.  THE DX11
                                        DIAGNOSTIC PACKAGE CONSISTS OF FOUR TAPES

                                        1.  DZDXA-(REV) MAINTENANCE CLOCK #1
                                        2.  DXDXF-(REV) MAINTENANCE CLOCK #2
                                        3.  DZDXG-(REV) DX OFFLINE DIAGNOSTIC EXERCISER
                                        4.  DZDXH-(REV) DX ONLINE-MAINTENANCE-CABLED EXERCISER

                                        THE DIAGNOSTICS WERE DIVIDED INTO FOUR TAPES BECAUSE
                                        OF THE 8K WORD MEMORY LIMIT REQUIRED TO SUPPORT MINIMUM
                                        SYSTEMS AND FOR FUNCTIONAL SAFEGUARDS, IT WAS FELT
                                        THAT SAFEGUARDS SHOULD BE TAKEN TO INSURE THAT NO ONE
                                        INADVERTENTLY RAN THE ONLINE-MAINTENANCE-CABLE EXERCISER
                                        WHILE CONNECTED ONLINE TO IBM,  IT WAS ALSO FELT
                                        THAT THE FUNCTIONAL SEPARATION OF TESTS WOULD FACILITATE
```

ADAPTION TO ACT11 AND DDP TESTING. THERE ARE ALSO TWO
OTHER MAINDECS SUPPORTED BY DIAGNOSTICS THAT RUN THE
DX11B:

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 V006A.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 500

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

```
                        3.1.3   DEPRESS "START" KEY ON CONSOLE

                        4.      STARTING PROCEDURE

                                **********************************************
                                ONLINE DIA NOSTIC REQUIRES THAT IT BE MAINTENANCE
                                CABLED  -SEE MANUAL FOR DETAILS
                                **********!***********************************

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

                                A.  SET SWITCH REGISTER TO 000200
                                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 SW TCH 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    ODD TRAP ON ERROR
                        !
                        .REM    !


                        4.2     STARTING ADDRESSES

                                ADDRESSES               COMMENT

                                200200                  NORMAL START

                                                WITH 200 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
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```
                        000042  IF THIS LOCATION IS NONZERO THE PROGRAM ASSUMES
                                IT IS RUNNING UNDER ACT11 OR DDP AND USES THE
                                DEFAULT PARAMETERS

                        0.ODT           ENTRANCE TO ^DT-11X VERSION V006A.ODT
                                        MAY START THE PROGRAM BY TYPE 200$G
                                        <CR>,(MAINTENANCE CLOCK TESTS ONLY)

                        NOTICE: HE WHO USES ODT IN A MEANS OTHER THAN EXPLICITLY
                        DIRECTED BY THIS DOCUMENT DOES SO AT HIS OWN RISK.

5.      OPERATING PROCEDURE

        STARTING FROM 200 WITH SR<07> UP CAUSES THE FOLLOWING GENERAL
        TYPEOUT:
MAINDEC-11-DZDXX-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 <D> 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,N?";

                        "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 .EST 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.
                        P1,-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, DMBB/S,
                        DR11/S, DR11A, DR11B, TYPESETTING AND BUS SWITCHES;
                        -TYPING <C?> WILL DEFAULT THIS PARAMETER

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

                        ADRS:  10 <CR><LF>
                        ADRS:  20 <CR><CR>
                        THIS REQUEST IS FOR THE CONTROL UNIT'S HEXIDECIMAL ADDRESS
                        OR ADDRESS'S, 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 ; DIAGNOSTIC THE M9?? MUST
                                NOT BE CUT FOR MORE THAN 16 CU ADDRESSES

                        THE IBM CONTROL UNITS ADDRESSES ARE SPECIFIED IN HEXADECIMAL.
                        FOR CONTROL UNIT 018(16)  THE
                        RESPONSE TO ADRS: IS 10(HEX) WHICH IS 00010000(2).
```

MCLK2.P11

```
                        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! 00
                        DEVICES PER CU! 0
                        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 M900 MUST ALSO BE STRAPPED FOR >1

                        "LIST ALL LEGAL COMMANDS"
                        COMMAND! 400<CR>
                        STATUS! 0 )CR><LF> TO CONTINUE LIST
                                  <CR><CR> TO TERMINATE LIST

                        THIS FACILITY WAS BUILT INTO THE DIAGNOSTIC TO ENABLE THE
                        OPERATOR T' 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,O, 400).  FOLLOWING THE COMMAND THE MONITOR WILL
                        ASK FOR THE CORRESPONDING STATUS.
                        =TYPING <CR> WILL DEFAULT THIS PARAMETER
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```
                                        "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>   OD. TRAP ON ERROR
                                !
                                .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    !

                                        THE RESTART ADDRESS IS 200.  IF THIS ADDRESS IS LEFT IN THE
                                        CONSOLE SWITCH WHEN "START" IS PRESSED THE MONITOR WILL TYPE
                                        OUT D,P,S, ?  IF THE SWITCHES ARE ZEROED THE TYPE WILL BE
                                        "SET SWITCHES".
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                        THERE ARE TWO CALIBRATION TESTS (MAINT CLK1) THAT SHOULD BE RUN IN
                        SCOPE MODE(T15 & T16).  IT IS QUITE POSSIBLE THAT USING THE STANDARD
                        OPERATIONS PROCEDURE PREVIOUSLY SUGGESTED THAT THE OPERATOR
                        WILL FALL NATURALLY INTO THESE CALIBRATION TESTS.  IF THE
                        SYSTEM HAS BEEN BROUGHT UP ONCE BEFORE AND THE OPERATOR
                        WISHES TO CHECK THE CALIBRATION THE FOLLOWING PROCEDURE
                        SHOULD BE FOLLOWED:

                        1.  EXAMINE TABLE OF CONTENTS FOR THE TEST NUMBER (N) OF
                            CALIBRATION ROUTINES.
                        2.  TYPE N IN RESPONSE TO D,P,S,N?
                        3.  PUT SW<14> UP IN RESPONSE TO "SWITCH SETTINGS"
                        4.  TYPE <CR> IF ERROR TYPE OUT OCCURS SET SW<13>.

                5.2.1   MAINTENANCE CLOCK CONTROL (MAINTENANCE CLK1 & CLK2 DIAG. ONLY)

                        WHEN SWITCH 13 IS SELECTED AND A MAINTENANCE CLOCK
                        PROGRAM IS BEING RUN THE EXECUTION OF THE JSR PC, CLK
                        SUBROUTINE WILL CAUSE A BREAK POINT TRAP TO ODT AND A
                        TYPEOUT OF THE FOLLOWING FORMAT WILL OCCUR:

                        AAAAAA BB!NNNNNN
                        @

                        THIS INDICATES THAT THE PROGRAM WAS TRAPPED TO ODT
                        AND IS AWAITING THE COMMAND TO "P"ROCEED BEFORE EXECUTING
                        THE NUMBER OF MAINTENANCE CLOCK PULSES SPECIFIED BY JSR PC,
                        CLK 4.
                        UPON TYPING "P" THE PROGRAM WILL CONTINUE FROM LOCATION
                        AAAAAA.

                        THIS IS A USEFUL FEATURE IN SEVERAL
                        RESPECTS .  FIRST, IT ALLOWS THE OPERATOR TO SINGLE
                        STEP THROUGH THE FLOWS.  THE LISTING AIDS HERE ALSO IN
                        THAT IT HIGHLIGHTS THE PHASE AND STATE.  IN ADDITION
                        TO WALKING THROUGH THE FLOWS THIS FEATURE ALSO ALLOWS THE
                        OPERATOR TO EXAMINE DONE DISPLAYED DX REGISTERS AND
                        KEY MEMORY LOCATIONS.

                        IT IS REQUIRED THAT ONLY THE FOLLOWING ODT COMMANDS BE USED
                        N/      OPENS WORD N
                        P       PROCEED FROM BREAK POINT
                        N!G     GOES TO WORD N AND STARTS PROGRAM
                        <CR>    CLOSES OPEN LOCATION    (CARRIAGE RETURN)
                        <LF>    OPENS NEXT LOCATION     (LINE FEED)
                        ^C      CONTROL C, RETURN TO DIAGNOSTIC MONITOR

                        ANY OTHER COMMANDS ARE USED AT THE OPERATORS OWN RISK.
                        IF OTHER COMMANDS ARE USED THE DX AND THEREFORE THE DIAG-
                        NOSTIC MAY BEHAVE STRANGELY.  PLEASE RELOAD.

                        A TYPICAL SEQUENCE

                        SET SWITCHES
```

```
                                        ;105536 B2/017044
                                        @P                      PROCEED

                                        ;105640 B2/017044
                                        @P                      PROCEED

                                        B06032 B2/017044
                                        @176204/B8'5C8          EXAMINE 3XCS
                                        176206 /B82B08          EXAMINE 3XDS
                                        176210 /B8;8C           EXAMINE 3XRA
                                        @P                      PROCEED
                                        F06504 B3/017044
                                        @                       CONTROL C
                                        D,P,S,N7                MONITOR MODE


                                6';     ERRORS

                                        TYP;CALLY ERROR REPORTS TAKE THE FOLLOWING FORMAT,

                                        ERROR PC: 017274
                                        ERROR IN TEST;  17
                                        CUADRS/MO; 000020
                                        B0;020742

                                        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
                                        20(8) AND THE IBM 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 "B@;NNNNNN",  HERE AGAIN
                                        THE POWER OF ODT MAY BE USED TO COLLECT ADDITIONAL
                                        DATA CONCERNING THE FAULT,

                                        A TYPICAL APPROACH 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>=0        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 B@;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. A 4IT 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/MO: 000020
ORIGIN OF MAP ERROR 017662
REGISTER-CONTENTS-MAP

DXM1:     170777 000400 (DXM1 IS UNREADABLE IGNORE THIS COMPARE)
DXCS:     174000 000000 (PHASE AND STATE FLOPS ARE NOT TRACED)
DXES:     100014 000016 (ERROR CONDITION IS THAT BIT2 IS SET)
00:020742
@

D,P,S,N7

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 NO ANOMALIES HERE:

1.  THE DXM1 IS OFTEN UNREADABLE THEREFORE IF THE DXM1
    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 DXM1 OR BITS
OTHER THAN 174000.

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

TT TRACE ERROR IN TEST:  N1
ORIGIN OF LAST TT UPDATE:  N2
TT ENTRY WAS:      "WHATEVER"
EXPECTED ENTRY:    "WHATEVER +1"
TT POINTER         N3
```

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

                        EXERCISER ERROR REPORTS ALSO INDICATE THE
                        DX MODE WHEN THE ERROR OCCURED:  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  THE DEVICES PER  CU
                        WITH 10(8) AND IN ACTUALITY THE DEVICES PER CU ARE CUT TO
                        4 ON THE M988, THIS TEST WILL CATCH THE ERROR;
                                WHEN SW3=1 PROGRAM RUN TIME IS GREATLY INCREASED
                        AS IT CHECKS ALL OTHER ADDRESSES FOR ADRECC & ADRECD.

                        DX ONLINE & DX OFFLINE EXERCISERS!!!!!!!!
                        THESE PROGRAMS WILL DEFAULT TO AUTOMATICALLY SETTING
                        SW1=1 & SW2=1 , HOWEVER, TO EXECUTE THEIR FUNCTINS EARLY IN
                        THE PROGRAM RUN TIME. SET THEM BEFORE STRIKING <CR> WHEN
                        THE MONITOR ASKS   "SET SWITCHES"
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595                                     ;OPEN AT LEAST 2 DEVICES/C. MUST BE STRAPPED ON M978
596
597                             8.1     EXECUTION TIME
598
599                                     THE EXECUTION TIME OF EACH PROGRAM IS VARIABLE AND IS A
600                                     FUNCTION OF THE PROGRAM LENGTH AND THE CONTROL UNIT
601                                     ADDRESS STRUCTURE.  IN GENERAL THEY RUN 10 TO 20 MINUTES.
602
603                             9.      PROGRAM DESCRIPTION
604
605                                     CONTAINED WITHIN LISTING.
606
607                             10.     LISTING
608
609                                     FOLLOWING
610
611                             11.     FLOW CHARTS
612
613                                     SEE PRINT SET
614
615                                     !
616                                     .LIST   MD
617
618
619
620                             .REM    <
621
622                                     MAINDEC-11-D2DXF-D-D
623                                     COPYRIGHT 1974 DIGITAL EQUIPMENT CORP.
624                                     146 MAIN ST., MAYNARD, MA, 01754
625                                     MAINTAINER: DIAGNOSTICS
626                                     AUTHOR: JOHN FRIEDRICH
627                             <
628                             ;********************* MOD APR 74 **********************************
629                             ;<
630                             ;<      REVISED: BY W. ARMSTRONG
631
632                             .SBTTL  DYNAMIC SWITCH SETTINGS (SWR #1)
633
634
635                             ;<      DYNAMIC SWITCH REGISTER SETTINGS
636                             ;<
637                             ;<              SWR#            SIGNIFICANCE)
638                             ;<              SET = ONE
639                             ;<              SWR 15          "HALT ON ERROR"
640                             ;<              SWR 14          "SCOPE LOOP"
641                             ;<              SWR 13          "INHIBIT ERROR REPORT"
642                             ;<              SWR 12          "SHORT ERROR REPORT"
643                             ;<              SWR 11          "INHIBIT ITERATIONS"
644                             ;<
645                             ;<              SWR 10          "MAINTAINENCE CLOCK CONTROL"
646                             ;<              SWR 09          "ODT TRAP ON ERROR"
647                             ;<
648                             ;<                      "USER CHANGE INFORMATION"
```

```
                        ;*                  "DUE TO REVISION APR 74"
                        ;*                  "PLEASE READ INFO BELOW"
                        ;*
                        ;*      NOTE:
                        ;*              AN OPERATOR RESPONSE OF "0" TO THE PROGRAM
                        ;*              "TTY" REQUEST FOR "DEVICES PER CUI" IS NO
                        ;*              LONGER DEFAULTED TO 20 (16 DECIMAL). I.E.
                        ;*
                        ;*      DEVICES PER CUI 0  "=ILLEGAL ?"
                        ;*
                        ;*              THE HEADER "CU CHANNEL ADDRES:" USED ON ERROR
                        ;*              OUTPUT HAS BEEN CHANGED TO "CUADRS/MOI". I.E.
                        ;*              IT SIGNIFIES EITHER THE CONTENTS OF THE "DXMO"
                        ;*              REGISTER OR THE CONTROL UNIT BASE ADDRESS WHERE
                        ;*              MEANINGFULL.
                        ;*
                        ;********************* MOD APR 74 *********************************
```

```
                                ;DXDS, DX DEVICE STATUS BITS

100000                          PARER =100000           ;ERRORS
040000                          NXM   = 40000           ;NONEXISTANT MEMORY REFERENCE
020000                          SELRST= 20000           ;IBM 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            ;ENDING 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 BDS0 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

000200                          ATTEN =200              ;ATTENTION
000100                          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
```

```
                                        ;SELECTION CONTROL LINES
000000                          OPLO  =100000           ;OPERATIONAL OUT
000000                          HLDO  = 40000           ;HOLD OUT
000000                          SELO  = 20000           ;SELECT OUT
000000                          SUPO  = 10000           ;SUPPRESS OUT

                                        ;TAG LINES
000000                          ADRO  =  4000           ;ADDRESS OUT
000000                          CMDO  =  2000           ;COMMAND OUT
000000                          SRVO  =  1000           ;SERVICE OUT
000000                          PARO  =   400           ;PARITY OF/FOR BUS OUT
                        ;DXMI DX MAINTENANCE-IN BITS

                                        ;SELECTION CONTROL LINES
000000                          OPLI  =100200           ;OPERATIONAL IN
000000                          SELI  = 40000           ;SELECT IN
000000                          REQI  = 20000           ;REQUEST IN

                                        ;TAG LINES
000000                          ADRI  = 10000           ;ADDRESS IN
000000                          STAI  =  4000           ;STATUS IN
000000                          SRVI  =  2000           ;SERVICE IN
000000                          CLKO  =  1000           ;OK TO GO ONLINE (RB)
000000                          PARI  =   400           ;BUSI PARITY (RB)

                        ;DXCB DX CONTROL BITS

000000                          LOCKO =100000           ;LOCK OUT
000000                          PHS   =074000           ;PHASE & STATE BITS
000000                          FASTCU=  2000           ;FAST CU
000000                          SYNC  =  1000           ;SYNCHRONIZATION
000000                          CUDX  =   400           ;CU DATA CONTROL
000000                          IOD   =   200           ;INPUT OUTPUT DONE

                                        ;NPR CONTROLS
000000                          BYPAS =   100           ;BYPASS
000000                          NPRX  =    40           ;NPR CONTROL SWITCH
000000                          NPRT  =    20           ;NPR TRANSFER DIRECTION
000000                          BALF  =    10           ;BUFFERED ALTERNATOR FLOP
000000                          ONLINB=     4           ;ON LINE TO IBM
000000                          ADRECC=     2           ;ADDRESS RECOGNITION (CU)
000000                          ADRECD=     1           ;ADDRESS RECOGNITION (DEVICE)

                        ;DXES DX EXTRA SIGNALS

000000                          MCLKP=1                 ;MAINTENANCE CLOCK PULSE
000000                          MCLKEN=2                ;MAINT. CLK ENABLE
000000                          SOSIEN=4                ;SRVO-SRVI ENABLE
000000                          TIMDIS=10               ;TIMER(5 SEC) DISABLE
000000                          DXTO=20                 ;DX TIMEOUT (5 SEC)
000000                          NPRTO=40                ;NPR TIMEOUT (8 MICROSEC)
000000                          INTREQ=200              ;INTERRUPT REQUEST
```

```
                                ;DXES1 DX EXTRA EXTRA SIGNALS

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


                                ;DEFINE REGISTER MAP INDICES

000000                          DS=     00
000002                          CA=     02
000004                          CS=     04
000006                          OS=     06
000010                          BA=     10
000012                          BC=     12
000014                          MO=     14
000016                          MI=     16
000020                          CB=     20
000022                          MD=     22
000024                          ES=     24

                                ;PHASE CONTROL FLOPS OF DXCB

000000                          PHASE0=000000
010000                          PHASE1=100000
020000                          PHASE2=200000
030000                          PHASE3=300000
040000                          PHASE4=400000
050000                          PHASE5=500000
060000                          PHASE6=600000
070000                          PHASE7=700000

                                ;TIME STATE FLOP AND STATE DEFINATION

004000                          TSSF=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
```

```
                370000                          PHS72=  PHASE7! TS2
                
                                        .SBTTL  MISCELLANEOUS DEFINITIONS
                
                104420                  SCOPE=TRAP                      ;SCOPE LOOP TRAP
                
                100000                          BI?15=100000
                040000                          BI?14=40000
                020000                          BI?13=20000
                010000                          BI?12=10000
                004000                          BI?11=4000
                002000                          BI?10=2000
                001000                          BI?9=1000
                000400                          BI?8=400
                000200                          BI?7=200
                000100                          BI?6=100
                000040                          BI?5=40
                000020                          BI?4=20
                000010                          BI?3=10
                000004                          BI?2=4
                000002                          BI?1=2
                000001                          BI?0=1
                000000                          HERE=0
                
                                        ;CHANNEL COMMANDS WITH PARITY
                
                000420                          TIOC=420                ;TEST I/O
                000021                          WRITEC=021              ;WRITE
                000002                          READC=002               ;READ
                000403                          NOPC=403                ;NOP
                000004                          SENSEC=4                ;SENSE
                000405                          ILLC=405                ;ILLEGAL COMMAND
                
                                        ;UTILITY FLAGS
                
                100000                          INTOK=100000
                000002                  DOPLIN=2                        ;SPW BIT FOR NO DST !
                
                                        ;CHANNEL STATUS
                
                000010                          CE=10                   ;CH END
                000004                          DE=4                    ;DEVICE END
                000002                          UC=2                    ;UNIT CHECK
                000200                          ATTN=200                ;ATTENTION
                000100                          SM=100                  ;STATUS MODIFIER
                000040                          CUE=40                  ;CU END
                000020                          BSY=20                  ;BUSY
                
                                        ;SWITCH DEFINITIONS
                
                100000                          HLTSW=BIT15             ;HALT ON ERROR
                040000                          LOPSW=BIT14             ;LOOP ON ERROR
                020000                          PNTSW=BIT13             ;INHIBIT PRINT
                010000                          SESW=BIT12              ;SHORT ERROR SWITCH
```

```
                        004000          IISW=BIT11              ;INHIBIT ITERATIONS
                        002000          MCCSW=BIT10             ;MAINTENANCE CLOCK CONTROL

                                ;PROCESSOR PRIORITY LEVELS

                        000000          LEVEL0= 000
                        000040          LEVEL1= 040
                        000100          LEVEL2= 100
                        000140          LEVEL3= 140
                        000200          LEVEL4= 200
                        000240          LEVEL5= 24
                        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

                        000004          TYPE=IOT
                        000240          NOP=240
                        177776          PS=177776               ;PROCESSOR STATUS
                        177570          SWR=177570
                        177570          SR=177570               ;SWITCH REGISTER

                        000000          E=0
                        024774          EMTABLE=EMTAG

                                ;EMT DEFINITIONS

001074  104000                  ERROR                   ;TRAPS TO 0,ERROR
001076  104001                  MAPERR                  ;TRAPS TO 0,MAPERR
001100  104002                  TRACER                  ;TRAPS TO 0,TRACER
001102  104003                  SAVRG                   ;TRAPS TO 0,SAVRG
001104  104004                  RSTRG                   ;TRAPS TO 0,RSTRG
001106  104005                  ACCEPTO                 ;TRAPS TO 0,ACCEPTO
001110  104006                  KEY,TO',R0                      ;TRAPS TO 0,KEY,TO',R0
001112  104007                  PARITY                  ;TRAPS TO 0,PARITY
001114  104010                  PCH1                    ;TRAPS TO 0,PCH1
001116  104011                  PCH2                    ;TRAPS TO 0,PCH2
001120  104012                  PCH3                    ;TRAPS TO 0,PCH3

                        .SBTTL  TRAP DEFINITIONS

                                ;TRAP INITIALIZATION
```

```
                        000014                  .=14
000014  000340                                  0,BRK,LEVEL7            ;BREAK TRAP

                        000020                  .=20
000020  001614  000340                          ,IOT,LEVEL7             ;TTY OUTPUT TRAP,LEVEL 7

                        000024                  .=24
000024  001444  000340                          PFAIL,LEVEL7            ;POWER FAIL TRAP

                        000030                  .=30
000030  024642  000340                          EMTDECODER,LEVEL7       ;EMT DECODER TRAP,LEVEL 7

                        000034                  .=34
000034  024754  000340                          SCOPEC,LEVEL7           ;SCOPE TRAP


                        000200                  .=200

000200  000137  001100  START:  JMP     @#BEGIN         ;GO TO BEGINNING OF PROGRAM

                        001100                  .=1100

001100  012706  001100  BEGIN:  MOV     #BEGIN,SP       ;SET UP STACK POINTER
001104  012737  000340  177776          MOV     #LEVEL7,PS      ;PRIORITY LEVEL 7

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

001112  012737  000002  034416          MOV     #2,@RTX
001120  012737  001154  000010          MOV     #I.ITB,@#10
001126  012737  000340  000012          MOV     #340,@#12
001134  005046                          CLR     -(SP)
001136  012746  001144                  MOV     #INITZ,-(SP)
001142  000006                          RTT
001144  012737  000006  034416  INITZ:  MOV     #6,@RTX
001152  000402                          BR      INITC
001154  062706  000010          INITB:  ADD     #10,SP
001160  013737  034416  034414  INITC:  MOV     @RTX,VESRT1
001166  012737  000012  000010          MOV     #12,@#10
001174  005037  000012                  CLR     @#12

                                        ;************************** MOD APR 74 ******************************


001200  005737  000042                  TST     @#42            ;ACT11
001204  001404                          BEQ     BGN0            ;BR IF NO
                                ;       JSR     PC,@MONDFLT     ;INSERT DEFAULT PARAMETERS
001206  005037  027444                  CLR     @#ONESHOT               ;DO NOT EXECUTE TIME CONSUMING TESTS
001212  000137  027066                  JMP     @#MON11         ;
001216  005327  000001          BGN0:   DEC     #1
001222  001002                          BNE     BGN1
001224  000137  026144                  JMP     @#MONITOR
001230  032737  000200  177570  BGN1:   BIT     #200,@SR        ;TEST FOR FAST START
001236  001402                          BEQ     BGN2            ;BRANCH IF FAST START
001240  000137  026214                  JMP     @#MON1,0
```

```
                                                    
000244  012700  001100          BGN2:   MOV     #BEGIN,SP
000250  012737  000340  177776          MOV     #LEVEL7,PS
000256  000137  027034                  JMP     @#ON10          ;USE PREVIOUS PARAMETERS
                                                    
                                                    
                                        .SBTTL  DX REGISTERS
                                                    
                                        DXBASE: 176200
                                        DXIV:   300             ;DX INTERRUPT VECTOR ADRS
                                        DXIS:   302             ;DX INTERRUPT STATUS
                                        DXPRT:  LEVEL4          ;INT PRIORITY ADRS
                                        LESS1:  LEVEL3          ;DX PRIORITY MINUS ONE
                                        DXDS:   176200          ;DEVICE STATUS ->TT
                                        DXCA:   176202          ;COMMAND AND ADDRESS ->TT
                                        DXCS:   176204          ;CONTROL UNIT STATUS
                                        DXOS:   176206          ;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
                                        DXES1:  176230          ;EXTRA EXTRA SIGNALS
                                                    
                                        ;BYTE REGISTERS
                                                    
                                        ;DXCA
                                                    
000326  176202          CUAR:   176202          ;CU ADDRESS REGISTER
000330  176203          CUCR:   176203          ;CU COMMAND REGISTER
                                                    
                                        ;DXOS
                                                    
000332  176206          CUSR:   176206          ;CU STATUS REGISTER
000334  176207          CUOR:   176207          ;CU OFFSET REGISTER
                                                    
                                        ;DXMO
                                                    
000336  176214          BUSO:   176214          ;IBM BUS OUT
000340  176215          CONO:   176215          ;CONTROL LINES OUT
                                                    
                                        ;DXMI
                                                    
000342  176216          BUSI:   176216          ;IBM BUS IN
000344  176217          CONI:   176217          ;CONTROL LINES IN
                                                    
                                        ;DXES
000346  176224          MISC:   176224          ;MISCELLANEOUS BITS
000350  176225          TTNDX:  176225          ;TUMBLE TABLE INDEX REG
                                                    
                                        ;DXMOB
                                                    
```

```
1044  001352  176226          BUSOB:  176226              ;BUS OUT BUFFERED
1045  001354  176227          CONOB:  176227              ;CONTROL OUT BUFFERED
1046
1047                          ;REGISTER ADDRESSES
1048
1049  001356  177700          REG0:   177700
1050  001360  177701          REG1:   177701
1051  001362  177702          REG2:   177702
1052  001364  177703          REG3:   177703
1053  001366  177704          REG4:   177704
1054  001370  177705          REG5:   177705
1055  001372  177706          REG6:   177706
1056  001374  177707          REG7:   177707
1057
1058                          ;TTY ADDRESSES
1059
1060  001376  177560          TKS:    177560
1061  001400  177562          TKB:    177562
1062  001402  177564          TPS:    177564
1063  001404  177566          TPB:    177566
1064
1065                          ;REGISTER TRACE TABLE
1066
1067  001406                  REGTT:                      ;REGISTER TRACE TABLE
1068  001406  000000          TDXDS:  0                   ;DEVICE STATUS TRACE
1069  001410  000000          TDXCA:  0                   ;COMMAND AND ADDRESS TRACE
1070  001412  000000          TDXCS:  0                   ;CU STATUS TRACE
1071  001414  000000          TDXOS:  0                   ;OFFSET AND STATUS TRACE
1072  001416  000000          TDXBA:  0                   ;BUS ADDRESS TRACE
1073  001420  000000          TDXMO:  0                   ;MAINTENANCE-OUT TRACE
1074  001422  000000          TDXMI:  0                   ;MAINTENANCE-IN TRACE
1075  001424  000000          TDXCB:  0                   ;CONTROL BIT TRACE
1076  001426  000000          TDXND:  0                   ;NPR DATA TRACE
1077  001430  000000          TDXES:  0                   ;EXTRA SIGNAL TRACE
1078  001432  000000          TDXES1: 0                   ;EXTRA SIGNAL TRACE 1
1079  001434  000000          TTYNDX: 0                   ;TTYNDX TRACE
1080
1081
1082                          ;STATUS POINTER WORD ADDRESS
1083
1084  001436  002000          SPW:    2000
1085
1086                          ;TUMBLE TABLE ADDRESS
1087
1088  001440  003000          TT:     3000
1089
1090                          ;DEVICE STATUS TABLE ADDRESS
1091
1092  001442  032400          DST:    DSTADRS             ;DST MUST BE MOD(400)
1093
1094
1095                          .SBTTL  POWER FAIL
1096
1097
```

```
                                        ;POWER FAIL ROUTINE
                                        ;IF SELECTED VERIFY STATUS"IN IS UP
                                        ;AND CE AND DE ARE PRESENTED AS STATUS
                                        ;
001444  104003                  PFAIL:  SAVRG
001446  013737  001636                  "OV      R6,SAVR6
001452  012737  001538  000024          MOV     #PWRUP,24
001460  032777  020000  177622          BIT     #S3LO,"DXMD
001466  001417                          BEQ     1$
001470  032777  100000  177614          BIT     #CPLI,"DXMI
001476  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
001500  104000                          ERROR                   ;
001502  032777  004000  177602          BIT     #STAI,"DXMI
001510  001071                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
001512  104000                          ERROR                   ;
001514  122777  000014  177620          CMPB    #CE!DE,"BUSI
001522  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
001524  104000                          ERROR                   ;
001526  000000                  1$:     HALT
                                        ;POWER UP ROUTINE
                                        ;
001530  000240                  PWRUP:  NOP                     ;PATCH ANYONE?
001532  013726  001636                  MOV     SAVR6,R6
001536  104004                          RSTRG
001540  012737  001444  000024          MOV     #PFAIL,24       ;RESTORE POWER FAIL VECTOR
001546  013777  001436  177526          MOV     SPW,"DXOS       ;RESTORE OFFSET REG
001554  004737  031050                  JSR     PC,RESRES       ;RESET AND RESTORE
001560  005027                          CLR     (PC)+           ;STALL FOR MECHANICS
001562  000000                          0
001564  005337  001562                  DEC     .-2
001570  001375                          BNE     .-4
001572  000004  001610                  TYPE    ,PFLD           ;POWER FAILED
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
001576  012637  177776                  MOV     (SP)+,PS
001602  000177  023276                  JMP     "RETURN
001606  000000                  SAVR6:  0
001610  050137  053517  051105  PFLD:   .ASCIZ  "<"POWER FAILED>"
001616  043040  044501  042514
001624  057524  000
001630                          .EVEN
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;SBTTL  STATUS POINTER WORD TABLE
001630                          ENDSTR=.                ;DEFINE END OF START CODE
002000                          .=2000
```

K2

```
1152                                    ;DEFAULT STATUS POINTER WORD (SPW)
1153                                    ;DEFAULT EMULATION IS OF ONE CONTROL UNIT
1154                                    ;WITH CAPACITY OF 16 DEVICES
1155            000070                  N=8
1156
1157                                    ;STATUS POINTER WORDS FOR CU 0
1158
1159  002000  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1160  002002  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1161  002004  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1162  002006  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1163  002010  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1164  002012  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1165  002014  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1166  002016  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1167  002020  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1168  002022  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1169  002024  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1170  002026  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1171  002030  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1172  002032  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1173  002034  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1174  002036  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1175
1176                                    ;STATUS POINTER WORDS FOR CU 1
1177
1178  002040  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1179  002042  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1180  002044  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1181  002046  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1182  002050  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1183  002052  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1184  002054  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1185  002056  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1186  002060  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1187  002062  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1188  002064  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1189  002066  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1190  002070  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1191  002072  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1192  002074  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1193  002076  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1194
1195                                    ;STATUS POINTER WORDS FOR CU 2
1196
1197  002100  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1198  002102  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1199  002104  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1200  002106  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1201  002110  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1202  002112  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1203  002114  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1204  002116  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1205  002120  031400                            ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
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1205  002122  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1206  002124  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1207  002126  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1208  002130  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1209  002132  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1210  002134  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1211  002136  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1212
1213                          ;STATUS POINTER WORDS FOR CU 3
1214
1215  002140  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1216  002142  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1217  002144  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1218  002146  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1219  002150  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1220  002152  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1221  002154  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1222  002156  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1223  002160  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1224  002162  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1225  002164  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1226  002166  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1227  002170  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1228  002172  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1229  002174  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1230  002176  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1231
1232                          ;STATUS POINTER WORDS FOR CU 4
1233
1234  002200  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1235  002202  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1236  002204  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1237  002206  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1238  002210  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1239  002212  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1240  002214  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1241  002216  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1242  002220  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1243  002222  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1244  002224  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1245  002226  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1246  002230  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1247  002232  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1248  002234  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1249  002236  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1250
1251                          ;STATUS POINTER WORDS FOR CU 5
1252
1253  002240  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1254  002242  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1255  002244  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1256  002246  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1257  002250  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1258  002252  031400                  ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1259
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1260  "02254  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1261  "02256  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1262  "02260  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1263  "02262  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1264  "02264  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1265  "02266  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1266  "02270  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1267  "02272  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1268  "02274  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1269  "02276  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1270
1271                                ;STATUS POINTER WORDS FOR CU 6
1272
1273  "02300  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1274  "02302  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1275  "02304  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1276  "02306  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1277  "02310  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1278  "02312  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1279  "02314  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1280  "02316  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1281  "02320  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1282  "02322  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1283  "02324  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1284  "02326  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1285  "02330  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1286  "02332  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1287  "02334  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1288  "02336  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1289
1290                                ;STATUS POINTER WORDS FOR CU 7
1291
1292  "02340  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1293  "02342  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1294  "02344  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1295  "02346  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1296  "02350  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1297  "02352  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1298  "02354  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1299  "02356  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1300  "02360  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1301  "02362  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1302  "02364  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1303  "02366  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1304  "02370  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1305  "02372  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1306  "02374  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1307  "02376  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1308
1309                                ;STATUS POINTER WORDS FOR CU 10
1310
1311  "02400  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1312  "02402  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1313  "02404  "31470                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
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1314  002406  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1315  002410  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1316  002412  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1317  002414  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1318  002416  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1319  002420  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1320  002422  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1321  002424  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1322  002426  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1323  002430  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1324  002432  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1325  002434  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1326  002436  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1327
1328                          ;STATUS POINTER WORDS FOR CU 11
1329
1330  002440  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1331  002442  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1332  002444  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1333  002446  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1334  002450  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1335  002452  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1336  002454  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1337  002456  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1338  002460  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1339  002462  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1340  002464  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1341  002466  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1342  002470  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1343  002472  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1344  002474  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1345  002476  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1346
1347                          ;STATUS POINTER WORDS FOR CU 12
1348
1349  002500  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1350  002502  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1351  002504  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1352  002506  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1353  002510  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1354  002512  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1355  002514  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1356  002516  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1357  002520  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1358  002522  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1359  002524  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1360  002526  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1361  002530  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1362  002532  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1363  002534  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1364  002536  031400                    ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1365
1366                          ;STATUS POINTER WORDS FOR CU 13
1367
```

```
1368  002540  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1369  002542  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1370  002544  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1371  002546  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1372  002550  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1373  002552  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1374  002554  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1375  002556  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1376  002560  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1377  002562  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1378  002564  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1379  002566  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1380  002570  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1381  002572  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1382  002574  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1383  002576  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1384
1385                          ;STATUS POINTER WORDS FOR CU 14
1386
1387  002600  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1388  002602  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1389  002604  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1390  002606  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1391  002610  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1392  002612  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1393  002614  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1394  002616  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1395  002620  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1396  002622  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1397  002624  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1398  002626  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1399  002630  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1400  002632  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1401  002634  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1402  002636  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1403
1404                          ;STATUS POINTER WORDS FOR CU 15
1405
1406  002640  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1407  002642  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1408  002644  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1409  002646  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1410  002650  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1411  002652  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1412  002654  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1413  002656  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1414  002660  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1415  002662  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1416  002664  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1417  002666  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1418  002670  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1419  002672  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1420  002674  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
1421  002676  031400                    ERRDST      ;DEVICE STATUS TABLE IS AT ERRDST
```

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1422
1423                                    ;STATUS POINTER WORDS FOR CU 16
1424
1425  002700  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1426  002702  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1427  002704  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1428  002706  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1429  002710  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1430  002712  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1431  002714  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1432  002716  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1433  002720  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1434  002722  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1435  002724  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1436  002726  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1437  002730  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1438  002732  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1439  002734  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1440  002736  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1441
1442                                    ;STATUS POINTER WORDS FOR CU 17
1443
1444  002740  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1445  002742  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1446  002744  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1447  002746  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1448  002750  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1449  002752  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1450  002754  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1451  002756  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1452  002760  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1453  002762  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1454  002764  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1455  002766  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1456  002770  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1457  002772  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1458  002774  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1459  002776  031400                        ERRDST          ;DEVICE STATUS TABLE IS AT ERRDST
1460
1461                                    .SBTTL  TUMBLE TABLE
1462          003000                    .=.     ;START OF  TUMBLE TABLE
1463
1464  003002  000400                    .BLKW   256.    ;RESERVE 269. WORDS FOR TT
1465
1466          004000                    ENDTT=.
1467
1468
1469
```

```
1470                                    ;*****************************************************************
1471                                    ;TEST   1       MAINTENANCE CLOCK ISS SPW(15100)=0
1472                                    ;*****************************************************************
1473  004000  104400                    TST11   SCOPE
1474  004002  012737  000400  025100            MOV     #400,@#ICOUNT   ;ITERATION COUNT
1475  004010  012737  000001  025126            MOV     #1,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
1476  004016  012737  004024  025134            MOV     #SCP1,@#RETURN  ;SCOPE LOOP RETURN ADRS
1477  004024                                SCP1:
1478
1479
1480                                    .REM    @
1481                                    .LIST
1482
1483                                    THE FUNCTION OF THIS TEST IS TO VERIFY THAT WHEN SPW (15100)=0
1484                                    AND SPW (07100) IS NON ZERO, THE DST FETCH IS BYPASSED.
1485
1486                                            @
1487
1488                                    ;INITIALIZE SPW TO BYPASS DST FETCH
1489                                    ;BY SETING SPW(15100)=0 AND SPW(07100)=FLOATING ONES
1490
1491  004024  012727  000001                   MOV     #1,(PC)+        ;FIRST FLOATING ONE
1492  004030  000000                    NDSTC:  0
1493  004032  013702  004030                   MOV     NDSTC,R2        ;LOAD R2 WITH CONTENTS OF SPW
1494  004036  013701  001436                   MOV     SP",R1          ;LOAD SPW ADRS IN R1
1495  004042  004737  030462                   JSR     PC,SP,1         ;BUILD SPW
1496
1497  004046  004737  024344                   JSR     PC;@#DXRES      ;RESET DX AND TT TRACE
1498  004052  153777  027452  175246          BISB    @#DEV,@CUAR     ;LOAD CUAR)ADDRESS
1499  004060  123777  027452  175240          CMPB    @#DEV,@CUAR     ;VERIFY LOAD
1500  004066  001401                           BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1501  004070  104000                           ERROR                   ;CUAR LOAD ERROR
1502  004072  153737  027452  024070          BISB    @#DEV,@#CAMAP   ;UPDATE MAP
1503  004100  052777  000002  175212          BIS     @MCLKEN,@DXES   ;SET MCLKEN IN REGISTER ES
1504  004106  052737  000002  024290          BIS     @#MCLKEN,@#ESMAP ;SET MCLKEN IN MAP OF ES
1505  004114  004737  024052                   JSR     PC;CHKREG
1506
1507                                    ;START SEQUENCE OFF IN PHS01
1508
1509  004120  032777  004000  175166          BIT     @TSSF,@DXCS     ;
1510  004126  001010                           BNE     1$
1511  004130  004537  023560                   JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1512  004134  000001                           1                       ;                               1 CLOCK PULSE(S)
1513  004136  032777  004000  175150          BIT     @TSSF,@DXCS
1514  004144  001001                           BNE     .+2             ;BRANCH IF NO ERROR CONDITION
1515  004146  104000                           ERROR                   ;TIME STATE ERROR
1516  004150  004737  024052            1$:    JSR     PC;CHKREG
1517
1518                                    ;ESTABLISH CONFIDENCE IN DX STABILITY
1519
1520  004154  004537  023560                   JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1521  004160  000144                           100.                    ;                               100. CLOCK PULSE(S)
1522  004162  004737  024052                   JSR     PC;CHKREG
1523  004166  004737  023430                   JSR     PC;PHST         ;CHECK CONTROL BITS FOR
```

```
1524  004172  004000                        PHS01                   ;THIS PHASE AND STATE                   PHS01
1525                                                                  ;PUT DEVICE ADRS ON BUS0
1526                                                                  ;CLOCK ADRS ONTO BUS0
1527                                                                  ;SET ADRS IN MAP
1528  004174  053777  027452  175126          BIS     @#DEV,@DXMO     ;LOAD DEVICE ADRS ON BUS0
1529  004202  123777  027452  175126          CMPB    @#DEV,@BUS0     ;NO BUFFER FLOPS FOR BUS0
1530  004210  001421                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1531  004212  104000                          ERROR                   ;DXMO LOAD ERROR
1532  004214  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1533  004220  000002                          2                       ;                       2 CLOCK PULSE(S)
1534  004222  053737  027452  024192          BIS     @#DEV,@#MOMAP   ;UPDATE REGISTER MAP
1535  004230  004737  023720                  JSR     PC,COPARO       ;COPY PARO INTO CLK0 IMAGE
1536  004234  004737  024052                  JSR     PC,CHKREG
1537  004240  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1538  004244  000010                          10                      ;                       10 CLOCK PULSE(S)
1539  004246  004737  024052                  JSR     PC,CHKREG
1540  004252  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1541  004256  004000                        PHS01                   ;THIS PHASE AND STATE                   PHS01
1542                                  ;RAISE ADDRESS OUT
1543
1544  004260  052777  004000  175022          BIS     @ADRO,@DXMO     ;SET ADRS OUT
1545  004266  032777  004000  175014          BIT     @ADRO,@DXMO     ;NOT WITHOUT CLOCK
1546  004274  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1547  004276  104000                          ERROR                   ;ADRO NO ZERO
1548  004300  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1549  004304  000002                          2                       ;                       2 CLOCK PULSE(S)
1550  004306  032777  004000  174774          BIT     @ADRO,@DXMO     ;VERIFY SET AFTER CLOCK
1551  004314  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
1552  004316  104000                          ERROR                   ;ADRO NOT SET
1553  004320  052737  004000  024192          BIS     @ADRO,@#MOMAP   ;UPDATE REG MAP
1554  004326  032777  000002  174760          BIT     @ADRECC,@DXCB   ;TEST FOR ADRECC
1555  004334  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
1556  004336  104000                          ERROR                   ;ADRECC NOT SET
1557  004340  052737  000002  024230          BIS     @ADRECC,@#CBMAP ;UPDATE MAP
1558  004346  032777  000001  174740          BIT     @ADRECD,@DXCB   ;TEST FOR ADRECD
1559  004354  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1560  004356  104000                          ERROR                   ;ADRECD NOT SET
1561  004360  052737  000001  024230          BIS     @ADRECD,@#CBMAP ;UPDATE MAP
1562  004366  004737  024052                  JSR     PC,CHKREG
1563  004372  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1564  004376  000010                          10                      ;                       10 CLOCK PULSE(S)
1565  004400  004737  024052                  JSR     PC,CHKREG
1566  004404  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1567  004410  004000                        PHS01                   ;THIS PHASE AND STATE                   PHS01
1568
1569                                  ;RAISE HOLD-OUT
1570  004412  052777  040000  174670          BIS     @HLDO,@DXMO     ;RAISE HOLD-OUT
1571  004420  032777  040000  174662          BIT     @HLDO,@DXMO     ;NOT WITHOUT CLOCK
1572  004426  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1573  004430  104000                          ERROR                   ;HLDO NOT BUFFERED
1574  004432  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1575  004436  000002                          2                       ;                       2 CLOCK PULSE(S)
1576  004440  032777  040000  174642          BIT     @HLDO,@DXMO     ;VERIFY HLDO CLOCKED
1577  004446  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
```

```
1578  P04450  104000                    ERROR                   ;HLDO NOT SET
1579  P04452  252737  040020  024192    BIS     #HLDO,@#MOMAP   ;UPDATE REG MAP
1580  P04460  004737  024052            JSR     PC,CHKREG
1581  P04464  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1582  P04470  000010                    10                      ;                                   10 CLOCK PULSE(S)
1583  P04472  004737  024052            JSR     PC,CHKREG
1584
1585                                    ;RAISE SELECT.OUT
1586                                    ;A PAIR OF MAINTENANCE CLOCK PULSES SHOULD
1587                                    ;RAISE SELO AND LEAVE THE DX IN PHS01
1588                                    ;AND WITH THE DEVICE ADDRESS RECOGNIZED (ADRECC.1)
1589
1590  P04476  052777  020000  174604    BIS     #SELO,@DXMO     ;RAISE SELECT.OUT
1591  P04504  032777  020000  174576    BIT     #SELO,@DXMO     ;NOT WITHOUT CLOCK
1592  P04512  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1593  P04514  104000                    ERROR                   ;SELO NOT BUFFERED
1594  P04516  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1595  P04522  000002                    2                       ;                                   2 CLOCK PULSE(S)
1596  P04524  032777  020000  174596    BIT     #SELO,@DXMO     ;VERIFY SELO CLOCKED
1597  P04532  001001                    BNE     .+2             ;BRANCH IF NO ERROR CONDITION
1598  P04534  104000                    ERROR                   ;SELO NOT SET
1599  P04536  052737  020000  024192    BIS     #SELO,@#MOMAP   ;UPDATE MAP
1600
1601                                    ;ADDRESS IS RECOGNIZED
1602                                    ;CHECK FOR ERRONEOUS PROPOGATION OF SELECT.IN
1603                                    ;OR PRESENTATION OF STATUS.IN
1604
1605  P04544  022777  176777  174540    CMP     #176777,@DXMI   ;DXMI SHOULD BE UNREADABLE
1606  P04552  001405                    BEQ     DUNREAD
1607  P04554  022777  177777  174530    CMP     #177777,@DXMI   ;DXMI MAY HAVE CLKO
1608  P04562  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1609  P04564  104000                    ERROR                   ;DXMI STATE ERROR
1610
1611                                    ;CONTROL UNIT BUSY (CUBSY) SHOULD NOT BE SET
1612
1613  P04566  032777  000400  174534  DUNREAD:BIT     #CUBSY,@DXCS    ;CUBSY SHOULD NOT BE SET
1614  P04574  001421                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1615  P04576  104000                    ERROR                   ;CUBSY NOT ZERO
1616  P04600  004737  023430            JSR     PC,@PHST        ;CHECK CONTROL BITS FOR
1617  P04604  004000                    PHS01                   ;THIS PHASE AND STATE               PHS01
1618
1619                                    ;SEE IF ANYTHING UNEXPECTED HAPPENED
1620
1621  P04606  032777  004000  174464    BIT     #BSYEN,@DXCS    ;BUSY ENABLE SHOULD NOT BE SET
1622  P04614  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1623  P04616  104000                    ERROR                   ;BSYEN SET
1624  P04620  004737  024052            JSR     PC,CHKREG
1625
1626                                    ;ADVANCE TO PHASE ZERO TIME STATE 2 (PHS02)
1627
1628  P04624  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1629  P04632  000001                    1                       ;                                   1 CLOCK PULSE(S)
1630  P04632  004737  023430            JSR     PC,@PHST        ;CHECK CONTROL BITS FOR
1631  P04636  000000                    PHS02                   ;THIS PHASE AND STATE               PHS02
```

```
1632
1633                                    ;LOCKOUT AND SYNC SHOULD = "1"
1634
1635  P84642  032777  100000  174446          BIT     @LOCKO,@DXCB    ;CHECK LOCKO SET
1636  P84646  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1637  P84650  104000                          ERROR                   ;LOCKO NOT SET
1638  P84652  052737  100000  024230          BIS     @LOCKO,@@CBMAP  ;UPDATE MAP
1639
1640  P84660  032777  001000  174426          BIT     @SYNC,@DXCB
1641  P84666  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1642  P84670  104000                          ERROR                   ;SYNC NOT SET
1643  P84672  052737  001000  024230          BIS     @SYNC,@@CBMAP   ;UPDATE MAP
1644
1645                                    ;BYPAS MUST NOT BE SET
1646
1647  P84700  032777  000100  174406          BIT     @BYPAS,@DXCB    ;VERIFY ISS IN PROGRESS
1648  P84706  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1649  P84710  104000                          ERROR                   ;BYPAS SET
1650  P84712  004737  P24052                  JSR     PC,@CHKREG
1651
1652                                    ;NEXT CLOCK TICK SHOULD FORCE THE DX
1653                                    ;INTO THE ADDRESS RESPONSE PHASE ONE TIME STATE 1
1654  P84716  004537  P23560                  JSR     R5,@@CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1655  P84722  000001                          1                       ;                              1 CLOCK PULSE(S)
1656  P84724  004737  023430                  JSR     PC,@PHST        ;CHECK CONTROL BITS FOR
1657  004730  014000                          PH511                   ;THIS PHASE AND STATE                  PH511
1658
1659                                    ;SYNC SHOULD BE CLEARED
1660
1661  P84732  032777  001000  174394          BIT     @SYNC,@DXCB     ;VERIFY SYNC CLEARED
1662  P84740  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1663  004742  104000                          ERROR                   ;SYNC SET
1664  P84744  042737  001000  024230          BIC     @SYNC,@@CBMAP   ;UPDATE MAP
1665  P84752  032777  000400  174328          BIT     @CUBSY,@DXCS    ;CU BUSY SHOULD NOT BE SET
1666  004760  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1667  P84762  104000                          ERROR                   ;CUBSY SET
1668  004764  127777  174346  174334          CMPB    @BUSO,@CUAR     ;VERIFY DEVICE ADRS IN ADRS REG
1669  P84772  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1670  P84774  104000                          ERROR                   ;CUAR TO BUSO TRANSFER ERROR
1671  P84776  113737  P27452  024070          MOVB    @@DEV,@@CAMAP   ;UPDATE MAP
1672
1673                                    ;ADRS-OUT SHOULD COPY INTO CHIS IF ADREC@="1"
1674                                    ;THIS INDICATES A CHANNEL INITIATED SELECTION IS IN
1675                                    ;PROGRESS
1676
1677  P85004  032777  000200  174262          BIT     @CHIS,@DXDS     ;CHIS SET IN DEVICE STATUS REG
1678  005012  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
1679  005014  104000                          ERROR                   ;THIS NOT SET
1680  P85016  052737  000200  024056          BIS     @CHIS,@@DSMAP   ;UPDATE MAP
1681
1682                                    ;OPERATIONAL-IN SHOULD BE SET
1683
1684  P85024  032777  100000  174200          BIT     @OPLI,@DXMI     ;VERIFY OPLI SET
1685  P85032  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
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1686  P05034  104000                    ERROR                   ;DPLI NOT SET
1687  P05036  052737  100000  024174    BIS     #DPLI,@#MIMAP   ;UPDATE MAP
1688  P05044  032777  000400  174248    BIT     #PARI,@DXMI     ;CHECK FOR PARITY IN
1689  P05052  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1690  P05054  104000                    ERROR                   ;PARI NOT SET
1691  P05056  052737  000400  024174    BIS     #PARI,@#MIMAP   ;UPDATE MAP
1692                                ;DXBA LOAD USES ITS OWN CLOCK
1693
1694                                ;BUS ADDRESS (15112) EQUALS OFFSET REG
1695                                ;BUS ADDRESS (00104) EQUALS CUAR (07100)
1696
1697  P05064  117727  174236            MOVB    @CUAR,(PC)+     ;SAVE CUAR(07100)
1698  P05070  000020              DIMAGBA:B                       ;HERE, IMAGE OF EXPECTED BA
1699  P05072  006337  005070            ASL     @#DIMAGBA       ;MAKE DEV ADRS MOD(2)
1700  P05076  042737  177001  005070    BIC     #^C1777,@#DIMAGBA       ;CLEAR ALL BUT SHIFTED ADRS
1701  P05104  017727  174172            MOV     @DXOS,(PC)+     ;SAVE OFFSET AND STATUS
1702  P05110  000000              DIMAGOS:B                       ;HERE, OFFSET IMAGE
1703  P05112  042737  001777  005110    BIC     #1777,@#DIMAGOS ;CLEAR ALL BUT OFFSET
1704  P05120  053737  005110  005070    BIS     @#DIMAGOS,@#DIMAGBA     ;CREATE BA IMAGE
1705
1706                                ;VERIFY BUS ADDRESS REGISTER WAS LOADED CORRECTLY
1707
1708  P05126  023777  005070  174150    CMP     @#DIMAGBA,@DXBA ;BA EQUALS EXPECTED BA?
1709  P05134  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1710  P05136  104000                    ERROR                   ;CUAR TO DXBA TRANSFER ERROR
1711  P05140  053737  005070  024126    BIS     @#DIMAGBA,@#BAMAP       ;UPDATE MAP
1712
1713  P05146  004737  024052            JSR     PC,CHKREG
1714
1715                                ;PHASE ONE-ADDRESS RESPONSE
1716                                ;ADVANCE DX TO PHASE ONE TIME STATE 2
1717                                ;SYNC IS ZERO QUALIFYING THE SIGNAL"BAAR"
1718
1719  P05152  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1720  P05156  000001                    1                       ;                       1 CLOCK PULSE(S)
1721  P05160  004737  023430            JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1722  P05164  010000                    PHS12                   ;THIS PHASE AND STATE           PHS12
1723
1724
1725  P05166  032777  000040  174120    BIT     @NPRX,@DXCB     ;NPRX=0?
1726  P05174  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1727  P05176  104000                    ERROR                   ;NPRX NOT ZERO
1728  P05200  052737  000040  024230    BIS     @NPRX,@#CBMAP   ;KEEP MAP UP TO DATE
1729
1730  P05206  032777  001000  174100    BIT     @SYNC,@DXCB     ;VERIFY SYNC="1"
1731  P05214  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1732  P05216  104000                    ERROR                   ;SYNC NOT SET
1733  P05220  052737  001000  024230    BIS     @SYNC,@#CBMAP   ;UPDATE MAP
1734
1735  P05226  032777  031000  174040    BIT     @31000,@DXDS    ;CHECK FOR NO IBM RESET
1736  P05234  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1737  P05236  104000                    ERROR                   ;IBM RESET
1738
1739                                ;VERIFY BUS ADDRESS DATA WAS TRANSFERRED INTO DXND
```

```
1748
1741  005240  027777  177624  174090          CMP     @DIMAGBA,@DXND  ;CHECK NPR DATA
1742  005246  001431                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
1743  005250  104000                          ERROR                   ;SPW TO DXND TRANSFER ERROR
1744  005252  037737  177612  024272          BIS     @DIMAGBA,@#NDMAP        ;UPDATE MAP
1745
1746  005260  004737  024052                  JSR     PC,CHKREG
1747  005264  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1748  005270  000001                          1                       ;                               1 CLOCK PULSE(S)
1749
1750  005272  032777  000040  174014          BIT     #NPRX,@DXCB     ;TEST FOR NPRX
1751  005300  001431                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1752  005302  104000                          ERROR                   ;NPRX SET
1753  005304  042737  000040  024230          BIC     #NPRX,@#CBMAP   ;UPDATE MAP
1754  005312  032777  000040  174000          BIT     #NPRTO,@DXES    ;TEST FOR NPR TIME OUT
1755  005320  001401                          BEQ     .+1             ;BRANCH IF NO ERROR CONDITION
1756  005322  104000                          ERROR                   ;NPRTO SET
1757
1758  005324  004737  024052                  JSR     PC,CHKREG
1759
1760  005330  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1761  005334  014000                          PHS11                   ;THIS PHASE AND STATE                   PHS11
1762
1763  005336  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1764  005342  000001                          1                       ;                               1 CLOCK PULSE(S)
1765  005344  004737  023430                  JSP     PC,PHST         ;CHECK CONTROL BITS FOR
1766  005350  010000                          PHS12                   ;THIS PHASE AND STATE                   PHS12
1767  005352  004737  024052                  JSR     PC,CHKREG
1768  005356  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1769  005362  000001                          1                       ;                               1 CLOCK PULSE(S)
1770  005364  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1771  005370  024000                          PHS21                   ;THIS PHASE AND STATE                   PHS21
1772
1773
1774                                  ;ADVANCE TO STATUS PREPARATION (PHASE TWO TIME STATE ONE)
1775                                  ;VERIFY SIG3 EVENTS TRANSFERRED
1776                                  ;COPY A ONE INTO BYPAS IF DXND(15:08)=0 (NO DST)
1777
1778  005372  032777  000100  173714          BIT     #BYPAS,@DXCB    ;VERIFY DXND(15:08)=0 SET BYPAS
1779  005400  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1780  005402  104000                          ERROR                   ;BYPAS NOT SET
1781  005404  052737  000100  024230          BIS     #BYPAS,@#CBMAP  ;UPDATE REG MAP
1782  005412  042777  160000  173670          BIC     #DPLO!HLDO!SELO,@DXMO   ;DX RESEX
1783  005420  042777  000002  173672          BIC     #MCLKEN,@DXES
1784  005426  052777  000001  173644          BIS     #DXFRS,@DXCS
1785  005434  106337  004030                  ASLB    @#NDSTC
1786  005440  103402                          BCS     15
1787  005442  200137  004032                  JMP     @#NDSTC+2
1788  005446  004737  030414          151     JSR     PC,@SPW,SETUP
1789
1790
1791
```

```
1792                                    ;*****************************************************************
1793                                    ;TEST  2        MAINTENANCE CLOCK ISS SPW(15:08)NOT ZERO
1794                                    ;*****************************************************************
1795  005452  104400                    TST21   SCOPE
1796  005454  012737  000040  025130            MOV     #32.,@#ICOUNT   ;ITERATION COUNT
1797  005462  012737  000002  026126            MOV     #2,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
1798  005470  012737  005476  025134            MOV     #S.P2,@#RETURN  ;SCOPE LOOP RETURN ADRS
1799  005476                                    SCP21
1800
1801                                    .REM    <
1802
1803                                    THE FUNCTION OF THIS TEST IS TO VERIFY THAT THE DX11 CAN EXECUTE
1804                                    A CHANNEL INITIATED SELECTION AND PRESENT STATUS THROUGH A DEVICE
1805                                    STATUS TABLE FETCH.
1806
1807                                            >
1808
1809
1810  005476  004737  024344                    JSR     PC,@#DXRES      ;RESET DX AND TT TRACE
1811  005502  153777  027452  173616            BISB    @#DEV,@CUAR     ;LOAD CUAR/ADDRESS
1812  005510  123777  027452  173610            CMPB    @#DEV,@CUAR     ;VERIFY LOAD
1813  005516  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1814  005520  104000                            ERROR                   ;CUAR LOAD ERROR
1815  005522  153737  027452  024070            BISB    @#DEV,@#CAMAP   ;UPDATE MAP
1816  005530  052777  000002  173562            BIS     @#CLKEN,@DXES   ;SET MCLKEN IN REGISTER ES
1817  005536  052737  000002  024290            BIS     @#CLKEN,@#ESMAP ;SET MCLKEN IN MAP OF ES
1818  005544  004737  024052                    JSR     PC,@#CHKREG
1819
1820                                    ;START SEQUENCE OFF IN PHS01
1821
1822  005550  032777  004000  173536            BIT     @#TSSF,@DXCB    ;
1823  005556  001010                            BNE     1$
1824  005560  004537  023560                    JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1825  005564  000001                            1                       ;                               1 CLOCK PULSE(S)
1826  005566  032777  004000  173520            BIT     @#TSSF,@DXCB
1827  005574  001001                            BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1828  005576  104000                            ERROR                   ;TIME STATE ERROR
1829  005600  004737  024052            1$:     JSR     PC,@#CHKREG
1830
1831                                    ;ESTABLISH CONFIDENCE IN DX STABILITY
1832
1833  005604  004537  023560                    JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1834  005610  000144                            100.                    ;                               100. CLOCK PULSE(S)
1835  005612  004737  024052                    JSR     PC,@#CHKREG
1836  005616  004737  023430                    JSR     PC,@#PHST       ;CHECK CONTROL BITS FOR
1837  005622  004000                            PHS01                   ;THIS PHASE AND STATE           PHS01
1838                                                                    ;PUT DEVICE ADRS ON BUS0
1839                                                                    ;CLOCK ADRS ONTO BUS0
1840                                                                    ;SET ADRS IN MAP
1841  005624  053777  027452  177496            BIS     @#DEV,@DXMO     ;LOAD DEVICE ADRS ON BUS0
1842  005632  123777  027452  173476            CMPB    @#DEV,@#BUS0    ;NO BUFFER FLOPS FOR BUS0
1843  005640  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1844  005642  104000                            ERROR                   ;DXMO LOAD ERROR
1845  005644  004537  023560                    JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
```

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1846  000502  000002                          2                       ;                                   2 CLOCK PULSE(S)
1847  000504  053737  027452  024192          BIS     @#DEV,@#MOMAP   ;UPDATE REGISTER MAP
1848  000512  004737  023720                  JSR     PC,COPARO       ;COPY PARO INTO CLKO IMAGE
1849  000516  004737  024052                  JSR     PC,CHKREG
1850  000522  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1851  000526  000010                          10                      ;                                   10 CLOCK PULSE(S)
1852  000530  004737  024052                  JSR     PC,CHKREG
1853  000534  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1854  000540  004000                          PHS01                   ;THIS PHASE AND STATE                       PHS01
1855                                  ;RAISE ADDRESS OUT
1856
1857  000542  052777  004000  173372          BIS     #ADRO,@DXMO     ;SET ADRS OUT
1858  000550  032777  004000  173364          BIT     #ADRO,@DXMO     ;NOT WITHOUT CLOCK
1859  000556  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1860  000560  104000                          ERROR                   ;ADRO NO ZERO
1861  000562  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1862  000566  000002                          2                       ;                                   2 CLOCK PULSE(S)
1863  000570  032777  004000  173344          BIT     #ADRO,@DXMO     ;VERIFY SET AFTER CLOCK
1864  000576  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1865  000600  104000                          ERROR                   ;ADRO NOT SET
1866  000602  052737  004000  024192          BIS     #ADRO,@#MOMAP   ;UPDATE REG MAP
1867  000610  032777  000002  173330          BIT     #ADRECC,@DXCR   ;TEST FOR ADRECC
1868  000616  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1869  000620  104000                          ERROR                   ;ADRECC NOT SET
1870  000622  052737  000002  024238          BIS     #ADRECC,@#CBMAP ;UPDATE MAP
1871  000630  032777  000001  173310          BIT     #ADRECD,@DXCB   ;TEST FOR ADRECD
1872  000636  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1873  000640  104000                          ERROR                   ;ADRECD NOT SET
1874  000642  052737  000001  024238          BIS     #ADRECD,@#CBMAP ;UPDATE MAP
1875  000650  004737  024052                  JSR     PC,CHKREG
1876  000654  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1877  000660  000010                          10                      ;                                   10 CLOCK PULSE(S)
1878  000662  004737  024052                  JSR     PC,CHKREG
1879  000666  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1880  000672  004000                          PHS01                   ;THIS PHASE AND STATE                       PHS01
1881
1882                                  ;RAISE HOLD-OUT
1883  000674  052777  040000  173240          BIS     #HLDO,@DXMO     ;RAISE HOLD-OUT
1884  000702  032777  040000  173232          BIT     #HLDO,@DXMO     ;NOT WITHOUT CLOCK
1885  000710  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1886  000712  104000                          ERROR                   ;HLDO NOT BUFFERED
1887  000714  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1888  000720  000002                          2                       ;                                   2 CLOCK PULSE(S)
1889  000722  032777  040000  173212          BIT     #HLDO,@DXMO     ;VERIFY HLDO CLOCKED
1890  000730  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1891  000732  104000                          ERROR                   ;HLDO NOT SET
1892  000734  052737  040000  024192          BIS     #HLDO,@#MOMAP   ;UPDATE REG MAP
1893  000742  004737  024052                  JSR     PC,CHKREG
1894  000746  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1895  000752  000010                          10                      ;                                   10 CLOCK PULSE(S)
1896  000754  004737  024052                  JSR     PC,CHKREG
1897
1898                                  ;RAISE SELECT-OUT
1899                                  ;A PAIR OF MAINTENANCE CLOCK PULSES SHOULD
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                                        ;RAISE SELO AND LEAVE THE DX IN PHS#1
                                        ;AND WITH THE DEVICE ADDRESS RECOGNIZED (ADRECC=1)

 F86126  052777  020000  173194        BIS     #SELO,@DXMO     ;RAISE SELECT-OUT
 F86134  032777  020000  173146        BIT     #SELO,@DXMO     ;NOT WITHOUT CLOCK
 F86142  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 F86144  104000                        ERROR                   ;SELO NOT BUFFERED
 F86146  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 F86152  000002                        2                       ;                                   2 CLOCK PULSE(S)
 F86154  032777  020000  173126        BIT     #SELO,@DXMO     ;VERIFY SELO CLOCKED
 F86162  001001                        BNE     .+             ;BRANCH IF NO ERROR CONDITION
 F86164  104000                        ERROR                   ;SELO NOT SET
 F86166  052737  020000  024152        BIS     #SELO,@#MOMAP   ;UPDATE MAP

                                        ;ADDRESS IS RECOGNIZED
                                        ;CHECK FOR ERRONEOUS PROPOGATION OF SELECT-IN
                                        ;OR PRESENTATION OF STATUS-IN

 F86174  022777  176777  173110        CMP     #176777,@DXMI   ;DXMI SHOULD BE UNREADABLE
 F86202  001405                        BEQ     UNREAD
 F86204  022777  177777  173100        CMP     #177777,@DXMI   ;DXMI MAY HAVE CLKO
 F86212  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 F86214  104000                        ERROR                   ;DXMI STATE ERROR

                                        ;CONTROL UNIT BUSY (CUBSY) SHOULD NOT BE SET

 F86216  032777  000400  173054  UNREAD: BIT     #CUBSY,@DXCS    ;CUBSY SHOULD NOT BE SET
 F86224  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 F86226  104000                        ERROR                   ;CUBSY NOT ZERO
 F86230  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
 F86234  004000                        PHS#1                   ;THIS PHASE AND STATE               PHS#1

                                        ;SEE IF ANYTHING UNEXPECTED HAPPENED

 F86236  032777  004000  173034        BIT     #BSYEN,@DXCS    ;BUSY ENABLE SHOULD NOT BE SET
 F86244  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
 F86246  104000                        ERROR                   ;BSYEN SET
 F86250  004737  024052                JSR     PC;CHKREG

                                        ;ADVANCE TO PHASE ZERO TIME STATE 2 (PHS#2)

 F86254  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
 F86260  000001                        1                       ;                                   1 CLOCK PULSE(S)
 F86262  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
 F86266  000000                        PHS#2                   ;THIS PHASE AND STATE               PHS#2

                                        ;LOCKOUT AND SYNC SHOULD = "1"

 F86270  032777  100000  173016        BIT     #LOCKO,@DXCS    ;CHECK LOCKO SET
 F86276  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
 F86300  104000                        ERROR                   ;LOCKO NOT SET
 F86302  052737  100000  024230        BIS     #LOCKO,@#CSMAP  ;UPDATE MAP

 F86310  032777  001000  172776        BIT     #SYNC,@DXCS
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1954  006316  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1955  006320  104000                          ERROR                   ;SYNC NOT SET
1956  006322  052737  001000  024230          BIS     #SYNC,@#CBMAP   ;UPDATE MAP
1957
1958                                  ;BYPAS MUST NOT BE SET
1959
1960  006330  032777  000100  172796          BIT     #BYPAS,@DXCB    ;VERIFY ISS IN PROGRESS
1961  006336  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1962  006340  104000                          ERROR                   ;BYPAS SET
1963  006342  004737  024052                  JSR     PC,CHKREG
1964
1965                                  ;NEXT CLOCK TICK SHOULD FORCE THE DX
1966                                  ;INTO THE ADDRESS RESPONSE PHASE ONE TIME STATE 1
1967  006346  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
1968  006352  000001                          1                       ;                       1 CLOCK PULSE(S)
1969  006354  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
1970  006360  014000                          PHS11                   ;THIS PHASE AND STATE           PHS11
1971
1972                                  ;SYNC SHOULD BE CLEARED
1973
1974  006362  032777  001000  172724          BIT     #SYNC,@DXCB     ;VERIFY SYNC CLEARED
1975  006370  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1976  006372  104030                          ERROR                   ;SYNC SET
1977  006374  042737  001000  024230          BIC     #SYNC,@#CBMAP   ;UPDATE MAP
1978  006402  032777  000400  172670          BIT     #CUBSY,@DXCS    ;CU BUSY SHOULD NOT BE SET
1979  006410  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1980  006412  104000                          ERROR                   ;CUBSY SET
1981  006414  127777  172716  172704          CMPB    @#BUSO,@CUAR    ;VERIFY DEVICE ADRS IN ADRS REG
1982  006422  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
1983  006424  104000                          ERROR                   ;CUAR TO BUSO TRANSFER ERROR
1984  006426  113737  027452  024070          MOVB    @#DEV,@#CAMAP   ;UPDATE MAP
1985
1986                                  ;ADRS-OUT SHOULD COPY INTO CHIS IF ADRECC#"1"
1987                                  ;THIS INDICATES A CHANNEL INITIATED SELECTION IS IN
1988                                  ;PROGRESS
1989
1990  006434  032777  000200  172632          BIT     #CHIS,@DXDS     ;CHIS SET IN DEVICE STATUS REG
1991  006442  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
1992  006444  104000                          ERROR                   ;THIS NOT SET
1993  006446  052737  000200  024056          BIS     #CHIS,@#DSMAP   ;UPDATE MAP
1994
1995                                  ;OPERATIONAL-IN SHOULD BE SET
1996
1997  006454  032777  100000  172630          BIT     #OPLI,@DXMI     ;VERIFY OPLI SET
1998  006462  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
1999  006464  104000                          ERROR                   ;OPLI NOT SET
2000  006466  052737  100000  024174          BIS     #OPLI,@#MIMAP   ;UPDATE MAP
2001  006474  032777  000400  172610          BIT     #PARI,@DXMI     ;CHECK FOR PARITY IN
2002  006502  001021                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2003  006504  104000                          ERROR                   ;PARI NOT SET
2004  006506  052737  000400  024174          BIS     #PARI,@#MIMAP   ;UPDATE MAP
2005                                  ;DXBA LOAD USES ITS OWN CLOCK
2006
2007                                  ;BUS ADDRESS (15112) EQUALS OFFSET REG
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2208                                    ;BUS ADDRESS (008101) EQUALS CUAR (007100)
2209
2210  006514  117727  172006            MOVB    @CUAR,(PC)+     ;SAVE CUAR(007100)
2211  006520  000000    IMAGBA: 0        ;HERE, IMAGE OF EXPECTED BA
2212  006522  006337  006520            ASL     @#IMAGBA        ;MAKE DEV ADRS MOD(2)
2213  006526  042737  177001  006520    BIC     #177001,@#IMAGBA        ;CLEAR ALL BUT SHIFTED ADRS
2214  006534  117727  172542            MOV     @DXOS,(PC)+     ;SAVE OFFSET AND STATUS
2215  006540  000000    IMAGOS: 0        ;HERE, OFFSET IMAGE
2216  006542  042737  001777  006540    BIC     #1777,@#IMAGOS  ;CLEAR ALL BUT OFFSET
2217  006550  053737  006540  006520    BIS     @#IMAGOS,@#IMAGBA       ;CREATE BA IMAGE
2218
2219                                    ;VERIFY BUS ADDRESS REGISTER WAS LOADED CORRECTLY
2220
2221  006556  023777  006520  172520    CMP     @#IMAGBA,@DXBA  ;BA EQUALS EXPECTED BA?
2222  006564  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2223  006566  104000                    ERROR                   ;CUAR TO DXBA TRANSFER ERROR
2224  006570  053737  006520  024126    BIS     @#IMAGBA,@#BAMAP        ;UPDATE MAP
2225
2226  006576  004737  024052            JSR     PC;CHKREG
2227
2228                                    ;PHASE ONE-ADDRESS RESPONSE
2229                                    ;ADVANCE DX TO PHASE ONE TIME STATE 2
2230                                    ;SYNC IS ZERO QUALIFYING THE SIGNAL "BAAR"
2231
2232  006602  004537  023560            JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2233  006606  000001                    1                       ;                       1 CLOCK PULSE(S)
2234  006610  004737  023430            JSR     PC;PHBT         ;CHECK CONTROL BITS FOR
2235  006614  010000                    PH%12                   ;THIS PHASE AND STATE           PH%12
2236
2237
2238  006616  032777  000040  172470    BIT     #NPRX,@DXCB     ;NPRX=0?
2239  006624  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2240  006626  104000                    ERROR                   ;NPRX NOT ZERO
2241  006630  052737  000040  024230    BIS     #NPRX,@#CBMAP   ;KEEP MAP UP TO DATE
2242
2243  006636  032777  001000  172460    BIT     #SYNC,@DXCB     ;VERIFY SYNC="1"
2244  006644  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2245  006646  104000                    ERROR                   ;SYNC NOT SET
2246  006652  052737  001000  024230    BIS     #SYNC,@#CBMAP   ;UPDATE MAP
2247
2248  006656  032777  031000  172410    BIT     #31000,@DXDS    ;CHECK FOR NO IBM RESET
2249  006664  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2250  006666  104000                    ERROR                   ;IBM RESET
2251
2252                                    ;VERIFY BUS ADDRESS DATA WAS TRANSFERRED INTO DXND
2253
2254  006672  027777  177024  172420    CMP     @#IMAGBA,@DXND  ;CHECK NPR DATA
2255  006676  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2256  006700  104000                    ERROR                   ;SPH TO DXND TRANSFER ERROR
2257  006702  057737  177012  024272    BIS     @#IMAGBA,@#NDMAP        ;UPDATE MAP
2258
2259  006710  004737  024052    TSTAG:  JSR     PC;CHKREG
2260  006714  004537  023560            JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2261  006720  000001                    1                       ;                       1 CLOCK PULSE(S)
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2282
2283  006722  032777  000040  172364          BIT     #NPRX,@DXCB     ;TEST FOR NPRX
2284  006730  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2285  006732  104000                          ERROR                   ;NPRX SET
2286  006734  042737  000040  024230          BIC     #NPRX,@#CBMAP   ;UPDATE MAP
2287  006742  032777  000040  172350          BIT     #NPRTO,@DXES    ;TEST FOR NPR TIME OUT
2288  006750  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2289  006752  104000                          ERROR                   ;NPRTO SET
2290
2291  006754  004737  024052                  JSR     PC,CHKREG
2292
2293  006760  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2294  006764  014000                          PHS11                   ;THIS PHASE AND STATE                   PHS11
2295
2296  006766  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2297  006772  000001                          1                       ;                               1 CLOCK PULSE(S)
2298  006774  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2299  007000  016000                          PHS12                   ;THIS PHASE AND STATE                   PHS12
2300  007002  004737  024052                  JSR     PC,CHKREG
2301  007006  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2302  007012  000001                          1                       ;                               1 CLOCK PULSE(S)
2303  007014  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2304  007020  024000                          PHS21                   ;THIS PHASE AND STATE                   PHS21
2305
2306
2307                                  ;ADVANCE TO STATUS PREPARATION (PHASE TWO TIME STATE ONE)
2308                                  ;VERIFY SIGS EVENTS TRANSFERRED
2309                                  ;COPY A ZERO INTO TYPAS IF DXND(15100) NOT ZERO (DO DST)
2310
2311  007022  032777  000100  172264          BIT     #BYPAS,@DXCB    ;VERIFY DXND(15100)=0 SET BYPAS
2312  007030  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2313  007032  104000                          ERROR                   ;BYPAS NOT SET
2314  007034  042737  000100  024230          BIC     #BYPAS,@#CBMAP  ;UPDATE REG MAP
2315
2316                                  ;VERIFY THE LOW (N/NZERO) BYTE OF SPW WAS PRESENTED
2317                                  ;AS STATUS BY LOADING DXND(07100) INTO CUSR
2318
2319
2100  007042  127777  177452  172262          CMPB    @#MAGBA,@CUSR   ;VERIFY SPW(07100) STATUS PRESENT
2101  007050  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2102  007052  104000                          ERROR                   ;SPW TO CUSR TRANSFER ERROR
2103  007054  117737  172252  024114          MOVB    @CUSR,@#OSMAP   ;UPDATE REG MAP
2104  007062  127777  172240  172292          CMPB    @CUAR,@BUSI     ;VERIFY ADRS ON BUSI FOR ECHO
2105  007070  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2106  007072  104000                          ERROR                   ;CUAR TO BUSI TRANSFER ERROR
2107  007074  017727  172212                  MOV     @DXMI,(PC)+     ;SAVE DXMI
2108  007100  000000                  SMIP1   0                       ;HERE
2109  007102  042737  177000  007100          BIC     #177000,@#SMIP  ;CLEAR ALL BUT ADRS+PARITY
2110  007110  023737  027452  007100          CMP     @#KEV,@#SMIP    ;COMPARE DEV ADRS+PARITY
2111  007116  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2112  007120  104000                          ERROR                   ;MI LOAD ERROR
2113  007122  042737  000777  024174          BIC     #777,@#MIMAP
2114  007130  053737  007100  024174          BIS     SMIP,@#MIMAP    ;UPDATE MAP
2115  007136  032777  001000  172150          BIT     #SYNC,@DXCB     ;SYNC ZERO?
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2116  007144  001421                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2117  007146  104000                        ERROR                   ;SYNC SET
2118  007150  042737  001000  024230        BIC     #SYNC,@#CBMAP   ;UPDATE MAP
2119
2120                                  ;WAITING FOR ADRI(ADRO DROP) TO COME UP
2121
2122  007156  004737  024052                JSR     PC;CHKREG
2123  007162  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2124  007166  000001                        1                       ;                               1 CLOCK PULSE(S)
2125  007170  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2126  007174  020022                        PHS22                   ;THIS PHASE AND STATE                   PHS22
2127  007176  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2128  007202  000011                        11                      ;                               11 CLOCK PULSE(S)
2129  007204  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2130  007210  024000                        PHS21                   ;THIS PHASE AND STATE                   PHS21
2131  007212  004737  024052                JSR     PC;CHKREG
2132
2133                                  ;DROPPING OF ADRO SHOULD RAISE ADRI
2134
2135  007216  042777  004000  172004        BIC     #ADRO,@DXMO     ;DROP ADRO
2136  007224  032777  004000  172006        BIT     #ADRO,@DXMO     ;NOT WITHOUT CLOCK
2137  007232  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2138  007234  104000                        ERROR                   ;ADRO NOT SET
2139  007236  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2140  007242  000002                        2                       ;                               2 CLOCK PULSE(S)
2141  007244  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2142  007250  024000                        PHS21                   ;THIS PHASE AND STATE                   PHS21
2143  007252  032777  004000  172030        BIT     #ADRO,@DXMO     ;ADRO SHOULD DROP
2144  007260  001401                        BEQ     .+3             ;BRANCH IF NO ERROR CONDITION
2145  007262  104000                        ERROR                   ;ADRO SET
2146  007264  042737  004000  024152        BIC     #ADRO,@#MOMAP   ;UPDATE MAP
2147
2148                                  ;ADRECC,D DROP WHEN ADRO DROPS
2149
2150  007272  032777  000002  172014        BIT     #ADRECC,@DXCB   ;TEST FOR NO ADRECC
2151  007300  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2152  007302  104000                        ERROR                   ;ADRECC SET
2153  007304  042737  000002  024230        BIC     #ADRECC,@#CBMAP ;UPDATE CB MAP
2154  007312  032777  000001  171774        BIT     #ADRECD,@DXCB   ;TEST FOR NO ADRECD
2155  007320  001401                        BEQ     .+3             ;BRANCH IF NO ERROR CONDITION
2156  007322  104000                        ERROR                   ;ADRECD SET
2157  007324  042737  000001  024230        BIC     #ADRECD,@#CBMAP ;UPDATE CB MAP
2158  007332  004737  024052                JSR     PC;CHKREG
2159  007336  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2160  007342  000001                        1                       ;                               1 CLOCK PULSE(S)
2161  007344  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2162  007350  020022                        PHS22                   ;THIS PHASE AND STATE                   PHS22
2163  007352  032777  010000  171732        BIT     #ADRI,@DXMI     ;ADRS-IN SHOULD BE UP
2164  007360  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2165  007362  104000                        ERROR                   ;ADRI NOT SET
2166  007364  052737  010000  024174        BIS     #ADRI,@#MIMAP   ;UPDATE MAP
2167  007372  004737  024052                JSR     PC;CHKREG
2168  007376  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2169  007402  000010                        10                      ;                               10 CLOCK PULSE(S)
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2170  007464  112777  000000  171676          MOVB    #0;@DXMO        ;REMOVE ADRS FROM BUSO
2171  007472  112737  000000  024192          MOVB    #0;@#MOMAP      ;UPDATE MAP
2172  007500  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ;SSUE CLOCK PULSES
2173  007504  000002                          2                       ;                                   2 CLOCK PULSE(S)
2174  007506  004737  024052                  JSR     PC;CHKREG
2175                                  ;RELEAVE ALL ONES STATUS FROM BUSI
2176  007512  012737  000403  027454          MOV     #NOPC,CMD       ;LOAD COMMAND
2177  007520  053777  027454  171642          BIS     CMD,@DXMO       ;LOAD CMD + PARITY ON BUSO
2178  007526  053737  027454  024192          BIS     CMD,@#MOMAP     ;UPDATE MAP
2179  007534  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2180  007540  000002                          2                       ;                                   2 CLOCK PULSE(S)
2181  007542  032777  001000  171622          BIT     #CLKO,@DXMI     ;TEST FOR CLOCK-OUT
2182  007550  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2183  007552  104000                          ERROR                   ;CLKO NOT SET
2184  007554  052737  001000  024174          BIS     #CLKO,@#MIMAP   ;UPDATE MI MAP
2185  007562  004737  024052                  JSR     PC,CHKREG
2186                                  ;STILL WAITING IN PHS21 FOR CMDO
2187  007576  052777  002000  171574          BIS     #C DO,@DXMO     ;RAISE COMMAND-OUT
2188  007614  032777  002000  171566          BIT     #CMDO,@DXMO     ;NOT WITHOUT CLOCK
2189  007622  001401                          BEQ     .+1             ;BRANCH IF NO ERROR CONDITION
2190  007624  104000                          ERROR                   ;CMDO NOT BUFFERED
2191  007626  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2192  007632  000001                          1                       ;                                   1 CLOCK PULSE(S)
2193  007634  032777  002000  171546          BIT     #CMDO,@DXMO     ;CMDO SHOULD BE UP
2194  007642  001001                          BNE     .+1             ;BRANCH IF NO ERROR CONDITION
2195  007644  104000                          ERROR                   ;CMDO NOT SET
2196  007646  052737  002000  024192          BIS     #CMDO,@#MOMAP   ;UPDATE MAP
2197                                  ;DO NPR FETCH OF STATUS FROM DST
2198                                  ;VERIFY DXND(15:00  INTO DXBA(15:00)
2199
2200  007654  017727  171536                  MOV     @DXND,(PC)+     ;SAVE DXND
2201  007660  000000          P2ND:   0               ;HERE
2202  007662  017727  171516                  MOV     @DXBA,(PC)+     ;SAVE DXBA
2203  007666  000000          P2BA:   0               ;HERE
2204  007672  123737  007661  007667          CMPB    @#P2ND+1,@#P2BA+1       ;VERIFY DXND(15:00) TO BA(15:00)
2205  007700  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2206  007702  104000                          ERROR                   ;ON TO BA TRANSFER ERROR
2207  007704  123727  007666  000002          CMPB    @#P2BA,#2               ;VERIFY BUSO(07:01) TO BA(07:01)
2208  007712  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2209  007714  104000                          ERROR                   ;BUSO TO BA TRANSFER ERROR
2210  007716  017737  171464  024126          MOV     @DXBA,@#BAMAP   ;UPDATE MAP
2211  007724  004537  023560                  JSR     R5 @#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2212  007730  000001                          1                       ;                                   1 CLOCK PULSE(S)
2213  007732  004737  023430                  JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2214  007736  020000                          PHS22                   ;THIS PHASE AND STATE                       PHS22
2215  007740  032777  010000  171446          BIT     #ADRI,@DXMI     ;ADRS-IN SHOULD BE DOWN
2216  007746  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2217  007750  104000                          ERROR                   ;ADRI DID NOT DROP
2218  007752  042737  010000  024174          BIC     #ADRI,@#MIMAP   ;UPDATE MAP
2219  007760  123777  027454  171444          CMPB    CMD,@CUCR       ;CMD SHOULD BE IN CUCR
2220  007766  001401                          BEQ     .+3             ;BRANCH IF NO ERROR CONDITION
2221  007770  104000                          ERROR                   ;CMD LOAD ERROR
2222  007772  113737  027454  024071          MOVB    CMD,@#CAMAP+1   ;UPDATE CMD SIDE OF CA MAP
2223  007800  032777  000100  171410          BIT     #BYPAS,@DXCB    ;VERIFY BYPAS SET
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2224  P07774  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2225  P07776  104000                        ERROR                   ;BYPAS NOT SET
2226  P07710  052737  P00100  024230        BIS     #BYPAS,@#CBMAP  ;UPDATE MAP
2227  P07716  032777  P00040  171370        BIT     #NPRX,@DXCB     ;VERIFY NPRX SET
2228  P07724  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2229  P07726  104000                        ERROR                   ;NPRX NOT SET
2230  P07730  052737  P00040  024230        BIS     #NPRX,@#CBMAP   ;UPDATE MAP
2231  P07736  032777  001000  171350        BIT     #SYNC,@DXCB     ;VERIFY SYNC SET
2232  P07744  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2233  P07746  104000                        ERROR                   ;SYNC NOT SET
2234  P07750  052737  001000  024230        BIS     #SYNC,@#CBMAP   ;UPDATE MAP
2235  P07756  013701  001442                MOV     DST,R1          ;LOAD ADDRESS OF DST
2236  P07762  027761  171330  000002        CMP     @DXND,2(R1)     ;VERIFY DST TO DXND TRANSFER
2237  P07770  001401                        BEQ     .+6             ;BRANCH IF NO ERROR CONDITION
2238  P07772  104000                        ERROR                   ;DST TO DXND TRANSFER ERROR
2239  P07774  017737  171316  024272        MOV     @DXND,@#NDMAP   ;UPDATE MAP
2240  P10002  004737  P24052                JSR     PC,@#CHKREG
2241  P10006  004537  023560                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2242  P10012  000002                        2                       ;                               2 CLOCK PULSE(S)
2243  P10014  004737  023430                JSR     PC,@#PHST       ;CHECK CONTROL BITS FOR
2244  P10020  020000                        PHS22                   ;THIS PHASE AND STATE                   PHS22
2245  P10022  032777  000040  171264        BIT     #NPRX,@DXCB     ;VERIFY NPRX 0
2246  P10030  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2247  P10032  104000                        ERROR                   ;NPRX NOT ZERO
2248  P10034  042737  000040  024230        BIC     #NPRX,@#CBMAP   ;UPDATE MAP
2249  P10042  004737  024052                JSR     PC,@#CHKREG
2250  P10046  004537  023560                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2251  P10052  000001                        1                       ;                               1 CLOCK PULSE(S)
2252  P10054  004737  023430                JSR     PC,@#PHST       ;CHECK CONTROL BITS FOR
2253  P10060  034000                        PHS31                   ;THIS PHASE AND STATE                   PHS31
2254  P10062  032777  001000  171224        BIT     #SYNC,@DXCB     ;VERIFY SYNC 0
2255  P10070  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2256  P10072  104000                        ERROR                   ;SYNC NOT ZERO
2257  P10074  042737  001000  024230        BIC     #SYNC,@#CBMAP   ;UPDATE MAP
2258  P10102  017727  171210                MOV     @DXND,(PC)+     ;SAVE DXND
2259  P10106  000000                P3ND:   0                       ;HERE
2260  P10110  123777  010107  171214        CMPB    @#P3ND+1,@CUSR  ;VERIFY DXND(15:08) TO CUSR
2261  P10116  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2262  P10120  104000                        ERROR                   ;DXND(15:08) TO CUSR TRANSFER ERROR
2263  P10122  017737  171170  024272        MOV     @DXND,@#NDMAP   ;UPDATE MAP
2264  P10130  017737  171146  024114        MOV     @DBOS,@#OSMAP   ;UPDATE MAP
2265  P10136  004737  024052                JSR     PC,@#CHKREG
2266  P10142  032777  004000  171142        BIT     #STAI,@DXMI     ;STATUS-IN 0
2267  P10150  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2268  P10152  104000                        ERROR                   ;STAI NOT ZERO
2269  P10154  042737  004000  024174        BIC     #STAI,@#MIMAP
2270  P10162  032777  000200  171104        BIT     #CHIS,@DXDS     ;CH INITIATED SELECTION
2271  P10170  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2272  P10172  104000                        ERROR                   ;CHIS NOT SET
2273  P10174  052737  000200  024036        BIS     #CHIS,@#OSMAP   ;UPDATE MAP
2274  P10202  032777  000100  171104        BIT     #BYPAS,@DXCB    ;VERIFY BYPAS SET
2275  P10210  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2276  P10212  104000                        ERROR                   ;PARITY ERROR ON CMD
2277  P10214  052737  000100  024230        BIS     #BYPAS,@#CBMAP  ;UPDATE MAP
```

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2278  P1P222  004737  P24052                  JSR     PC;CHKREG
2279  P1P226  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2280  P1P232  000001                          1                       ;                                1 CLOCK PULSE(S)
2281  P1P234  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2282  P1P240  030030                          PHS32                   ;THIS PHASE AND STATE                    PHS32
2283  P1P242  126177  000003  171072          CMPB    3(R1),@BUSI     ;VERIFY SET TO BUSI TRANSFER
2284  P1P250  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2285  P1P252  104030                          ERROR                   ;BUSI STATUS ERROR
2286  P1P254  117737  171062  024174          MOVB    @BUSI,@#MIMAP
2287  P1P262  032777  000400  171022          BIT     #PARI,@DXMI     ;CHECK PARITY GENERATOR
2288  P1P270  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2289  P1P272  104030                          ERROR                   ;PARITY ERROR
2290  P1P274  052737  000400  024174          BIS     #PARI,@#MIMAP
2291  P1P302  004737  P24052                  JSR     PC;CHKREG
2292  P1P306  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2293  P1P312  000007                          7                       ;                                7 CLOCK PULSE(S)
2294  P1P314  004737  P24052                  JSR     PC;CHKREG
2295
2296                                  ;WAIT FOR CMDO TO DROP
2297
2298                                  ;PREP FOR SIG6A
2299
2300  P1P320  032777  001000  170702          BIT     #SRVO,@DXMO     ;SRVO=0?
2301  P1P326  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2302  P1P330  104000                          ERROR                   ;SRVO SET
2303  P1P332  032777  034000  170734          BIT     #IBMRST,@DXDS   ;IBM RESET
2304  P1P340  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2305  P1P342  104000                          ERROR                   ;
2306  P1P344  042777  002000  170736          BIC     #CMDO,@DXMO     ;DROP COMMAND-OUT
2307  P1P352  032777  002000  170730          BIT     #CMDO,@DXMO     ;NOT WITHOUT CLOCK
2308  P1P360  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2309  P1P362  104000                          ERROR                   ;CMDO NOT BUFFERED
2310  P1P364  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2311  P1P370  000002                          2                       ;                                2 CLOCK PULSE(S)
2312  P1P372  004737  023430                  JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2313  P1P376  030031                          PHS31                   ;THIS PHASE AND STATE                    PHS31
2314  P1P400  032777  002000  170702          BIT     #CMDO,@DXMO     ;CMDO SHOULD BE ZERO
2315  P1P406  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2316  P1P410  104000                          ERROR                   ;CMDO STUCK HIGH
2317  P1P412  042737  002000  024192          BIC     #CMDO,@#MOMAP   ;UPDATE MAP
2318
2319                                  ;VERIFY SI06A EVEN_S TRANSPIRED
2320  P1P420  032777  001000  170646          BIT     #CHENDS,@DXDS   ;VERIFY CHENDS SET
2321  P1P426  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2322  P1P430  104000                          ERROR                   ;CHENDS NOT SET
2323  P1P432  052737  001000  024096          BIS     #CHENDS,@#DSMAP
2324  P1P440  032777  004000  170644          BIT     #SIAI,@DXMI     ;VERIFY STATUS-IN UP
2325  P1P446  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2326  P1P450  104000                          ERROR                   ;STATUS-IN NOT SET
2327  P1P452  052737  004000  024174          BIS     #STAI,@#MIMAP   ;UPDATE MI MAP
2328
2329  P1P460  004737  024052                  JSR     PC;CHKREG
2330  P1P464  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2331  P1P470  000010                          10                      ;                                10 CLOCK PULSE(S)
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2332                                        ;WAIT FOR SIG6 QUALIFIED SRVO,STAI
2333  018472  004737  024052                        JSR     PC,@#CHKREG
2334  018476  004737  023430                        JSR     PC,@#PHST           ;CHECK CONTROL BITS FOR
2335  018502  034000                              PHS31                       ;THIS PHASE AND STATE                   PHS31
2336  018504  017737  170564  022690                MOV     @#DXDS,@#ENTRY1     ;LOAD IT ENTRY ONE
2337  018512  017737  170560  022710                MOV     @#DXCA,@#ENTRY2     ;LOAD IT ENTRY TWO
2338  018520  012777  024560  170536                MOV     #FAILSL,@#DXIV      ;POINT INTER VECTOR TO TRAP
2339  018526  013777  001272  170530                MOV     LESS1,@#DXIV        ;DX PRT MINUS ONE
2340  018534  052777  000100  170536                BIS     #INTEN,@#DXCS       ;SET INTERRUPT ENABLE
2341  018542  052737  000100  024102                BIT     #INTEN,@#CSMAP      ;UPDATE MAP
2342
2343  018550  004737  024052                        JSR     PC,@#CHKREG
2344  018554  052777  001000  170526                BIS     #SRVO,@#DXMO        ;ENABLE SIG6
2345                                        ;ADVANCE TO MARK (PHASE FOUR TIME STATE 1)
2346
2347  018562  004537  023560                        JSR     R5,@#CLK            ;ROUTINE TO ISSUE CLOCK PULSES
2348  018566  000002                              2                           ;                                   2 CLOCK PULSE(S)
2349  018570  032777  001000  170512                BIT     #SRVO,@#DXMO        ;SRVO IS UP
2350  018576  001001                              BNE     .+4                 ;BRANCH IF NO ERROR CONDITION
2351  018600  104000                              ERROR                       ;SRVO NOT SET
2352  018602  052737  001000  024132                BIS     #SRVO,@#MOMAP       ;UPDATE MAP
2353  018610  032777  004000  170474                BIT     #STAI,@#DXMI        ;STATUS-IN SHOULD DROP
2354  018616  001401                              BEQ     .+4                 ;BRANCH IF NO ERROR CONDITION
2355  018620  104000                              ERROR                       ;STAI STUCK HIGH
2356  018622  042737  004000  024174                BIC     #STAI,@#MIMAP       ;UPDATE MI MAP
2357  018630  004737  023430                        JSR     PC,@#PHST           ;CHECK CONTROL BITS FOR
2358  018634  044000                              PHS41                       ;THIS PHASE AND STATE                   PHS41
2359                                        ;BA LOAD IS ASYNC
2360
2361  018636  032777  001000  170440                BIT     #BIT9,@#DXBA        ;TYNDX OFFSET
2362  018644  001001                              BNE     .+4                 ;BRANCH IF NO ERROR CONDITION
2363  018646  104000                              ERROR                       ;DXBA(09) NOT SET
2364  018650  052737  001000  024126                BIS     #BIT9,@#BAMAP       ;UPDATE MAP
2365  018656  105777  170422                        TSTB    @#DXBA              ;SET UP FOR TT ENTRY
2366  018662  001401                              BEQ     .+4                 ;BRANCH IF NO ERROR CONDITION
2367  018664  104000                              ERROR                       ;DXBA LOAD ERROR
2368  018666  105037  024126                        CLRB    @#BAMAP             ;UPDATE BAMAP
2369  018672  023777  001440  170424                CMP     @#LT,@#DXBA         ;DXBA MUST POINT TO TT
2370  018700  001401                              BEQ     .+4                 ;BRANCH IF NO ERROR CONDITION
2371  018702  104000                              ERROR                       ;DXBA LOAD ERROR
2372  018704  017737  170374  024126                MOV     @#DXBA,@#BAMAP      ;UPDATE MAP
2373  018712  004737  024052                        JSR     PC,@#CHKREG
2374                                        ;VERIFY SIG7
2375  018716  032777  000040  170370                BIT     #NPRX,@#DXCB        ;NPRX MUST BE ZERO
2376  018724  001401                              BEQ     .+4                 ;BRANCH IF NO ERROR CONDITION
2377  018726  104000                              ERROR                       ;NPRX SET
2378  018730  032777  000100  170396                BIT     #SYNC,@#DXCB        ;SYNC MUST BE ZERO
2379  018736  001401                              BEQ     .+4                 ;BRANCH IF NO ERROR CONDITION
2380  018740  104000                              ERROR                       ;SYNC SET
2381  018742  004537  023560                        JSR     R5,@#CLK            ;ROUTINE TO ISSUE CLOCK PULSES
2382  018746  000001                              1                           ;                                   1 CLOCK PULSE(S)
2383  018750  004737  023430                        JSR     PC,@#PHST           ;CHECK CONTROL BITS FOR
2384  018754  040000                              PHS42                       ;THIS PHASE AND STATE                   PHS42
2385                                        ;VERIFY BUS ADDRESS
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2386  P10756  017727  170320          MOV     @DXDS,(PC)+     ;SAVE OFFSET
2387  P10762  000000                  IBA2:   0               ;HERE, BA IMAGE #2
2388  P10764  042737  001777  010762          BIC     #1777,@#IBA2    ;CLEAR ALL BUT OFFSET
2389  P10772  117727  170352          MOVB    @TTNDX,(PC)+    ;SAVE TTNDX
2390  P10776  000000                  INDX:   0               ;HERE
2391  P11000  005337  010776          DEC     @#INDX          ;LOOK BACK TO SEE WHERE DATA WENT
2392  P11004  006337  010776          ASL     @#INDX          ;WORD BOUNDARIES
2393  P11010  042737  177001  010776          BIC     #177001,@#INDX  ;CLEAR ALL BUT TTNDX BITS
2394  P11016  053737  010776  010762          BIS     @#INDX,@#IBA2   ;BUILD BA IMAGE
2395  P11024  052737  001000  010762          BIS     #BIT9,@#IBA2    ;TT OFFSETS SPW BY 1000
2396                          ;VERIFY DXBA CONTAINS PROPER TT ADRS
2397  P11032  023777  010762  170244          CMP     @#IBA2,@DXBA    ;IMAGE BA=BA
2398  P11040  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2399  P11042  104000                          ERROR                   ;DXBA LOAD ERROR
2400                          ;VERIFY DS MADE IT TO ND
2401  P11044  027777  170224  170244          CMP     @DXDS,@DXND     ;CONTENTS OF DS MADE IT TO ND
2402  P11052  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2403  P11054  104020                          ERROR                   ;DS INTO ND TRANSFER ERROR
2404  P11056  057737  170212  024272          BIS     @DXDS,@#NDMAP   ;UPDATE ND MAP
2405
2406                          ;VERIFY NO DATA MADE IT TO TUMBLE TABLE
2407  P11064  027777  170204  177670          CMP     @DXDS,@IBA2     ;DS MADE IT TO TT?
2408  P11072  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2409  P11074  104000                          ERROR                   ;DS INTO TT TRANSFER ERROR
2410  P11076  013737  010762  024126          MOV     @#IBA2,@#BAMAP  ;UPDATE
2411  P11104  032777  001000  170202          BIT     #SYNC,@DXCB     ;SIGN
2412  P11112  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2413  P11114  104000                          ERROR                   ;SYNC NOT SET
2414  P11116  052737  001000  024230          BIS     #SYNC,@#CBMAP   ;UPDATE MAP
2415  P11124  117737  170220  024251          MOVB    @TTNDX,@#ESMAP+1        ;UPDATE ES MAP
2416  P11132  032777  000100  170194          BIT     #BYPAS,@DXCB    ;BYPAS SHOULD DROP
2417  P11140  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2418  P11142  104000                          ERROR                   ;BYPAS SET
2419  P11144  042737  000100  024230          BIC     #BYPAS,@#CBMAP  ;UPDATE MAP
2420  P11152  032777  000040  170134          BIT     #NPRX,@DXCB     ;NPRX SHOULD BE UP
2421  P11160  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2422  P11162  104000                          ERROR                   ;NPRX NOT SET
2423  P11164  052737  000040  024230          BIS     #NPRX,@#CBMAP   ;UPDATE MAP
2424  P11172  032777  000020  170114          BIT     #NPRT,@DXCB     ;NPRT SHOULD BE UP
2425  P11200  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2426  P11202  104000                          ERROR                   ;NPRT NOT SET
2427  P11204  052737  000020  024230          BIS     #NPRT,@#CBMAP   ;UPDATE MAP
2428  P11212  004737  024052                  JSR     PC,CHKREG
2429  P11216  042777  001000  170064          BIC     #SRVO,@DXMO     ;GET RID OF SRVO ON NEXT CLOCK
2430  P11224  042737  001000  024192          BIC     #SRVO,@#MOMAP   ;UPDATE MAP
2431
2432  P11232  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2433  P11236  000001                          1                       ;                       1 CLOCK PULSE(S)
2434  P11240  004737  P23430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2435  P11244  044000                          PH541                   ;THIS PHASE AND STATE           PH541
2436  P11246  032777  000040  170040          BIT     #NPRX,@DXCB     ;TEST FOR NPRX=0
2437  P11254  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2438  P11256  104000                          ERROR                   ;NPRX DID NOT DROP
2439  P11260  042737  000040  024230          BIC     #NPRX,@#CBMAP   ;UPDATE MAP
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2440
2441  011266  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2442  011272  000001                    1                       ;                                   1 CLOCK PULSE(S)
2443  011274  004737  023430            JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2444  011300  040000                    PHS42                   ;THIS PHASE AND STATE                       PHS42
2445  011302  013727  001440            MOV     TT,(PC)+
2446  011306  000000            STT1:   0                       ;SAVE TT ADRS
2447  011310  062737  000002  011336    ADD     #2,STT1         ;CREATE BA IMAGE
2448  011316  023777  011300  167760    CMP     STT1,@DXBA      ;VERIFY CORRECT BUS ADDRESS
2449  011324  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2450  011326  104000                    ERROR                   ;DXBA LOAD ERROR
2451  011330  013737  011300  024126    MOV     STT1,@DAMAP     ;UPDATE MAP
2452  011336  004737  024052            JSR     PC,@#CHKREG
2453
2454
2455
2456
2457
2458
2459
2460
2461
2462  011342  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2463  011346  000001                    1                       ;                                   1 CLOCK PULSE(S)
2464  011350  004737  023430            JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2465  011354  070000                    PHS71                   ;THIS PHASE AND STATE                       PHS71
2466  011356  027777  167734  167712    CMP     @DXND,@DXCA     ;ND SHOULD CONTAIN CA
2467  011364  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2468  011366  104000                    ERROR                   ;CA INTO ND TRANSFER ERROR
2469  011370  017737  167722  024272    MOV     @DXND,NDMAP     ;UPDATE MAP
2470  011376  032777  001000  167710    BIT     #SYNC,@DXCB     ;
2471  011404  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2472  011406  104000                    ERROR                   ;SYNC SET
2473  011412  042737  001000  024230    BIC     #SYNC,@#CBMAP   ;UPDATE CB MAP
2474  011416  032777  000040  167670    BIT     #NPRX,@DXCB     ;NPRX MUST BE ONE
2475  011424  001001                    BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2476  011426  104000                    ERROR                   ;NPRX NOT SET
2477  011430  052737  000040  024230    BIS     #NPRX,@#CBMAP   ;UPDATE CB MAP
2478  011436  032777  000200  167634    BIT     #DONE,@DXCS     ;DONE MUST BE SET
2479  011444  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2480  011446  104000                    ERROR                   ;DONE NOT SET
2481  011450  052737  000200  024102    BIS     #DONE,@#CSMAP   ;UPDATE MAP
2482  011456  032777  000200  167634    BIT     #INTREQ,@DXES   ;TEST FOR INTREQ
2483  011464  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2484  011466  104000                    ERROR                   ;INTREQ NOT SET
2485  011470  052737  000200  024250    BIS     #INTREQ,@#ESMAP ;UPDATE MAP
2486  011476  062737  000400  024250    ADD     #4.0,ESMAP      ;UPDATE TTNDX  MAP
2487  011504  004737  024052            JSR     PC,CHKREG
2488
2489
2490  011510  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2491  011514  000001                    1                       ;                                   1 CLOCK PULSE(S)
2492  011516  004737  023430            JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2493  011522  070000                    PHS72                   ;THIS PHASE AND STATE                       PHS72
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2494  011524  032777  000040  167502          BIT     @NPRX,@DXCB     ;NPRX SHOULD = ZERO
2495  011532  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2496  011534  104000                          ERROR                   ;NPRX SET
2497  011536  042737  000040  024230          BIC     @NPRX,CBMAP     ;UPDATE MAP
2498  011544  004737  024052                  JSR     PC,CHKREG
2499
2500
2501  011550  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ;SSUE CLOCK PULSES
2502  011554  000001                          1                       ;                                1 CLOCK PULSE(S)
2503  011556  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2504  011562  074000                          PHS71                   ;THIS PHASE AND STATE                    PHS71
2505  011564  004737  024052                  JSR     PC,CHKREG
2506
2507
2508
2509
2510
2511  011570  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ;SSUE CLOCK PULSES
2512  011574  000001                          1                       ;                                1 CLOCK PULSE(S)
2513  011576  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2514  011602  070000                          PHS72                   ;THIS PHASE AND STATE                    PHS72
2515  011604  032777  001000  167502          BIT     @SYNC,@DXCB     ;SYNC'S UP
2516  011612  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2517  011614  104000                          ERROR                   ;SYNC NOT SET
2518  011616  052737  001000  024230          BIS     @SYNC,@#CBMAP   ;UPDATE MAP
2519  011624  032777  000040  167462          BIT     @NPRX,@DXCB     ;NPRX IS ZERO
2520  011632  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2521  011634  104000                          ERROR                   ;NPRX NOT ZERO
2522  011636  042737  000040  024230          BIC     @NPRX,CBMAP     ;UPDATE MAP
2523  011644  032777  000020  167442          BIT     @NPRT,@DXCB     ;NPRT IS ZERO
2524  011652  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2525  011654  104000                          ERROR                   ;NPRT NOT ZERO
2526  011656  042737  000020  024230          BIC     @NPRT,CBMAP     ;UPDATE MAP
2527  011664  005777  167404                  TST     @DXDS           ;DEVICE STATUS REG MUST BE ZERO
2528  011670  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2529  011672  104000                          ERROR                   ;DS
2530  011674  005037  024056                  CLR     @#DSMAP         ;UPDATE MAP
2531  011700  004737  024052                  JSR     PC,CHKREG
2532
2533  011704                          YES1:
2534  011704  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2535  011710  000001                          1                       ;                                1 CLOCK PULSE(S)
2536  011712  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2537  011716  074000                          PHS71                   ;THIS PHASE AND STATE                    PHS71
2538  011720  004737  024052                  JSR     PC,CHKREG
2539  011724  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2540  011730  000010                          10                      ;                                10 CLOCK PULSE(S)
2541  011732  004737  024052                  JSR     PC,CHKREG
2542  011736  042777  000002  167394          BIC     @MCLKEN,@DXES   ;CLEAR MAINT CLK EN
2543  011744  032777  000002  167346          BIT     @MCLKEN,@DXES
2544  011752  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2545  011754  104000                          ERROR                   ;MCLKEN STUCK HIGH
2546  011756  042777  000200  167314          BIC     @DONE,@DXCS     ;CLEAR DONE AND LOCKO
2547  011764  032777  000200  167306          BIT     @DONE,@DXCS
```

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2548  011772  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2549  011774  104000                          ERROR                   ;DONE STUCK
2550  011776  032777  100000  167310          BIT     #LOCK0,@DXCB    ;LOCK0 MUST BE ZERO
2551  012004  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2552  012006  104000                          ERROR                   ;LOCK0 STUCK HIGH
2553  012010  052777  000001  167262          BIS     #DXFRS,@DXCS    ;RETURN TO PHASE ZERO
2554  012016  017727  167272                  MOV     @DXCB,(PC)+     ;SAVE CB
2555  012022  000000                  SCB81:  0                       ;HERE
2556  012024  042737  004000  012022          BIC     #TSSF,SCB8      ;CLEAR TIME STATE FLOP
2557  012032  005737  012022                  TST     SCB8
2558  012036  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2559  012040  104000                          ERROR                   ;NOT PHASE ZERO
2560                                  ;EXIT IN PHASE ZERO
2561
2562  012042  004737  003414                  JSR     PC,SPW,SETUP    ;REBUILD SPW
2563
```

```
2564                                    ;*****************************************************
2565                                    ;TEST  3        MAINTENANCE CLOCK OUTPUT (IBM READ) TEST
2566                                    ;***************** *****************************************
2567  012046  104400                    TST3:   SCOPE
2568  012050  012737  000480  025130            MOV     #480,@#ICOUNT   ;ITERATION COUNT
2569  012056  012737  000003  026126            MOV     #3!@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
2570  012064  012737  012072  025104            MOV     #SCP3,@#RETURN  ;SCOPE LOOP RETURN ADRS
2571  012072                            SCP3:
2572
2573  012072  004737  024344                    JSR     PC,DXINES       ;DX AND TABLE INITIALIZATION
2574  012076  012737  000002  027494            MOV     #READC,@#CMD    ;LOAD COMMAND
2575  012104  004737  023024                    JSR     PC,@#TRAINT     ;TT TRACE TRACE INIT
2576  012110  012737  000200  022698            MOV     #CMIS,@#ENTRY1  ;LOAD EXPECTED TT ENTRY 1
2577  012116  013737  001272  177776            MOV     @#LESS1,PS      ;LOWER PROCESSOR STATUS
2578  012124  012737  012124  025220            MOV     #.,@#TERPC      ;ORIGIN OF TRAP ERROR
2579  012132  004737  023126                    JSR     PC,FASTISS              ;SELECT
2580
2581  012136  017737  167136  024102            MOV     @DXCS,@#CSMAP   ;UPDATE MAP
2582  012144  012737  177774  027510            MOV     #-4,@#COUNT     ;SOFTWARE BYTE COUNTER
2583  012152  013777  027510  167126            MOV     @#COUNT,@DXBC   ;LOAD BYTE COUNT
2584  012160  023777  027510  167120            CMP     @#COUNT,@DXBC   ;VERIFY LOAD
2585  012166  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2586  012170  104000                            ERROR                   ;
2587  012172  017737  167110  024140            MOV     @DXBC,@#BCMAP   ;UPDATE BYTE COUNT
2588  012200  052777  100000  167072            BIS     #PARSTP,@DXCS   ;SET STOP-ON-PARITY ERROR
2589  012206  032777  100000  167064            BIT     #PARSTP,@DXCS   ;VERIFY CONTROL AND STATUS
2590  012214  001001                            BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2591  012216  104000                            ERROR                   ;STOP-ON-PARITY ERROR NOT SET
2592  012220  052737  100000  024102            BIS     #PARSTP,@#CSMAP ;UPDATE MAP
2593  012226  012777  016676  167030            MOV     #M%RD,@DXIV     ;TRANSFER DONE INTERRUPT
2594  012234  012737  000020  022698            MOV     #CUDEND,@#ENTRY1        ;LOAD READ DONE DS
2595  012242  012777  016772  167034            MOV     #M%RDAT,@DXBA   ;BUS ADDRESS FOR NPR DATA
2596  012250  022777  016772  167026            CMP     #M%RDAT,@DXBA   ;VERIFY LOAD
2597  012256  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2598  012260  104000                            ERROR                   ;DXBA LOAD ERROR
2599  012262  017737  167016  024126            MOV     @DXBA,@#BAMAP   ;UPDATE MAP
2600  012270  012701  016772                    MOV     #M%RDAT,R1      ;POINT R1 TO SOURCE FILE FOR WRITE
2601  012274  052777  000002  167016            BIS     #M%CLKEN,@DXES  ;SET MAINTENANCE CLOCK END
2602
2603  012302  032777  000002  167010            BIT     #MCLKEN,@DXES   ;VERIFY SET
2604  012310  001001                            BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2605  012312  104000                            ERROR                   ;MCLKEN NOT SET
2606  012314  052737  000002  024250            BIS     #MCLKEN,@#ESMAP ;
2607  012322  017727  166766                    MOV     @DXCB,(PC)+     ;SAVE CONTROL BITS
2608  012326  000000                    MCRCB:  0
2609  012330  042737  107777  012326            BIC     #107777,@#MCRCB ;CLEAR ALL BUT PHASE
2610  012336  022737  070000  012326            CMP     #PHASE7,@#MCRCB ;VERIFY DX IN PHASE 7
2611  012344  001401                            BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2612  012346  104000                            ERROR                   ;
2613  012350  032777  004000  166736            BIT     #TSSF,@DXCB     ;EXAMINE TIME STATE FLOP
2614  012356  001010                            BNE     MCR1            ;BRANCH IF TS1
2615  012360  052777  000001  166732            BIS     #M%LKP,@DXES    ;ISSUE CLOCK TICK
2616  012366  032777  004000  166720            BIT     #TSSF,@DXCB     ;EXAMINE TIME STATE FLOP
2617  012374  001001                            BNE     .+4             ;BRANCH IF NO ERROR CONDITION
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2618  ?12376  104078                          ERROR                           ;ERROR IF NO? T51
2619                                  ;LOOK FOR QUALIFICATION OF SIG17
2620  ?12400  ?32777  100?08  166?74  "CR11:  BIT     #0?LI,@DXMI     ;VERIFY OPLI SET (CU SELECTED)
2621  ?12404  ?01?71                          BNE     .+?             ;BRANCH IF NO ERROR CONDITION"
2622  ?12410  104028                          ERROR                   ;SELECTION ERROR
2623  ?12412  ?52737  100000  024174          BIS     #OPLI,@#MIMAP   ;UPDATE MAP
2624  ?12420  ?32777  ?01000  166666          BIT     #S?NC,@DXCB     ;VERIFY SYNC=1
2625  ?12426  ?01?71                          BNE     .+?             ;BRA?CH IF NO ERROR CONDITION"
2626  ?12430  104000                          ERROR                   ;SYNC NO? SE?
2627  ?12432  ?52737  ?01000  024238          BIS     #SYNC,@#CBMAP   ;UPDATE MAP
2628  ?12440  127727  166724  000002          CMPB    @T?NDX,#2       ;CHECK T?NDX
2629  ?12446  ?01431                          BEQ     .+4             ;BRA?CH IF NO ERROR CONDITION"
2630  ?12450  104020                          ERROR                   ;T?NDX INC ERROR
2631  ?12452  117737  166672  024251          MOVB    @T?NDX,@#ESMAP+1        ;UPDATE MAP
2632  ?12460  022777  100000  166622          CMP     #0?LO!SELO!MLDO,@DXMO
2633  ?12466  001471                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2634  ?12470  104020                          ERROR                   ;DXMO WRITE ERROR
2635  ?12472  ?17737  166612  024152          MOV     @DXMO,@#MOMAP   ;UPDATE MAP
2636  ?12500  123777  027454  166622          CMPB    @#CMD,@CUCR     ;VERIFY COMMAMD LOAD
2637  ?12506  001421                          BEQ     .+?             ;BRANCH IF NO ERROR CONDITION
2638  ?12510  104000                          ERROR                   ;COMMAND LOAD ERROR
2639  ?12512  113737  027454  024071          MOVB    @#CMD,@#CAMAP+1 ;UPDATE MAP
2640  ?12520  123777  027452  166630          CMPB    @#DEV,@CUAR     ;VERIFY ADRS LOAD
2641  ?12526  001471                          BEQ     .+?             ;BRANCH IF NO ERROR CONDITION
2642  ?12530  104000                          ERROR                   ;ADRS LOAD ERROR
2643  ?12532  113737  027452  024070          MOVB    @#DEV,@#CAMAP   ;UPDATE MAP
2644  ?12540  ?27777  166532  166550          CMP     @DACA,@DXND     ;VERIFY CA TO ND TRANSFER
2645  ?12546  001401                          BEQ     .+?             ;BRANCH IF NO ERROR CONDITION
2646  ?12550  104000                          ERROR                   ;DXND LOAD ERROR
2647  ?12552  ?17737  166540  024272          MOV     @DXND,@#NDMAP   ;UPDATE MAP
2648  ?12560  ?04737  024?52                  JSR     PC;CHKREG
2649  ?12564  ?52777  ?00004  166536          BIS     #4;@DXCS        ;SET FUNCTION "OUTPUT"
2650  ?12572  ?32777  ?00004  166530          BIT     #4;@DXCS        ;VERIFY FUNCTION SET
2651  ?12600  ?01?71                          BNE     .+?             ;BRANCH IF NO ERROR CONDITION
2652  ?12602  104000                          ERROR                   ;FUNCTION BIT NOT LOAD
2653  ?12604  ?52737  ?00004  024102          BIS     #4;@#CSMAP      ;UPDATE MAP
2654  ?12612  ?04737  024?52                  JSR     PC,CHKREG
2655  ?12616  ?04537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2656  ?12622  ?00010                          10                      ;                               10 CLOCK PULSE(S)
2657  ?12624  ?04737  023430                  JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2658  ?12630  074000                          PHS71                   ;THIS PHASE AND STATE                   PHS71
2659  ?12632  ?04737  ?24?52                  JSR     PC;CHKREG
2660  ?12636  ?52777  ?00001  166434          BIS     #GO,@DXCS       ;SET FUNCTION "GO"
2661  ?12644  ?04537  023560                  JSR     R5 @#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2662  ?12650  000001                          1                       ;                               1 CLOCK PULSE(S)
2663  ?12652  004737  023430                  JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2664  ?12656  ?70000                          PHS72                   ;THIS PHASE AND STATE                   PHS72
2665  ?12660  032777  ?00001  166412          BIT     #GO,@DXCS       ;VERIFY GO SET
2666  ?12666  001?21                          BNE     .+?             ;BRANCH IF NO ERROR CONDITION
2667  ?12670  104000                          ERROR                   ;GO "OT SE?
2668
2669  ?12672  ?52737  ?00001  024102          BIS     #GO,@#CSMAP     ;UPDATE MAP
2670  ?12700  ?04737  024?52                  JSR     PC;CHKREG
2671                                  ;NEXT CLOCK PULSE SHOULD FORCE THE DX
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2672                                        ;INTO PHASE 6 TIME STATE 1
2673  012704  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2674  012710  000001                        1                       ;                       1 CLOCK PULSE(S)
2675  012712  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2676  012716  004000                        PHS61                   ;THIS PHASE AND STATE           PHS61
2677
2678                                        ;VERIFY CU16 EVENTS TRANSPIRED
2679  012720  032777  100000  166366        BIT     #LOCKO,@DXCB    ;LOCK-OUT MUST BE SET
2680  012726  001001                        BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2681  012730  104000                        ERROR                   ;LOCKO NOT SET
2682  012732  052737  100000  024230        BIS     #LOCKO,@#CBMAP  ;UPDATE MAP
2683  012740  032777  000100  166346        BIT     #BYPAS,@DXCB    ;BYPAS MUST BE=1
2684  012746  001001                        BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2685  012750  104000                        ERROR                   ;BYPAS NOT SET
2686  012752  052737  000100  024230        BIS     #BYPAS,@#CBMAP  ;UPDATE MAP
2687  012760  032777  000400  166326        BIT     #CUDX,@DXCB     ;CUDX MUST BE=1
2688  012766  001401                        BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2689  012770  104000                        ERROR                   ;CUDX SET
2690  012772  042737  000400  024230        BIC     #CUDX,@#CBMAP   ;UPDATE MAP
2691  013000  032777  000010  166306        BIT     #BALF,@DXCB     ;BALF MUST BE 0
2692  013006  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2693  013010  104000                        ERROR                   ;BALF SET
2694  013012  042737  000010  024230        BIC     #BALF,@#CBMAP   ;UPDATE MAP
2695  013020  032777  001000  166266        BIT     #SYNC,@DXCB     ;A COUPLE OF JOBS SYNC'D
2696  013026  001401                        BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2697  013030  104000                        ERROR                   ;SYNC NOT ZERO
2698  013032  042737  001000  024230        BIC     #SYNC,@#CBMAP   ;UPDATE MAP
2699  013040  032777  000200  166246        BIT     #IOD,@DXCB      ;IOD=0
2700  013046  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2701  013050  104000                        ERROR                   ;I/O DONE SET
2702  013052  042737  000200  024230        BIC     #IOD,@#CBMAP    ;UPDATE MAP
2703  013060  004737  024052                JSR     PC;CHKREG
2704  013064                          EMCR1:
2705  013064  004537  023560                JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2706  013072  000001                        1                       ;                       1 CLOCK PULSE(S)
2707  013072  004737  023430                JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2708  013076  005000                        PHS62                   ;THIS PHASE AND STATE           PHS62
2709  013100  020177  166200                CMP     R1;@DXBA        ;VERIFY BUS ADDRESS IS CORRECT
2710  013104  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2711  013106  104000                        ERROR                   ;INCORRECT BUS ADDRESS
2712  013110  017737  166170  024126        MOV     @DXBA,@#BAMAP   ;UPDATE MAP
2713  013116  032777  000040  166170        BIT     #NPRX,@DXCB     ;VERIFY NPRX=1
2714  013124  001001                        BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2715  013126  104000                        ERROR                   ;NPRX DID NOT SET
2716  013130  052737  000040  024230        BIS     #NPRX,@#CBMAP   ;UPDATE MAP
2717  013136  032777  001000  166150        BIT     #SYNC,@DXCB     ;VERIFY SYNC=1
2718  013144  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2719  013146  104000                        ERROR                   ;SYNC NOT SET
2720  013150  052737  001000  024230        BIS     #SYNC,@#CBMAP   ;UPDATE MAP
2721  013156  032777  000020  166130        BIT     #NPRT,@DXCB     ;VERIFY NPRT=0
2722  013164  001401                        BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2723  013166  104000                        ERROR                   ;NPRT NOT ZERO
2724  013170  042737  000020  024230        BIC     #NPRT,@#CBMAP   ;UPDATE MAP
2725  013176  004737  024052                JSR     PC;CHKREG       ;
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2726  013202  004537  023560              JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2727  013206  000001                      1                       ;                                1 CLOCK PULSE(S)
2728  013210  004737  022430              JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2729  013214  004000                      PHS61                   ;THIS PHASE AND STATE                    PHS=1
2730  013216  032777  000040  160070      BIT     #NPRX,@DXCB     ;VERIFY NPRX=0
2731  013224  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2732  013226  104000                      ERROR                   ;NPRX SET
2733  013230  042737  000040  024230      BIC     #NPRX,@#CBMAP   ;UPDATE MAP
2734  013236  032777  000020  160050      BIT     #NPRT,@DXCB     ;VERIFY NPRT=1
2735  013244  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2736  013246  104000                      ERROR                   ;NPRT SET
2737
2738  013250  042737  000020  024230      BIC     #NPRT,@#CBMAP   ;UPDATE MAP
2739  013256  021177  160034              CMP     @R1,@DXND       ;VERIFY DATA TRANSFER
2740  013262  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2741  013264  104000                      ERROR                   ;NPR DATA TRANSFER ERROR
2742  013266  004737  024052              JSR     PC;CHKREG
2743  013272  004537  023560              JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2744  013276  000001                      1                       ;                                1 CLOCK PULSE(S)
2745  013300  023777  027510  160000      CMP     @#COUNT,@DXBC   ;VERIFY BYTE COUNT
2746  013306  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2747  013310  104000                      ERROR                   ;BYTE COUNT ERROR
2748  013312  017737  165770  024140      MOV     @DXBC,@#BCMAP   ;UPDATE MAP
2749  013320  032777  000200  165766  NIODR1: BIT     #IOD,@DXCB      ;VERIFY IOD=0
2750  013326  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2751  013330  104000                      ERROR                   ;IOD PREMATURELY SET
2752  013332  042737  000200  024230      BIC     #IOD,@#CBMAP    ;UPDATE MAP
2753  013340  032777  000040  165746      BIT     #NPRX,@DXCB     ;VERIFY NPRX=0
2754  013346  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2755  013350  104000                      ERROR                   ;NPRX NOT ZERO
2756  013352  042737  000040  024230      BIC     #NPRX,@#CBMAP   ;UPDATE MAP
2757  013360  032777  000400  165726      BIT     #CUDX,@DXCB     ;VERIFY CUDX=0
2758  013366  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2759  013370  104000                      ERROR                   ;CUDX NOT ZERO
2760  013372  042737  000400  024230      BIC     #CUDX,@#CBMAP   ;UPDATE MAP
2761  013400  004737  024052              JSR     PC;CHKREG
2762  013404  004537  023560              JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2763  013410  000001                      1                       ;                                1 CLOCK PULSE(S)
2764  013412  004737  022430              JSR     PC;PHST         ;CHECK CONTROL BITS FOR
2765  013416  004000                      PHS61                   ;THIS PHASE AND STATE                    PHS61
2766  013420  032777  001000  165666      BIT     #SYNC,@DXCB     ;VERIFY SYNC=0
2767  013426  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2768  013430  104000                      ERROR                   ;SYNC DID NOT CLEAR
2769  013432  042737  001000  024230      BIC     #SYNC,@#CBMAP   ;UPDATE MAP
2770                              ;VERIFY NPR TRANSFERRED DATA FROM MEMORY INTO DXND
2771  013440  021177  165652              CMP     @R5,@DXND       ;CHECK DXND DATA
2772  013444  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2773  013446  104000                      ERROR                   ;NPR DATA TRANSFER ERROR
2774                              ;VERIFY DXND(15:00) TO CUCR TRANSFER
2775  013450  017727  165642              MOV     @DXND,(PC)+     ;SAVE DXND
2776  013454  000000                      MCRND1: 0               ;HERE
2777  013456  123777  013455  165644      CMPB    @#MCRND+1,@CUCR ;VERIFY DXND(15:08) TO CUCR
2778  013464  001401                      BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2779  013466  104000                      ERROR                   ;DXND (15:08) TO CUCR TRANSFER ERROR
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2780  013470  117737  165634  024071          MOVB    @CUCR,@@CAMAP+1 ;UPDATE MAP
2781  013476  127777  165614  165026          CMPB    @DXND,@CUSR     ;VERIFY DXND(7:0) TO CUSR
2782  013504  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2783  013506  104000                          ERROR                   ;DXND(7:0) TO CUSR TRANSFER ERROR
2784  013510  117737  165616  024114          MOVB    @CUSR,@@OSMAP   ;UPDATE MAP
2785  013516  017737  165574  024272          MOV     @DXND,@@NDMAP   ;UPDATE MAP
2786                                  ;CHECK WHAT CAN BE CHECKED OF S1C9
2787  013524  032777  000400  165562          BIT     #CUDX,@DXCB     ;VERIFY CUDX=1
2788  013532  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
2789  013534  104000                          ERROR                   ;CUDX NOT SET
2790  013536  052737  000400  024230          BIS     #CUDX,@@CBMAP
2791  013544  032777  002000  165540          BIT     #SRVI,@DXMI     ;VERIFY SRVI=0
2792  013552  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2793  013554  104000                          ERROR                   ;SRVI NOT ZERO
2794  013556  042737  002000  024174          BIC     #SRVI,@@MIMAP   ;UPDATE MAP
2795  013564  032777  000010  165522          BIT     #B'LF,@DXCB     ;FIRST DATA BYTE
2796  013572  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2797  013574  104000                          ERROR                   ;BALF NOT ZERO
2798  013576  042737  000010  024230          BIC     #BALF,@@CBMAP   ;UPDATE MAP
2799  013604  005201                          INC     R1              ;INC TO NEXT BYTE ADRS
2800  013606  020177  165472                  CMP     R1,@DXBA        ;BA AT NEXT BYTE
2801  013612  001401                          BEQ     .+6             ;BRANCH IF NO ERROR CONDITION
2802  013614  104000                          ERROR                   ;DXBA INC ERROR
2803
2804  013616  017737  165462  024126          MOV     @DXBA,@@BAMAP   ;UPDATE MAP
2805  013624  004737  024052                  JSR     PC,CHKREG
2806  013630  004537  023560                  JSR     R5,@@CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2807  013634  000001                          1                       ;                          1 CLOCK PULSE(S)
2808  013636  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2809  013642  000000                          PHS62                   ;THIS PHASE AND STATE              PHS62
2810  013644  005201                          INC     R1              ;INC TO NEXT BYTE ADRS
2811  013646  020177  165432                  CMP     R1,@DXBA        ;BA AT NEXT BYTE
2812  013652  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2813  013654  104000                          ERROR                   ;DXBA INC ERROR
2814  013656  017737  165422  024126          MOV     @DXBA,@@BAMAP   ;UPDATE MAP
2815  013664  032777  000040  165422          BIT     #NPRX,@DXCB     ;VERIFY NPRX SET
2816  013672  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2817  013674  104000                          ERROR                   ;NPRX NOT SET
2818  013676  052737  000040  024230          BIS     #NPRX,@@CBMAP   ;UPDATE MAP
2819  013704  021177  165406                  CMP     @R1,@DXND       ;VERIFY NPR DATA
2820  013710  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2821  013712  104000                          ERROR                   ;NPR DATA TRANSFER ERROR
2822  013714  017737  165376  024272          MOV     @DXND,@@NDMAP   ;UPDATE MAP
2823  013722  127777  165404  165412          CMPB    @CUSR,@BUSI     ;VERIGY CUSR TO BUSI
2824  013730  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2825  013732  104000                          ERROR                   ;CUSR TO BUSI TRANSFER ERROR
2826  013734  117737  165402  024174          MOVB    @BUSI,@@MIMAP   ;UPDATE MAP
2827  013742  005037  013752                  CLR     @#.1ST          ;ZERO DATA AND PARITY
2828  013746  117727  165360                  MOVB    @CUSR,(PC)+     ;SAVE FIRST BYTE
2829  013752  000000          .1ST:           0                       ;HERE
2830  013754  104007  013752                  PARITY  ,,.1ST          ;COMPUTE ODD PARITY
2831  013760  105037  013752                  CLRB    @#.1ST          ;CLEAR ALL BUT PARITY
2832  013764  017727  165322                  MOV     @DXMI,(PC)+     ;SAVE DXMI
2833  013770  000000          .1ST1:          0                       ;HERE
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2834  014772  042737  177377  013770          BIC     #177377,@#177570 ;CLEAR ALL BUT PARITY
2835  015000  023737  013752  013770          CMP     @#177570,@#177570 ;VERIFY CORRECT PARITY
2836  015006  001401                          BEQ     .+4               ;BRANCH IF NO ERROR CONDITION
2837  015010  104000                          ERROR                     ;PARITY GENERATION ERROR
2838  015012  017737  165274  024174          MOV     @DXMI,@#MIMAP
2839  015020  004537  023560                  JSR     R5,@#CLK          ;ROUTINE TO ISSUE CLOCK PULSES
2840  015024  000001                          1                         ;                              1 CLOCK PULSE(S)
2841  015026  004737  023430                  JSR     PC,PHST           ;CHECK CONTROL BITS FOR
2842  015032  004000                          PHS61                     ;THIS PHASE AND STATE                  PHS61
2843  015034  032777  000040  165252          BIT     #NPRX,@DXCB       ;VERIFY NPRX CLEARED
2844  015042  001401                          BEQ     .+2               ;BRANCH IF NO ERROR CONDITION
2845  015044  104000                          ERROR                     ;NPRX NOT ZERO
2846  015046  042737  000040  024230          BIC     #NPRX,@#CBMAP     ;UPDATE MAP
2847  015054  032777  002000  165230          BIT     #SRVI,@DXMI       ;VERIFY SRVI=1
2848  015062  001001                          BNE     .+4               ;BRANCH IF NO ERROR CONDITION
2849  015064  104000                          ERROR                     ;SRVI NOT SET
2850  015066  052737  002000  024174          BIS     #SRVI,@#MIMAP     ;UPDATE MAP
2851  015074  032777  001000  165212          BIT     #SYNC,@DXCB       ;VERIFY SYNC SET
2852  015102  001001                          BNE     .+4               ;BRANCH IF NO ERROR CONDITION
2853  015104  104000                          ERROR                     ;SYNC NOT SET
2854  015106  052737  001000  024230          BIS     #SYNC,@#CBMAP     ;UPDATE MAP
2855  015114  004737  024052                  JSR     PC,CHKREG
2856  015120  004537  023560                  JSR     R5,@#CLK          ;ROUTINE TO ISSUE CLOCK PULSES
2857  015124  000007                          7                         ;                              7 CLOCK PULSE(S)
2858
2859  015126  004737  024052                  JSR     PC,CHKREG
2860  015132  052777  001000  165198          BIS     #SRVO,@DXMO       ;RAISE SERVICE-OUT
2861  015140  004537  023560                  JSR     R5,@#CLK          ;ROUTINE TO ISSUE CLOCK PULSES
2862  015144  000001                          1                         ;                              1 CLOCK PULSE(S)
2863  015146  004737  023430                  JSR     PC,PHST           ;CHECK CONTROL BITS FOR
2864  015152  004000                          PHS61                     ;THIS PHASE AND STATE                  PHS61
2865  015154  052737  001000  024152          BIS     #SRVO,@#MOMAP     ;UPDATE MAP
2866  015162  004737  024052                  JSR     PC,CHKREG
2867  015166  004537  023560                  JSR     R5,@#CLK          ;ROUTINE TO ISSUE CLOCK PULSES
2868  015172  000001                          1                         ;                              1 CLOCK PULSE(S)
2869
2870  015174  004737  023430                  JSR     PC,PHST           ;CHECK CONTROL BITS FOR
2871  015200  000000                          PHS62                     ;THIS PHASE AND STATE                  PHS62
2872  015202  004737  024052                  JSR     PC,CHKREG
2873  015206  004537  023560                  JSR     R5,@#CLK          ;ROUTINE TO ISSUE CLOCK PULSES
2874  015212  000001                          1                         ;                              1 CLOCK PULSE(S)
2875  015214  004737  023430                  JSR     PC,PHST           ;CHECK CONTROL BITS FOR
2876  015220  004000                          PHS61                     ;THIS PHASE AND STATE                  PHS61
2877  015222  032777  000100  165064          BIT     #BYPAS,@DXCB      ;VERIFY BYPAS=0
2878  015230  001401                          BEQ     .+4               ;BRANCH IF NO ERROR CONDITION
2879  015232  104000                          ERROR                     ;BYPAS NOT ZERO
2880  015234  042737  000100  024230          BIC     #BYPAS,@#CBMAP    ;UPDATE MAP
2881  015242  032777  002000  165042          BIT     #SRVI,@DXMI       ;VERIFY SRVI=0
2882  015250  001401                          BEQ     .+2               ;BRANCH IF NO ERROR CONDITION
2883  015252  104000                          ERROR                     ;SRVI DID NOT DROP
2884  015254  042737  002000  024174          BIC     #SRVI,@#MIMAP     ;UPDATE MAP
2885  015262  032777  000010  165024          BIT     #BALF,@DXCB       ;VERIFY BALF=1
2886  015270  001001                          BNE     .+4               ;BRANCH IF NO ERROR CONDITION
2887  015272  104000                          ERROR                     ;BALF NOT SET
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E5

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2888  014274  052737  000010  024230          BIS     #BALF,@#CBMAP   ;UPDATE MAP
2889  014302  005237  027510                  INC     COUNT
2890  014306  023727  027510  164772          CMP     @#COUNT,@DXBC   ;CHECK BYTE COUNT
2891  014314  001401                          BEQ     .+6             ;BRANCH IF NO ERROR CONDITION
2892  014316  104000                          ERROR                   ;READ BYTE COUNT ERROR
2893  014320  017737  164762  024140          MOV     @DXBC,@#BCMAP
2894  014326  004737  024052                  JSR     PC,CHKREG
2895  014332  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2896  014336  000002                          2                       ;                               2 CLOCK PULSE(S)
2897  014340  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2898  014344  004000                          PHS61                   ;THIS PHASE AND STATE                   PHS61
2899  014346  042777  001000  164734          BIC     #SRVO,@DXMO     ;DROP SRVO
2900  014354  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2901  014360  000001                          1                       ;                               1 CLOCK PULSE(S)
2902  014362  032777  001000  164720          BIT     #SRVO,@DXMO     ;VERIFY SRVO=0
2903  014370  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2904  014372  104000                          ERROR                   ;SRVO DID NOT DROP
2905  014374  042737  001000  024152          BIC     #SRVO,@#MOMAP   ;UPDATE MAP
2906  014402  004737  024052                  JSR     PC,CHKREG
2907  014406  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2908  014412  000001                          1                       ;                               1 CLOCK PULSE(S)
2909  014414  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2910  014420  004000                          PHS61                   ;THIS PHASE AND STATE                   PHS61
2911  014422  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2912  014426  000001                          1                       ;                               1 CLOCK PULSE(S)
2913  014430  127777  164674  164704          CMPB    @CUCR,@BUSI     ;VERIFY SECOND DATA BYTE
2914  014436  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2915  014440  104000                          ERROR                   ;CUCR TO BUSI TRANSFER ERROR
2916  014442  117737  164674  024174          MOVB    @BUSI,@#MIMAP   ;UPDATE MAP
2917  014450  032777  000400  164636          BIT     #CUDX,@DXCB     ;VERIFY CUDX ZERO
2918  014456  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2919  014460  104000                          ERROR                   ;CUDX DID NOT CLEAR
2920  014462  042737  000400  024230          BIC     #CUDX,@#CBMAP   ;UPDATE MAP
2921  014470  005037  014500                  CLR     @#,2ST          ;ZERO DATA AND PARITY
2922  014474  117727  164638                  MOVB    @CUCR,(PC)+     ;SAVE SECOND BYTE
2923  014500  000000          ,2ST:           0                       ;HERE
2924  014502  104007  014500                  PARITY  ,,2ST           ;COMPUTE ODD PARITY
2925  014506  105037  014500                  CLRB    @#,2ST          ;CLEAR ALL BUT PARITY
2926  014512  017727  164574                  MOV     @DAMI,(PC)+     ;SAVE DXMI
2927  014516  000000          ,2ST1:          0                       ;HERE
2928  014520  042737  177377  014516          BIC     #177377,@#,2ST1 ;CLEAR ALL BUT PARITY
2929  014526  023737  014500  014516          CMP     @#,2ST,@#,2ST1  ;VERIFY CORRECT PARITY
2930  014534  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2931  014536  104000                          ERROR                   ;PARITY GENERATION ERROR
2932  014540  117737  164564  024071          MOVB    @CUCR,@#CAMAP+1 ;UPDATE MAP
2933  014546  004737  024052                  JSR     PC,CHKREG
2934  014552  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2935  014556  000001                          1                       ;                               1 CLOCK PULSE(S)
2936  014560  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
2937  014564  004000                          PHS61                   ;THIS PHASE AND STATE                   PHS61
2938  014566  032777  001000  164520          BIT     #SYNC,@DXCB     ;VERIFY SYNC CLEARED
2939  014574  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
2940  014576  104000                          ERROR                   ;SYNC DID NOT CLEAR
2941  014600  042737  001000  024230          BIC     #SYNC,@#CBMAP   ;UPDATE MAP
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2942  ?14676  ?32777  ?00400  164?00        BI?     @CUDX,@DXCB     ;VERIFY CUDX SET
2943  ?14614  ?01?01                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2944  ?14616  104000                        ERROR                   ;CUDX NO? SE?
2945  ?14620  ?52737  ?00400  ?24230        BIS     @CUDX,@@CBMAP   ;UPDATE MAP
2946  ?14626  121177  164?00                CMPB    @R?,@CUSR       ;CHECK JED DATA BYTE
2947  ?14632  ?01401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2948  ?14634  104000                        ERROR                   ;DXND TO CUSR TRANSFER ERROR
2949  ?14636  117737  164478  ?24114        MOVB    @CJSR,@@OSMAP   ;UPDATE MAP
2950  ?14644  005201                        INC     R1
2951  ?14646  ?20177  164432                CMP     R1,@DXBA        ;VERIFY DXBA
2952  ?14652  ?01401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2953  ?14654  104000                        ERROR                   ;DXBA INC ERROR
2954  ?14656  ?17737  164422  ?24126        MOV     @DXBA,@@BAMAP   ;UPDATE MAP
2955  ?14664  121177  164440                CMPB    @R?,@CUCR       ;CHECK 49W DATA BYTE
2956  ?14670  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2957  ?14672  104000                        ERROR                   ;DXND TO CUCR TRANSFER ERROR
2958  ?14674  117737  164430  ?24071        MOVB    @CUCR,@@CAMAP+1 ;UPDATE MAP
2959  ?14702  ?32777  001000  164404        BI?     @SYNC,@DXCB     ;VERIFY SYNC CLEARED
2960  ?14710  001401                        BEQ     .+?             ;BRANCH IF NO ERROR CONDITION
2961  ?14712  104000                        ERROR                   ;SYNC SE?
2962  ?14714  ?42737  001000  ?24230        BIC     @SYNC,@@CBMAP   ;UPDATE MAP
2963  ?14722  ?32777  002000  164302        BI?     @S?VI,@DXMI     ;SRVI SHOULD BE UP
2964  ?14730  001001                        BNE     .+?             ;BRANCH IF NO ERROR CONDITION
2965  ?14732  104000                        ERROR                   ;SRVI NO? SE?
2966  ?14734  ?52737  ?02000  ?24174        BIS     @SRVI,@@MIMAP   ;UPDATE MAP
2967  ?14742  ?04737  024052                JSR     PC,CHKREG
2968  ?14746  004537  023560                JSR     R5,@@CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2969  ?14752  000001                        1                       ;                       1 CLOCK PULSE(S)
2970  ?14754  032777  001000  164332        BI?     @SYNC,@DXCB     ;VERIFY SYNC SET
2971  ?14762  001001                        BNE     .+?             ;BRANCH IF NO ERROR CONDITION
2972  ?14764  104000                        ERROR                   ;SYNC NO? SE?
2973  ?14766  052737  ?01000  ?24230        BIS     @SYNC,@@CBMAP   ;UPDATE MAP
2974  ?14774  ?32777  ?00040  164?12        BI?     @NPRX,@DXCB     ;VERIFY NPRX SET
2975  ?15002  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2976  ?15004  104000                        ERROR                   ;NPRX NO? SE?
2977  ?15006  ?52737  000040  ?24230        BIS     @NPRX,@@CBMAP   ;UPDATE MAP
2978  ?15014  005201                        INC     R1              ;INC ADRS OF DATA
2979  ?15016  ?20177  164262                CMP     R1,@DXBA        ;VERIFY CORRECT BUS ADRS
2980  ?15022  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
2981  ?15024  104000                        ERROR                   ;DXBA LOAD ERROR
2982  ?15026  017737  164252  ?24126        MOV     @DXBA,@@BAMAP   ;UPDATE MAP
2983  ?15034  021177  164256                CMP     @R?,@DXND       ;VERIFY NPR DATA
2984  ?15040  001401                        BEQ     .+?             ;BRANCH IF NO ERROR CONDITION
2985  ?15042  104000                        ERROR                   ;NPR DATA TRANSFER ERROR
2986  ?15044  017737  164246  ?24272        MOV     @DXND,@@NDMAP   ;UPDATE MAP
2987  ?15052  004737  024052                JSR     PC,CHKREG
2988  ?15056  004537  023560                JSR     R5,@@CLK        ;ROUTINE TO ISSUE CLOCK PULSES
2989  ?15062  000001                        1                       ;                       1 CLOCK PULSE(S)
2990  ?15064  032777  000040  164222        BI?     @NPRX,@DXCB     ;VERIFY NPRX CLEARED
2991  ?15072  001401                        BEQ     .+?             ;BRANCH IF NO ERROR CONDITION
2992  ?15074  104000                        ERROR                   ;NPRX SE?
2993  ?15076  042737  000040  ?24230        BIC     @NPRX,@@CBMAP   ;UPDATE MAP
2994  ?15104  ?52777  ?01000  164176        BIS     @SRVO,@DXMO     ;RAISE SRVO
2995  ?15112  004537  023560                JSR     R5,@@CLK        ;ROUTINE TO ISSUE CLOCK PULSES
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2996  015116  000001                    1                       ;                       1 CLOCK PULSE(S)
2997  015120  032777  001000  164102    BIT     #SRVO,@#XMO     ;VERIFY SRVO SET
2998  015126  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
2999  015130  104000                    ERROR                   ;SRVO NOT SET?
3000  015132  052737  001000  024192    BIS     #SRVO,@#MOMAP   ;UPDATE MAP
3001  015140  004737  024052            JSR     PC,@#CHKREG
3002  015144  004537  023560            JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3003  015150  000002                    2                       ;                       2 CLOCK PULSE(S)
3004  015152  032777  002000  164132    BIT     #SRVI,@#XMI     ;VERIFY SRVI DROPED
3005  015160  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3006  015162  104000                    ERROR                   ;SRVI DID NOT DROP
3007  015164  042737  002000  024174    BIC     #SRVI,@#MIMAP   ;UPDATE MAP
3008  015172  032777  000010  164114    BIT     #BALF,@#XCB     ;VERIFY BALF 0
3009  015200  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3010  015202  104000                    ERROR                   ;BALF NOT ZERO
3011  015204  042737  000010  024230    BIC     #BALF,@#CBMAP   ;UPDATE MAP
3012  015212  005237  027510            INC     @#COUNT         ;INC SOFT BYTE COUNT
3013  015216  023777  027510  164062    CMP     @#COUNT,@#XBC   ;VERIFY CORRECT BYTE COUNT
3014  015224  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3015  015226  104000                    ERROR                   ;XBC INC ERROR
3016  015230  017737  164052  024140    MOV     @#XBC,@#BCMAP   ;UPDATE MAP
3017  015236  004737  024052            JSR     PC,CHKREG
3018  015242  042777  001000  164040    BIC     #SRVO,@#XMO     ;DROP SRVO
3019  015250  004537  023560            JSR     R5 @#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3020  015254  000003                    3                       ;                       3 CLOCK PULSE(S)
3021  015256  032777  001000  164024    BIT     #SRVO,@#XMO     ;VERIFY SRVO DROPED
3022  015264  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3023  015266  104000                    ERROR                   ;SRVO DID NOT DROP
3024  015270  042737  001000  024192    BIC     #SRVO,@#MOMAP   ;UPDATE MAP
3025  015276  032777  002000  164006    BIT     #SRVI,@#XMI     ;VERIFY SRVI SET
3026  015304  001001                    BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3027  015306  104000                    ERROR                   ;SRVI NOT SET
3028  015310  052737  002000  024174    BIS     #SRVI,@#MIMAP   ;UPDATE MAP
3029  015316  127777  164010  164016    CMPB    @#USR,@#USI     ;VERIFY SED DATA BYTE
3030  015324  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3031  015326  104000                    ERROR                   ;DXMI LOAD ERROR
3032  015330  005037  015348            CLR     @#,3ST          ;ZERO DATA AND PARITY
3033  015334  117727  163772            MOVB    @#USR,(PC)+     ;SAVE THIRD BYTE
3034  015340  000000            .3ST:   0                       ;HERE
3035  015342  104007  015348            PARITY  ,,3ST           ;COMPUTE ODD PARITY
3036  015346  105037  015348            CLRB    @#,3ST          ;CLEAR ALL BUT PARITY
3037  015352  017727  163734            MOV     @#XMI,(PC)+     ;SAVE DXMI
3038  015356  000000            .3ST1:  0                       ;HERE
3039  015360  042737  177377  015396    BIC     #177377,@#,3ST1 ;CLEAR ALL BUT PARITY
3040  015366  023737  015348  015396    CMP     @#,3ST,@#,3ST1  ;VERIFY CORRECT PARITY
3041  015374  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3042  015376  104000                    ERROR                   ;PARITY GENERATION ERROR
3043  015400  017737  163726  024174    MOV     @#XMI,@#MIMAP
3044  015406  032777  000200  163730    BIT     #IOD,@#XCB
3045  015414  001401                    BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3046  015416  104000                    ERROR                   ;IOD NOT SET
3047  015420  042737  000200  024230    BIC     #IOD,@#CBMAP    ;UPDATE MAP
3048  015426  004737  024052            JSR     PC,CHKREG       ;WAIT FOR SRVO
3049  015432  052777  001000  163690    BIS     #SRVO,@#XMO     ;RAISE SRVO
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3058  015440  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3059  015444  000001                  1                       ;                                   1 CLOCK PULSE(S)
3060  015446  004737  023430          JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3061  015452  000000                  PHS62                   ;THIS PHASE AND STATE                PHS62
3062  015454  032777  001000  163626  BIT     #SRVO,@DXMO     ;VERIFY SRVO SET
3063  015462  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3064  015464  104000                  ERROR                   ;SRVO NOT SET
3065  015466  052737  001000  024192  BIS     #SRVO,@#MOMAP   ;UPDATE MAP
3066  015474  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3067  015500  000001                  1                       ;                                   1 CLOCK PULSE(S)
3068  015502  032777  002000  163622  BIT     #SRVI,@DXMI     ;SRVI MUST DROP
3069  015510  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3070  015512  104000                  ERROR                   ;SRVI DID NOT DROP
3071  015514  042737  002000  024174  BIC     #SRVI,@#MIMAP   ;UPDATE MAP SRVI=0
3072  015522  032777  000010  163564  BIT     #BALF,@DXCB     ;VERIFY BALF=0
3073  015530  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3074  015532  104000                  ERROR                   ;BALF NOT ZERO
3075  015534  052737  000010  024230  BIS     #BALF,@#CBMAP   ;UPDATE MAP
3076  015542  042777  001000  163540  BIC     #SRVO,@DXMO     ;DROPSRVO
3077  015550  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3078  015554  000001                  1                       ;                                   1 CLOCK PULSE(S)
3079  015556  032777  001000  163524  BIT     #SRVO,@DXMO     ;VERIFY SRVO DROPPED
3080  015564  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3081  015566  104000                  ERROR                   ;SRVO DID NOT DROP
3082  015570  042737  001000  024192  BIC     #SRVO,@#MOMAP   ;UPDATE MAP
3083  015576  032777  000010  163510  BIT     #BALF,@DXCB     ;VERIFY BALF 1
3084  015604  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3085  015606  104000                  ERROR                   ;BALF NOT 1
3086  015610  052737  000010  024230  BIS     #BALF,@#CBMAP   ;UPDATE MAP
3087  015616  032777  000040  163470  BIT     #NPRX,@DXCB     ;VERIFY NPRX 0
3088  015624  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3089  015626  104000                  ERROR                   ;NPRX NOT 0
3090  015630  042737  000040  024230  BIC     #NPRX,@#CBMAP   ;UPDATE MAP
3091  015636  005237  027510          INC     @#COUNT         ;INCREMENT BYTE COUNT
3092  015642  023777  027510  163436  CMP     @#COUNT,@DXBC   ;VERIFY BYTE COUNT
3093  015650  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3094  015652  104000                  ERROR                   ;BYTE COUNT ERROR
3095  015654  017737  163426  024140  MOV     @DXBC,@#BCMAP   ;UPDATE MAP
3096  015662  004737  024052          JSR     PC,CHKREG
3097  015666  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3098  015672  000001                  1                       ;                                   1 CLOCK PULSE(S)
3099  015674  122777  000360  163430  CMPB    #360,@CUSR      ;CHECK 49H DATA BYTE
3100  015702  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3101  015704  104000                  ERROR                   ;DATA ERROR
3102  015706  117737  163420  024114  MOVB    @CUSR,@#OSMAP   ;UPDATE MAP
3103  015714  127727  163410  000377  CMPB    @CUCR,#377      ;
3104  015722  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3105  015724  104000                  ERROR                   ;DATA ERROR
3106  015726  117737  163376  024071  MOVB    @CUCR,@#CAMAP+1 ;UPDATE MAP
3107  015734  022777  013737  163394  CMP     #13737,@DXND    ;NPR'S DONT STOP TILL IBM DONE
3108  015742  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3109  015744  104000                  ERROR                   ;DXND LOAD ERROR
3110  015746  017737  163344  024272  MOV     @DXND,@#NDMAP   ;UPDATE MAP
3111  015754  004737  024052          JSR     PC,CHKREG
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3104  016760  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3105  016764  000001                  1                       ;                                   1 CLOCK PULSE(S)
3106  016766  127777  163336  163346  CMPB    @CJCH,@BUSI     ;VERIFY 4TH DATA BYTE
3107  016774  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3108  016776  104000                  ERROR                   ;DXMI LOAD ERROR
3109  017000  117737  163324  024174  MOVB    @CJCH,@#MIMAP   ;UPDATE MAP
3110  017006  005037  016016          CLR     @#,4ST          ;ZERO DATA AND PARITY
3111  017012  117727  163312          MOVB    @CJCH,(PC)+     ;SAVE FOURTH BYTE
3112  017016  000000          ,4ST:   0                       ;MEMF
3113  017020  104027  017016          PARITY  ,,4ST           ;COMPUTE ODD PARITY
3114  017024  105037  017016          CLRB    @#,4ST          ;CLEAR ALL BUT PARITY
3115  017030  017727  163256          MOV     @DXMI,(PC)+     ;SAVE DXMI
3116  017034  000000          ,4ST1:  0                       ;MEMF
3117  017036  042737  177377  016034  BIC     #177377,@#,4ST1 ;CLEAR ALL BUT PARITY
3118  017044  023737  016016  016034  CMP     @#,4ST,@#,4ST1  ;VERIFY CORRECT PARITY
3119  017052  001401                  BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3120  017054  104000                  ERROR                   ;PARITY GENERATION ERROR
3121  017056  017737  163230  024174  MOV     @DXMI,@#MIMAP
3122  017064  052777  001000  163216  BIS     #SRVO,@DXMO     ;SET SRVO
3123  017072  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3124  017076  000001                  1                       ;                                   1 CLOCK PULSE(S)
3125  017100  032777  001000  163202  BIT     #SRVO,@DXMO     ;VERIFY SRVO SET
3126  017106  001001                  BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3127  017110  104000                  ERROR                   ;SRVO NOT SET
3128  017112  052737  001000  024152  BIS     #SRVO,@#MOMAP   ;UPDATE MAP
3129  017120  032777  000010  163166  BIT     #BALF,@DXCB     ;VERIFY BALF SET
3130  017126  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3131  017130  104000                  ERROR                   ;BALF NOT SET
3132  017132  052737  000010  024230  BIS     #BALF,@#CBMAP   ;UPDATE MAP
3133  017140  005201                  INC     R1
3134  017142  020177  163136          CMP     R1,@DXBA        ;VERIFY CORRECT BUS ADRS
3135  017146  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3136  017150  104000                  ERROR                   ;DXBA LOAD ERROR
3137  017152  017737  163126  024126  MOV     @DXBA,@#BAMAP   ;UPDATE MAP
3138  017160  122777  000027  163142  CMPB    #27,,@CUCR      ;VERIFY CUCR LOAD
3139  017166  001401                  BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3140  017170  104000                  ERROR                   ;CUCR LOAD ERROR
3141  017172  117737  163132  024071  MOVB    @CUCR,@#CAMAP+1 ;UPDATE MAP
3142  017200  122777  000337  163124  CMPB    #337,@CUSR      ;VERIFY CUSR LOAD
3143  017206  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3144  017210  104000                  ERROR                   ;CUSR LOAD ERROR
3145  017212  117737  163114  024114  MOVB    @CJSR,@#OSMAP   ;UPDATE MAP
3146  017220  032777  002000  163304  BIT     #SRVI,@DXMI     ;VERIFY SRVI SET
3147  017226  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3148  017230  104000                  ERROR                   ;SRVI DID NOT SET
3149  017232  052737  002000  024174  BIS     #SRVI,@#MIMAP   ;UPDATE MAP
3150  017240  032777  001000  163046  BIT     #SYNC,@DXCB     ;VERIFY SYNC DROPPED
3151  017246  001401                  BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3152  017250  104000                  ERROR                   ;SYNC DID NOT DROP
3153  017252  042737  001000  024230  BIC     #SYNC,@#CBMAP   ;UPDATE MAP
3154  017260  004737  024052          JSR     PC,@#CHKREG
3155  017264  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3156  017270  000001                  1                       ;                                   1 CLOCK PULSE(S)
3157  017272  004737  023430          JSR     PC,@#MST        ;CHECK CONTROL BITS FOR
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3158  016276  007030                        PHS62                   ;THIS PHASE AND STATE                   PHS62
3159  016300  005201                        INC     R1
3160  016302  020177  162776                CMP     R1,@DXBA        ;VERIFY CORRECT BUS ADRS
3161  016306  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3162  016310  104000                        ERROR                   ;DXBA LOAD ERROR
3163  016312  017737  162760  024126        MOV     @DXBA,@#BAMAP   ;UPDATE MAP
3164  016320  021177  162772                CMP     @#L,@DXND       ;VERIFY CORRECT NPR DATA
3165  016324  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3166  016326  104000                        ERROR                   ;NPR DATA TRANSFER ERROR
3167  016330  017737  162762  024272        MOV     @DXND,@#NDMAP   ;UPDATE MAP
3168  016336  032777  001000  162790        BIT     #SYNC,@DXCB     ;VERIFY SYNC SET
3169  016344  001001                        BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3170  016346  104000                        ERROR                   ;SYNC NOT SET
3171  016350  052737  001000  024230        BIS     #SYNC,@#CBMAP
3172  016356  032777  000040  162730        BIT     #NPRX,@DXCB     ;VERIFY NPRX SET
3173  016364  001001                        BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3174  016366  104000                        ERROR                   ;NPRX NOT SET
3175  016370  052737  000040  024230        BIS     #NPRX,@#CBMAP   ;UPDATE MAP
3176  016376  004737  024052                JSR     PC,CHKREG
3177  016402  004537  023560                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3178  016406  000001                        1                       ;                               1 CLOCK PULSE(S)
3179  016410  032777  000400  162676        BIT     #CUDX,@DXCB     ;VERIFY CUDX 0
3180  016416  001401                        BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3181  016420  104000                        ERROR                   ;CUDX NOT 0
3182  016422  042737  000400  024230        BIC     #CUDX,@#CBMAP   ;UPDATE MAP
3183  016430  032777  002000  162654        BIT     #SRVI,@DXMI     ;VERIFY SRVI 0
3184  016436  001401                        BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3185  016440  104000                        ERROR                   ;SRVI NOT 0
3186  016442  042737  002000  024174        BIC     #SRVI,@#MIMAP
3187  016450  022777  000020  162616        CMP     #CUDEND,@DXDS   ;VERIFY DEVICE STATUS
3188  016456  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3189  016460  104000                        ERROR                   ;DXDS STATUS ERROR
3190  016462  017737  162606  024096        MOV     @DXDS,@#DSMAP   ;UPDATE MAP
3191  016470  022777  016772  162620        CMP     #MEMDAT,@DXND   ;DXND STILL GOING
3192  016476  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3193  016500  104000                        ERROR                   ;DXND LOAD ERROR
3194  016502  017737  162610  024272        MOV     @DXND,@#NDMAP   ;UPDATE MAP
3195  016510  032777  000200  162576        BIT     #IOD,@DXCB
3196  016516  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3197  016520  104000                        ERROR                   ;IOD NOT SET
3198  016522  052737  000200  024230        BIS     #IOD,@#CBMAP    ;UPDATE MAP
3199  016530  032777  001000  162556        BIT     #SYNC,@DXCB     ;VERIFY SYNC=0
3200  016536  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3201  016540  104000                        ERROR                   ;SYNC SET
3202  016542  052737  001000  024230        BIS     #SYNC,@#CBMAP   ;UPDATE MAP
3203  016550  032777  000010  162536        BIT     #BALF,@DXCB     ;VERIFY BALF 0
3204  016556  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3205  016560  104000                        ERROR                   ;BALF NOT 0
3206  016562  042737  000010  024230        BIC     #BALF,@#CBMAP   ;UPDATE MAP
3207  016570  032777  000040  162516        BIT     #NPRX,@DXCB     ;VERIFY NPRX 0
3208  016576  001401                        BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3209  016600  104000                        ERROR                   ;NPRX NOT 0
3210  016602  042737  000040  024230        BIC     #NPRX,@#CBMAP   ;UPDATE MAP
3211  016610  005237  027510                INC     @#COUNT         ;INCREMENT BYTE COUNT
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3212  016614  023777  027510  162464          CMP     @#COUNT,@DXBC   ;VERIFY BYTE COUNT
3213  016622  001421                          BEQ     .+44            ;BRANCH IF NO ERROR CONDITION
3214  016624  104000                          ERROR                   ;BYTE COUNT ERROR
3215  016626  017737  162454  024140          MOV     @DXBC,@#BCMAP   ;UPDATE MAP
3216  016634  004737  024052                  JSR     PC,CHKREG
3217                                  ;CLEAR MAINTENANCE CLOCK ENABLE AND WAIT FOR
3218                                  ;READ DONE INTERRUPT
3219  016640  012737  000340  000002          MOV     #LEVEL7,@#PS    ;RAISE PRIORITY
3220  016646  042777  000002  162444          BIC     #MCLKEN,@DXCS   ;CLEAR MAINT CLK
3221  016654  032777  000002  162436          BIT     #MCLKEN,@DXCS   ;VERIFY MCLKEN=0
3222  016662  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3223  016664  104000                          ERROR                   ;MCLKEN DID NOT CLEAR
3224  016666  012737  001272  177776          MOV     #LESS1,@#PS     ;LOWER STATUS
3225  016674  000001                          WAIT                    ;WAIT FOR DONE INT
3226  016676  032777  000200  162374  MCRD1   BIT     #DONE,@DXCS     ;CHECK FOR VALID INTERRUPT
3227  016704  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3228  016706  104000                          ERROR                   ;INVALID INTERRUPT
3229  016710  042777  000200  162362          BIC     #DONE,@DXCS     ;CLEAR DONE
3230  016716  005777  162364                  TST     @DXBC           ;VERIFY BYTE COUNT ZERO
3231  016722  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3232  016724  104000                          ERROR                   ;BYTE COUNT NOT ZERO
3233  016726  022737  000020  003004          CMP     #CUDEND,@#3004  ;VERIFY TT ENTRY
3234  016734  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3235  016736  104000                          ERROR                   ;TT ENTRY ERROR
3236  016740  123737  027452  003006          CMPB    @#DEV,@#3006    ;VERIFY TT ENTRY 2
3237  016746  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3238  016750  104000                          ERROR                   ;TT ENTRY ERROR
3239  016752  042777  077777  162338          BIC     #77777,@DXMD    ;DROP ALL BUT OPLO
3240  016760  005077  162326                  CLR     @DXMI           ;DROP OPLI
3241  016764  012716  016776                  MOV     @#MCREX,@SP     ;FUDGE RTI RETURN
3242  016770  000002                          RTI
3243                                  ;DATA BUFFER FOR MAINT CLK READ TEST
3244
3245  016772     125                  MCRDAT: .BYTE   125
3246  016773     017                          .BYTE   017
3247  016774     360                          .BYTE   360
3248  016775     377                          .BYTE   377
3249
3250  016776  013737  016772  016772  MCREX:  MOV     @#MCRDAT,@#MCRDAT       ;DXMD TEST DATA PATTERN
3251
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                                        ;*****************************************************
                                        ;TEST   4       MAINTENANCE CLOCK INPUT (IBM WRITE) TEST
                                        ;*****************************************************
017004  104400                  TST4:   SCOPE
017006  012737  000400  025130          MOV     #400,@#ICOUNT   ;ITERATION COUNT
017014  012737  000004  026126          MOV     #4,@#ERTSTN     ;SAVE TEST # FOR ERROR REPORT
017022  012737  017038  025134          MOV     #SCP4,@#RETURN  ;SCOPE LOOP RETURN ADRS
017038                          SCP41:
017038  004737  024344                  JSR     PC,DXRES        ;DX AND TABLE INITIALIZATION
017034  052777  000100  162236          BIS     #INTEN,@DXCS    ;SET INTERRUPT ENABLE
017042  022777  000100  162230          CMP     #INTEN,@DXCS    ;VERIFIED CONTROL AND STATUS
017050  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
017052  104000                          ERROR                   ;
017054  017737  162220  024102          MOV     @DXCS,@#CSMAP   ;UPDATE MAP
017062  012737  000001  027474          MOV     #WRITEC,@#CMD   ;LOAD COMMAND
017070  004737  023024                  JSR     PC,@#STRAINT    ;TT TRACE TRACE INIT
017074  012737  000200  022650          MOV     #CHIS,@#ENTRY1  ;LOAD EXPECTED TT ENTRY 1
017102  013737  000272  177776          MOV     @#PSAVE,PS      ;LOWER PROCESSOR STATUS
017110  012737  017110  025220          MOV     #.,@#STERPC     ;ORIGIN OF TRAP ERROR
017116  004737  023126                  JSR     PC,FASTISS              ;SELECT
                                        ;
017122  012737  177774  027510          MOV     #-4,@#COUNT     ;SOFTWARE BYTE COUNTER
017130  013777  027510  162170          MOV     @#COUNT,@DXBC   ;LOAD BYTE COUNT
017136  023777  027510  162142          CMP     @#COUNT,@DXBC   ;VERIFY LOAD
017144  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
017146  104000                          ERROR                   ;
017150  017737  162132  024140          MOV     @DXBC,@#BCMAP   ;UPDATE BYTE COUNT
017156  052777  100000  162114          BIS     #PARSTP,@DXCS   ;SET STOP-ON-PARITY ERROR
017164  032777  100000  162106          BIT     #PARSTP,@DXCS   ;VERIFY CONTROL AND STATUS
017172  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
017174  104000                          ERROR                   ;PARSTP BIT NOT SET
                                        ;
017176  052737  100000  024102          BIS     #PARSTP,@#CSMAP ;UPDATE MAP
017204  012777  022402  162052          MOV     #MWD,@DXIV      ;TRANSFER DONE INTERRUPT
017212  012777  022464  162044          MOV     #MCWNPR,@DXBA   ;BUS ADDRESS FOR NPR DATA
017220  022777  022464  162036          CMP     #MCWNPR,@DXBA   ;VERIFY LOAD
017226  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
017230  104000                          ERROR                   ;
017232  017737  162046  024126          MOV     @DXBA,@#BAMAP   ;UPDATE MAP
017240  004737  022474                  JSR     PC,ZENPRD       ;ZERO NPR DATA FILE
017244  012702  022464                  MOV     #MCWNPR,R2      ;POINT R2 AT NPR DATA
017250  012701  022454                  MOV     #MCWDAT,R1      ;POINT R1 TO SOURCE FILE FOR WRITE DATA
017254  052777  000002  162036          BIS     #MCLKEN,@DXES   ;SET MAINTENANCE CLOCK ENABLE
017262  032777  000002  162030          BIT     #MCLKEN,@DXES   ;VERIFY SET
017270  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
017272  104000                          ERROR                   ;MCLKEN NOT SET
017274  052737  000002  024230          BIS     #MCLKEN,@#ESMAP
017302  017727  162000                  MOV     @DXCB,(PC)+     ;SAVE CONTROL BITS
017306  000000                  MCWCB1: 0                       ;HERE
017310  042737  107777  017336          BIC     #107777,@#MCWCB ;CLEAR ALL BUT PHASE FLOPS
017316  022737  070000  017336          CMP     #PHASE7,@#MCWCB ;VERIFY DX IN PHASE 7
017324  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
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3326  017326  104038                          ERROR                   ;
3327  017330  032777  020000  161756          BIT     @TSSF,@DXCR     ;EXAMINE TIME STATE FLOP
3328  017336  001010                          BNE     MCW1            ;BRANCH IF T91
3329  017340  052777  000001  161752          BIS     @MCLKP,@DXES    ;ISSUE CLOCK TICK
3330  017346  032777  020000  161740          BIT     @TSSF,@DXCR     ;EXAMINE TIME STATE FLOP
3331  017354  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3332  017356  104000                          ERROR                   ;
3333                                  ;LOOK FOR QUALIFICATION OF SIG17
3334  017360  032777  100000  161724  MCW11   BIT     @OPLI,@DXMI     ;VERIFY SELECTION COMPLETE
3335  017366  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3336  017370  104000                          ERROR                   ;
3337  017372  052737  100000  024174          BIS     @OPLI,@#MIMAP   ;UPDATE MAP
3338  017400  127727  161744  000002          CMPB    @TINDX,#2       ;CHECK TINDX
3339  017406  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3340  017410  104000                          ERROR                   ;TINDX INC ERROR
3341  017412  117737  161732  024251          MOVB    @TINDX,@#ESMAP+1        ;UPDATE MAP
3342  017420  032777  001000  161666          BIT     @SYNC,@DXCR     ;VERIFY SYNC=1
3343  017426  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3344  017430  104000                          ERROR                   ;SYNC NOT SET
3345  017432  052737  001000  024230          BIS     @SYNC,@#CBMAP   ;UPDATE MAP
3346  017440  022777  160000  161642          CMP     @DXLD!SELO!MLOD,@DXMO
3347  017446  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3348  017450  104000                          ERROR                   ;DXMO WRITE ERROR
3349  017452  017737  161632  024192          MOV     @DXMO,@#MOMAP   ;UPDATE MAP
3350  017460  123777  027454  161642          CMPB    @#CMD,@CUCR     ;VERIFY COMMAND LOAD
3351  017466  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3352  017470  104000                          ERROR                   ;COMMAND LOAD ERROR
3353  017472  113737  027454  024071          MOVB    @#CMD,@#CAMAP+1 ;UPDATE MAP
3354  017500  123777  027452  161620          CMPB    @#DEV,@CUAR     ;VERIFY ADRS LOAD
3355  017506  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3356  017510  104000                          ERROR                   ;ADRS LOAD ERROR
3357  017512  113737  027452  024070          MOVB    @#DEV,@#CAMAP   ;UPDATE MAP
3358  017520  027777  161552  161570          CMP     @DXCA,@DXND     ;VERIFY CA TO ND TRANSFER
3359  017526  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3360  017530  104000                          ERROR                   ;DXND LOAD ERROR
3361  017532  017737  161560  024272          MOV     @DXND,@#NDMAP   ;UPDATE MAP
3362  017540  004737  024052                  JSR     PC,CHKREG
3363  017544  052777  000002  161526          BIS     #2,@DXCS        ;SET FUNCTION "INPUT"
3364  017552  032777  000002  161520          BIT     #2,@DXCS        ;VERIFY FUNCTION SET
3365  017560  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3366  017562  104000                          ERROR                   ;FUNCTION BIT NOT LOAD
3367  017564  052737  000002  024182          BIS     #2,@#CSMAP      ;UPDATE
3368  017572  004737  024052                  JSR     PC,CHKREG
3369  017576  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3370  017602  000010                          10                      ;                       10 CLOCK PULSE(S)
3371  017604  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3372  017610  174000                          PHS71                   ;THIS PHASE AND STATE           PHS71
3373  017612  004737  024052                  JSR     PC,CHKREG
3374  017616  052777  000001  161494          BIS     #GO,@DXCS       ;SET FUNCTION "GO"
3375  017624  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3376  017630  000001                          1                       ;                       1 CLOCK PULSE(S)
3377  017632  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3378  017636  070000                          PHS72                   ;THIS PHASE AND STATE           PHS72
3379  017640  032777  000001  161432          BIT     #GO,@DXCS       ;VERIFY GO SET
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3368  017646  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3369  017650  104000                        ERROR                   ;GO NOT SET
3370  017652  052737  000001  024102        BIS     #GO,@#CSMAP     ;UPDATE MAP
3371  017660  004737  024052                JSR     PC,CHKREG
3372                                ;NEXT CLOCK PULSE SHOULD FORCE THE DX
3373                                ;INTO PHASE 5 TIME STATE 1
3374
3375  017664  004537  023560                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3376  017670  000001                        1                       ;                       1 CLOCK PULSE(S)
3377  017672  004737  023430                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3378  017676  054000                        PHS51                   ;THIS PHASE AND STATE           PHS51
3379                                ;VERIFY CU15 EVENTS TRANSPIRED
3380
3381  017700  032777  100000  161406        BIT     #LOCKO,@DXCB    ;LOCK-OUT MUST BE SET
3382  017706  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3383  017710  104000                        ERROR                   ;LOCKO NOT SET
3384  017712  052737  100000  024230        BIS     #LOCKO,@#CBMAP  ;UPDATE MAP
3385  017720  032777  000100  161366        BIT     #BYPAS,@DXCB    ;BYPAS MUST BE=1
3386  017726  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3387  017730  104000                        ERROR                   ;BYPAS NOT SET
3388  017732  052737  000100  024230        BIS     #BYPAS,@#CBMAP  ;UPDATE MAP
3389  017740  032777  000400  161346        BIT     #CUDX,@DXCB     ;CUDX MUST BE =1
3390  017746  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3391  017750  104000                        ERROR                   ;CUDX NOT SET
3392  017752  052737  000400  024230        BIS     #CUDX,@#CBMAP   ;UPDATE MAP
3393  017760  032777  000010  161326        BIT     #BALF,@DXCB     ;BALF MUST BE 0 .
3394  017766  001401                        BEQ     .+6             ;BRANCH IF NO ERROR CONDITION
3395  017770  104000                        ERROR                   ;BALF SET
3396  017772  042737  000010  024230        BIC     #BALF,@#CBMAP   ;UPDATE MAP
3397  020000  032777  001000  161306        BIT     #SYNC,@DXCB     ;SYNC=0
3398  020006  001401                        BEQ     .+6             ;BRANCH IF NO ERROR CONDITION
3399  020010  104000                        ERROR                   ;SYNC NOT ZERO
3400  020012  042737  001000  024230        BIC     #SYNC,@#CBMAP   ;UPDATE MAP
3401  020020  032777  000200  161266        BIT     #IOD,@DXCB      ;IOD MUST BE 0
3402  020026  001401                        BEQ     .+6             ;BRANCH IF NO ERROR CONDITION
3403  020030  104000                        ERROR                   ;I/O DONE SET
3404  020032  042737  000200  024230        BIC     #IOD,@#CBMAP    ;UPDATE MAP
3405  020040  004737  024052                JSR     PC,CHKREG
3406  020044  004537  023560                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3407  020050  000001                        1                       ;                       1 CLOCK PULSE(S)
3408  020052  004737  023430                JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3409  020056  050000                        PHS52                   ;THIS PHASE AND STATE           PHS52
3410  020060  032777  000100  161226        BIT     #BYPAS,@DXCB    ;VERIFY BYPAS CLEARED
3411  020066  001401                        BEQ     .+6             ;BRANCH IF NO ERROR CONDITION
3412  020070  104000                        ERROR                   ;BYPAS  BIS NOT CLEAR
3413  020072  042737  000100  024230        BIC     #BYPAS,@#CBMAP  ;UPDATE MAP
3414  020100  032777  002000  161204        BIT     #SRVI,@DXMI     ;SERVICE-IN MUST BE SET
3415  020106  001001                        BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3416  020110  104000                        ERROR                   ;SRVICE-IN NOT SET
3417  020112  052737  002000  024174        BIS     #SRVI,@#MIMAP   ;UPDATE MAP
3418  020120                        MCWL1
3419  020120  004537  023560                JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3420  020124  000011                        11                      ;                       11 CLOCK PULSE(S)
3421  020126  004737  024052                JSR     PC,CHKREG
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3414  P2P132  P04737  P23438                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3415  P2P136  P54000                          PHS51                   ;THIS PHASE AND STATE                   PHS51
3416
3417                                  ;WAIT FOR SERVICE-OUT TO ACCEPT FIRST BYTE
3418
3419  P2P140  P51177  161172                BIS     @R1,@BUSO       ;LOAD DATA+PARITY ON BUSO
3420  P2P144  P04537  P23500                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3421  P2P150  P00002                          2                       ;                               2 CLOCK PULSE(S)
3422  P2P152  121177  161160                  CMPB    @R1,@BUSO       ;VERIFY LOAD
3423  P2P156  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3424  P2P160  104000                          ERROR                   ;BUSO LOAD ERROR
3425  P2P162  111137  024152                  MOVB    @R1,@#MOMAP     ;UPDATE MAP
3426  P2P166  042737  000400  024152          BIC     #PARD,@#MOMAP   ;DIDDLE THE BIT
3427  P2P174  051137  024152                  BIS     @R1,@#MOMAP     ;LOAD PARITY BIT
3428  P2P200  004737  023720                  JSR     PC,COPARO       ;COPY PARO INTO CLKO
3429  P2P204  052777  001000  161076          BIS     #SRVO,@DXMO     ;RAISE SERVICE-OUT
3430  P2P212  004537  023500                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3431  P2P216  000001                          1                       ;                               1 CLOCK PULSE(S)
3432  P2P220  004737  023438                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3433  P2P224  050000                          PHS52                   ;THIS PHASE AND STATE                   PHS52
3434  P2P226  032777  001000  161054          BIT     #SRVO,@DXMO     ;VERIFY SERVICE-OUT SET
3435  P2P234  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3436  P2P236  104000                          ERROR                   ;SRVO DID NOT SET
3437  P2P240  052737  001000  024152          BIS     #SRVO,@#MOMAP   ;UPDATE MAP
3438  P2P246  032777  000010  161040          BIT     #BALF,@DXCB     ;BALF=0 FIRST BYTE OF WORD
3439  P2P254  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3440  P2P256  104000                          ERROR                   ;ILLEGAL BALF STATE
3441  P2P260  042737  000010  024230          BIC     #BALF,@#CBMAP   ;UPDATE MAP
3442  P2P266  004737  024052                  JSR     PC,CHKREG       ;ANYTHING WEIRD HAPPEN
3443
3444  P2P272  004537  023500                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3445  P2P276  000001                          1                       ;                               1 CLOCK PULSE(S)
3446  P2P300  004737  023438                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3447  P2P304  054000                          PHS51                   ;THIS PHASE AND STATE                   PHS51
3448                                  ;VERIFY PHS52 EVENTS TRANSPIRED (FIRST BYTE OF WORD TRANSFER)
3449  P2P306  032777  000100  161000          BIT     #BYPAS,@DXCB    ;BYPAS MUST BE 0
3450  P2P314  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3451  P2P316  104000                          ERROR                   ;BYPAS NOT ZERO
3452  P2P320  042737  000100  024230          BIC     #BYPAS,@#CBMAP  ;UPDATE MAP
3453  P2P326  032777  000010  160700          BIT     #BALF,@DXCB     ;BALF=1
3454  P2P334  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3455  P2P336  104000                          ERROR                   ;BALF NOT SET
3456  P2P340  052737  000010  024230          BIS     #BALF,@#CBMAP   ;UPDATE MAP
3457  P2P346  127777  160764  160736          CMPB    @BUSO,@CUSR     ;VERIFY 1ST DATA BYTE LOAD
3458  P2P354  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3459  P2P356  104000                          ERROR                   ;DATA BYTE LOAD ERROR
3460  P2P360  117737  160746  024114          MOVB    @CUSR,@#OSMAP   ;UPDATE MAP
3461  P2P366  005237  027510                  INC     COUNT           ;DECREMEND BYTE COUNT
3462  P2P372  023777  027510  160726          CMP     @#COUNT,@DXBC
3463  P2P400  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3464  P2P402  104000                          ERROR                   ;DXCB COUNTING ERROR
3465  P2P404  013737  027510  024140          MOV     @#COUNT,@#BCMAP ;UPDATE MAP
3466  P2P412  032777  002000  160672          BIT     #SRVI,@DXMI     ;SRVI SHOULD DROP
3467  P2P420  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
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3468  022422  104078                  ERROR                   ;SRVI DID NOT DROP
3469  022424  042737  002000  024174  BIC     #SRVI,@#MIMAP   ;UPDATE MAP
3470  022432  004737  024052          JSR     PC,CHKREG
3471
3472                                  ;WAIT FOR SRVO TO DROP
3473
3474  022436  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3475  022442  000010                  10                      ;                       10 CLOCK PULSE(S)
3476  022444  004737  023438          JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3477  022450  054000                  PH351                   ;THIS PHASE AND STATE           PH351
3478  022452  004737  024052          JSR     PC,CHKREG       ;ANYTHING WEIRD HAPPEN
3479  022456  042777  001777  160624  BIC     #SRVO!777,@DXMO ;CLEAR DATA & PARITY SRVO
3480  022464  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3481  022470  000003                  3                       ;                       3 CLOCK PULSE(S)
3482  022472  105777  160640          TSTB    @BUSO           ;VERIFY DATA REMOVED FROM BUSO
3483  022476  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3484  022500  104000                  ERROR                   ;BUSO DID NOT CLEAR
3485  022502  042737  001777  024192  BIC     #SRVO!777,@#MOMAP       ;UPDATE MAP
3486  022510  004737  023720          JSR     PC,COPARO       ;COPY PARO INTO CLKO
3487  022514  032777  002000  160570  BIT     #SRVI,@DXMI     ;TEST FOR SRVI
3488  022522  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3489  022524  104000                  ERROR                   ;SRVI DID NOT SET
3490  022526  052737  002000  024174  BIS     #SRVI,@#MIMAP   ;
3491  022534  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3492  022540  000007                  7                       ;                       7 CLOCK PULSE(S)
3493  022542  004737  024052          JSR     PC,CHKREG
3494
3495                                  ;WAITING FOR SRVO TO RISE, PUT DATA ON BUSO
3496
3497  022546  005721                  TST     (R1)+           ;INCREMENT TO NEXT DATA BYTE
3498  022550  051177  160534          BIS     @R1,@DXMO       ;LOAD DATA
3499  022554  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3500  022560  000002                  2                       ;                       2 CLOCK PULSE(S)
3501  022562  121177  160550          CMPB    @R1,@BUSO       ;VERIFY LOAD
3502  022566  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3503  022570  104000                  ERROR                   ;DATA LOAD ERROR
3504  022572  111137  024152          MOVB    @R1,@#MOMAP     ;UPDATE MAP
3505  022576  042737  000400  024152  BIC     #P=RO,@#MOMAP   ;DIDDLE THE BIT
3506  022604  051137  024152          BIS     @R1,@#MOMAP     ;LOAD PARITY BIT
3507  022610  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3508  022614  000002                  2                       ;                       2 CLOCK PULSE(S)
3509  022616  004737  023720          JSR     PC,COPARO       ;COPY PARO INTO CLKO
3510  022622  004737  024052          JSR     PC,CHKREG
3511  022626  052777  001000  160454  BIS     #SRVO,@DXMO     ;RAISE SRVO
3512  022634  004537  023560          JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3513  022640  000001                  1                       ;                       1 CLOCK PULSE(S)
3514  022642  004737  023438          JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3515  022646  050000                  PH352                   ;THIS PHASE AND STATE           PH352
3516  022650  032777  001000  160432  BIT     #SRVO,@DXMO     ;VERIFY SRVO SET
3517  022656  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3518  022660  104000                  ERROR                   ;
3519  022662  052737  001000  024192  BIS     #SRVO,@#MOMAP   ;UPDATE MAP SRVO=1
3520
3521                                  ;VERIFY S1611A (GEI READY FOR SECOND DATA BYTE)
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3522
3523  020670  032777  002000  160414          BIT     #SRV1,@DXMI     ;VERIFY SRV1 SET
3524  020676  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3525  020700  104000                          ERROR                   ;SRV1 NOT SET
3526  020702  052737  002000  024174          BIS     #SRV1,@#MIMAP   ;UPDATE MAP SRV1=1
3527
3528                                  ;CHECK BALF=1 FOR SECOND DATA BYTE
3529                                  ;BALF=1 TRANSFER BUS0 INTO CUCR
3530
3531  020710  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3532  020714  000001                          1                       ;                              1 CLOCK PULSE(S)
3533  020716  004737  023430                  JSR     PC,PHST         ;CHECK CONTROL BITS FOR
3534  020722  054000                          PHS51                   ;THIS PHASE AND STATE                  PHS51
3535  020724  032777  000010  160362          BIT     #BALF,@DXCB     ;BALF=0
3536  020732  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3537  020734  104000                          ERROR                   ;
3538  020736  042737  000010  024230          BIC     #BALF,@#CBMAP   ;UPDATE MAP
3539  020744  032777  000400  160342          BIT     #CJDX,@DXCB     ;CJDX=0 (WORD READY
3540  020752  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3541  020754  104000                          ERROR                   ;WORD NOT READY ERROR
3542  020756  042737  000400  024230          BIC     #CJDX,@#CBMAP   ;UPDATE MAP
3543  020764  127777  160346  160336          CMPB    @BUS0,@CUCR     ;VERIFY SECOND DATA BYTE LOAD
3544  020772  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3545  020774  104000                          ERROR                   ;SECOND DATA BYTE TRANSFER ERROR
3546  020776  117737  160326  024071          MOVB    @CUCR,@#CAMAP+1 ;UPDATE MAP
3547  021004  032777  000040  160302          BIT     #NPRX,@DXCB     ;CHECK NPRX
3548  021012  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3549  021014  104000                          ERROR                   ;NPRX NOT ZERO
3550  021016  042737  000040  024230          BIC     #NPRX,@#CBMAP
3551  021024  032777  002000  160260          BIT     #SJVI,@DXMI     ;SRV1 MUST DROP
3552  021032  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3553  021034  104000                          ERROR                   ;SRV1 DID NOT DROP
3554  021036  042737  002000  024174          BIC     #SRVI,@#MIMAP   ;UPDATE MAP
3555  021044  005237  027510                  INC     COUNT
3556  021050  023777  027510  160230          CMP     @#COUNT,@DXBC   ;VERIFY BYTE COUNT
3557  021056  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3558  021060  104000                          ERROR                   ;DXBC COUNT ERROR
3559  021062  017737  160220  024140          MOV     @DXBC,@#BCMAP   ;UPDATE MAP
3560
3561                                  ;AT THIS POINT TWO BYTES HAVE BEEN ACCEPTED FROM
3562                                  ;THE CHANNEL (SIMULATOR) AND THE DX IS READY TO
3563                                  ;REQUEST AN NPR TRANSFER INTO MEMORY.
3564
3565
3566  021070  032777  001000  160216          BIT     #SYNC,@DXCB     ;SYNC MUST BE 0
3567  021076  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3568  021100  104000                          ERROR                   ;SYNC SET ERROR
3569  021102  042737  001000  024230          BIC     #SYNC,@#CBMAP   ;UPDATE MAP
3570  021110  005737  027510                  TST     @#COUNT         ;IOD?
3571  021114  001002                          BNE     NIOD
3572  021116  000137  021740                  JMP     @#CWIOD         ;MAINT CLK DONE
3573  021122  004737  024052          NIOD:   JSR     PC,CHKREG       ;FORGET ANYTHING
3574
3575  021126  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
```

```
3576  021132  000001                          1                       ;                                   1 CLOCK PULSE(S)
3577  021134  004737  023430                  JSR     PC,@PHST        ;CHECK CONTROL BITS FOR
3578  021140  050000                          PHS52                   ;THIS PHASE AND STATE                       PHS52
3579  021142  004737  024052                  JSR     PC,@CHKREG      ;CUDX,NPRX, SYNC=0
3580
3581  021146  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3582  021152  000001                          1                       ;                                   1 CLOCK PULSE(S)
3583  021154  004737  023430                  JSR     PC,@PHSY        ;CHECK CONTROL BITS FOR
3584  021160  050000                          PHS51                   ;THIS PHASE AND STATE                       PHS51
3585                                  ;VERIFY DXND LOAD
3586
3587  021162  127777  160144  160126          CMPB    @CUSR,@DXND     ;CUSR TO DXND(7:)
3588  021170  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3589  021172  104000                          ERROR                   ;CUSR INTO DXND(7:0) TRANSFER ERROR
3590  021174  017727  160116                  MOV     @DXND,(PC)+     ;SAVE DXND
3591  021200  000000                  SND:    0                       ;HERE
3592  021202  000337  021200                  SWAB    @#SND           ;PUT DXND(15:08) INTO (7:0)
3593  021206  127737  160116  021200          CMPB    @CUCR,@#SND     ;VERIFY CUCR TO DXND(15:08)
3594  021214  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3595  021216  104000                          ERROR                   ;CUCR IN[illegible]DXND(15:08) TRANSFER ERROR
3596  021220  017737  160072  024272          MOV     @DXND,@#NDMAP   ;UPDATE [illegible] MAP
3597  021226  027712  160064                  CMP     @DXND,@R2       ;VERIFY NPR TRANSFER
3598  021232  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3599  021234  104000                          ERROR                   ;NPR DATA TRANSFER ERROR
3600  021236  032777  001000  160050          BIT     #SYNC,@DXCB     ;SYNC=1
3601  021244  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3602  021246  104000                          ERROR                   ;
3603  021250  052737  001000  024238          BIS     #SYNC,@#CBMAP   ;UPDATE MAP
3604  021256  032777  000400  160030          BIT     #CUDX,@DXCB     ;CUDX=1
3605  021264  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3606  021266  104000                          ERROR                   ;
3607  021270  052737  000400  024238          BIS     #CUDX,@#CBMAP   ;UPDATE MAP
3608  021276  032777  000040  160010          BIT     #NPRX,@DXCB     ;NPRX=1
3609  021304  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3610  021306  104000                          ERROR                   ;
3611  021310  052737  000040  024238          BIS     #NPRX,@#CBMAP   ;UPDATE MAP
3612  021316  032777  000020  157770          BIT     #NPRT,@DXCB     ;NPRT=1
3613  021324  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3614  021326  104000                          ERROR                   ;
3615  021330  052737  000020  024238          BIS     #NPRT,@#CBMAP   ;UPDATE MAP
3616  021336  004737  024052                  JSR     PC,@#CHKREG
3617  021342  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3618  021346  000001                          1                       ;                                   1 CLOCK PULSE(S)
3619  021350  032777  000020  157736          BIT     #NPRT,@DXCB     ;CHECK NPRT
3620  021356  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3621  021360  104000                          ERROR                   ;NPRT ZERO
3622  021362  052777  000020  157724          BIS     #NPRT,@DXCB     ;CHECK NPRX
3623  021370  032777  000040  157716          BIT     #NPRX,@DXCB     ;VERIFY NPRX CLEARED
3624  021376  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3625  021400  104000                          ERROR                   ;NPRX NOT ZERO
3626  021402  042737  000040  024238          BIC     #NPRX,@#CBMAP   ;UPDATE MAP
3627  021410  032777  000400  157676          BIT     #CUDX,@DXCB     ;CUDX MUST BE 1
3628  021416  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3629  021420  104000                          ERROR                   ;CUDX NOT SET
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3630  021422  052737  000400  024238          BIS     #CUDX,@#CBMAP   ;UPDATE MAP
3631  021430  020277  157650                  CMP     R2,@DXBA        ;VERIFY CORRECT ADDRESS
3632  021434  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3633  021436  104000                          ERROR                   ;NPR TRANSFER ERROR
3634
3635  021440  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3636  021444  000002                          2                       ;                              2 CLOCK PULSE(S)
3637  021446  105722                          TSTB    (R2)+           ;INC TO NEXT NPR WORD
3638  021450  020277  157630                  CMP     R2,@DXBA        ;VERIFY DXBA LOAD
3639  021454  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3640  021456  104000                          ERROR                   ;DXBA INCREMENT ERROR
3641  021460  017737  157620  024126          MOV     @DXBA,@#BAMAP   ;UPDATE MAP
3642  021466  042777  001777  157614          BIC     #SRVO!777,@DXMO
3643  021474  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3644  021500  000002                          2                       ;                              2 CLOCK PULSE(S)
3645  021502  105777  157602                  TSTB    @DXMO
3646  021506  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3647  021510  104000                          ERROR                   ;BUSO DID NOT CLEAR
3648  021512  004737  023720                  JSR     PC,COPARO       ;COPY PARO INTO CLKO
3649  021516  032777  001000  157564          BIT     #SRVO,@DXMO     ;VERIFY SRVO DROPED
3650  021524  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3651  021526  104000                          ERROR                   ;SRVO DID NOT DROP
3652  021530  042737  001777  024192          BIC     #SRVO!777,@#MOMAP
3653  021536  105722                          TSTB    (R2)+           ;INC TO NEXT BYTE ADRS
3654  021540  020277  157540                  CMP     R2,@DXBA        ;VERIFY DXBA ADRS
3655  021544  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3656  021546  104000                          ERROR                   ;DXBA INC ERROR
3657  021550  017737  157530  024126          MOV     @DXBA,@#BAMAP   ;UPDATE MAP
3658  021556  032777  000020  157530          BIT     #NPRT,@DXCB     ;VERIFY NPRT SET
3659  021564  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3660  021566  104000                          ERROR                   ;NPRT NOT SET
3661  021570  052737  000020  024238          BIS     #NPRT,@#CBMAP
3662  021576  032777  000400  157510          BIT     #CUDX,@DXCB     ;VERIFY CUDX SET
3663  021604  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3664  021606  104000                          ERROR                   ;CUDX NOT SET
3665  021610  052737  000400  024238          BIS     #CUDX,@#CBMAP
3666  021616  032777  001000  157470          BIT     #SYNC,@DXCB     ;VERIFY SYNC 0
3667  021624  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3668  021626  104000                          ERROR                   ;SYNC NOT 0
3669  021630  042737  001000  024238          BIC     #SYNC,@#CBMAP   ;UPDATE MAP
3670  021636  032777  002000  157446          BIT     #SRVI,@DXMI     ;VERIFY SRVI SET
3671  021644  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3672  021646  104000                          ERROR                   ;SRVI NOT SET
3673  021650  052737  002000  024174          BIS     #SRVI,@#MIMAP   ;UPDATE MAP
3674  021656  004737  024052                  JSR     PC,CHKREG
3675  021662  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3676  021666  000002                          2                       ;                              2 CLOCK PULSE(S)
3677  021670  032777  002000  157414          BIT     #SRVI,@DXMI     ;VERIFY SRVI SET
3678  021676  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3679  021700  104000                          ERROR                   ;SRVI DID NOT DROP
3680  021702  052737  002000  024174          BIS     #SRVI,@#MIMAP   ;UPDATE MAP
3681  021710  032777  001000  157376          BIT     #SYNC,@DXCB     ;VERIFY SYNC DROPED
3682  021716  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3683  021720  104000                          ERROR                   ;SYNC DID NOT DROP
```

```
3684  022722  042737  001000  024238          BIC     #SYNC,@#CBMAP   ;UPDATE
3685  022730  004737  024052                  JSR     PC;CHKREG
3686  022734  000137  020120                  JMP     @#MCWL          ;STAY IN MC WRITE LOOP
3687  022740  032777  000200  157346  MCWIOD: BIT     #IOD,@DXCB      ;VERIFY I/O DONE SET
3688  022746  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3689  022750  104000                          ERROR                   ;IOD NOT SET
3690  022752  052737  000200  024238          BIS     #IOD,@#CBMAP    ;UPDATE MAP
3691  022760  032777  000020  157326          BIT     #NPRT,@DXCB     ;VERIFY NPRT SET
3692  022766  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3693  022770  104000                          ERROR                   ;NPRT NOT SET
3694  022772  052737  000020  024238          BIS     #NPRT,@#CBMAP
3695  023000  032777  000020  157266          CMP     #CUDEND,@DXDS   ;VERIFY CU DATA END
3696  023006  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3697  023010  104000                          ERROR                   ;DXDS STATUS ERROR
3698  023012  017737  157256  024056          MOV     @DXDS,@#DSMAP
3699  023020  004737  024052                  JSR     PC,CHKREG       ;FORGET ANYTHING
3700  023024  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3701  023030  000001                          1                       ;                       1 CLOCK PULSE(S)
3702  023032  004737  023430                  JSR     PC;PHST         ;CHECK CONTROL BITS FOR
3703  023036  050000                          PHS52                   ;THIS PHASE AND STATE           PHS52
3704  023042  004737  024052                  JSR     PC;CHKREG       ;CUDX,NPRX, SYNC=0
3705
3706  023044  004537  023560                  JSR     R5;@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3707  023050  000001                          1                       ;                       1 CLOCK PULSE(S)
3708  023052  004737  023430                  JSR     PC;PHST         ;CHECK CONTROL BITS FOR
3709  023056  054000                          PHS51                   ;THIS PHASE AND STATE           PHS51
3710                                  ;VERIFY DXND LOAD
3711
3712  023060  017737  157232  024272          MOV     @DXND,@#NDMAP
3713  023066  127737  157240  157222          CMPB    #CJSR,@DXND     ;CJSR TO DXND(71)
3714  023074  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3715  023076  104000                          ERROR                   ;CJSR INTO DXND(718) TRANSFER ERROR
3716  023100  017727  157212                  MOV     @DXND,(PC)+     ;SAVE DXND
3717  023104  000000                  SND21:  0                       ;HERE
3718  023106  000337  023104                  SWAB    @#SND2          ;PUT DXND(15:08) INTO (7:0)
3719  023112  127737  157212  023104          CMPB    @CUCR,@#SND2    ;VERIFY CUCR TO DXND(15:08)
3720  023120  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3721  023122  104000                          ERROR                   ;CUCR INTO DXND(15:08) TRANSFER ERROR
3722  023124  017737  157166  024272          MOV     @DXND,@#NDMAP   ;UPDATE DXND MAP
3723  023132  027712  157160                  CMP     @DXND,@R2       ;VERIFY NPR TRANSFER
3724  023136  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3725  023140  104000                          ERROR                   ;NPR DATA TRANSFER ERROR
3726  023142  032777  001000  157144          BIT     #SYNC,@DXCB     ;SYNC=1
3727  023150  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3728  023152  104000                          ERROR                   ;
3729  023154  052737  001000  024238          BIS     #SYNC,@#CBMAP   ;UPDATE MAP
3730  023162  032777  000400  157124          BIT     #CUDX,@DXCB     ;CUDX=1
3731  023170  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3732  023172  104000                          ERROR                   ;
3733  023174  052737  000400  024238          BIS     #CUDX,@#CBMAP   ;UPDATE MAP
3734  023202  032777  000040  157104          BIT     #NPRX,@DXCB     ;NPRX=1
3735  023210  001001                          BNE     .+2             ;BRANCH IF NO ERROR CONDITION
3736  023212  104000                          ERROR                   ;
3737  023214  052737  000040  024238          BIS     #NPRX,@#CBMAP   ;UPDATE MAP
```

```
3738  022222  032777  000020  157004          BIT     @NPRT,@DXCB     ;NPRT=1
3739  022230  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3740  022232  104000                          ERROR                   ;
3741  022234  052737  000020  024230          BIS     @NPRT,@#CBMAP   ;UPDATE MAP
3742  022242  004737  024052                  JSR     PC,CHKREG
3743  022246  004537  023560                  JSR     R5,@#CLK        ;ROUTINE TO ISSUE CLOCK PULSES
3744  022252  000001                          1                       ;                                1 CLOCK PULSE(S)
3745  022254  032777  000020  157032          BIT     @NPRT,@DXCB     ;CHECK NPRT
3746  022262  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3747  022264  104000                          ERROR                   ;NPRT ZERO
3748  022266  052777  000020  157020          BIS     @NPRT,@DXCB     ;CHECK NPRX
3749
3750
3751
3752  022274  032777  000040  157012          BIT     @NPRX,@DXCB     ;VERIFY NPRX CLEARED
3753  022302  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3754  022304  104000                          ERROR                   ;NPRX NOT ZERO
3755  022306  042737  000040  024230          BIC     @NPRX,@#CBMAP   ;UPDATE MAP
3756  022314  032777  000400  156772          BIT     @CUDX,@DXCB     ;CUDX MUST BE 1
3757  022322  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3758  022324  104000                          ERROR                   ;CUDX NOT SET
3759  022326  052737  000400  024230          BIS     @CUDX,@#CBMAP   ;UPDATE MAP
3760  022334  020277  156744                  CMP     R2,@DXBA        ;VERIFY CORRECT ADDRESS
3761  022340  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3762  022342  104000                          ERROR                   ;NPR TRANSFER ERROR
3763
3764  022344  032777  000200  156742          BIT     @IOD,@DXCB      ;VERIFY IOD SET
3765  022352  001001                          BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3766  022354  104000                          ERROR                   ;IOD NOT SET
3767  022356  052737  000200  024230          BIS     @IOD,@#CBMAP    ;UPDATE MAP
3768  022364  004737  024052                  JSR     PC,CHKREG
3769  022370  042777  000002  156722          BIC     @MCLKEN,@DXES   ;CLEAR MAINTENANCE CLOCK
3770
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```
3792  022376  000001                  WAIT                    ;FROM WRITE DONE INTERRUPT
3793  022400  000020                  WAIT                    ;RETURN FROM INTERRUPT FAILED
3794
3795  022402  032777  000200  159670  MCWD1:  BIT     #DONE,@DXCS     ;CHECK FOR VALID INTERRUPT
3796  022410  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3797  022412  104000                  ERROR                   ;INVALID INTERRUPT
3798  022414  042777  000200  159656          BIC     #DONE,@DXCS     ;CLEAR DONE
3799  022422  023727  003004  000020          CMP     @#,004,#CUDEND  ;VERIFY TT ENTRY #1
3800  022430  001401                  BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3801  022432  104000                  ERROR                   ;TT ENTRY ERROR
3802
3803  022434  023777  003006  159634          CMP     @#3006,@DXCA    ;VERIFY TT ENTRY 2
3804  022442  001401                  BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3805  022444  104000                  ERROR                   ;TT ENTRY ERROR
3806  022446  012716  022512          MOV     #MCWEX,@SP      ;RETURN ADDRESS
3807  022452  000002                  RTI
3808
3809                                  ;MAINTENANCE CLOCK WRITE DATA
3810
3811  022454  000777                  MCWDAT: .WORD   777
3812  022456  000420                          .WORD   420
3813  022460  000525                          .WORD   525
3814  022462  000652                          .WORD   652
3815                                  ;MAINTENANCE CLOCK WRITE NPR DATA FILE
3816
3817  022464  000000                  MCWNPR: .WORD   0               ;BYTES 1,2
3818  022466  000000                          .WORD   0               ;BYTES 3,4
3819  022470  000000                          .WORD   0               ;BUFFER FOR ERROR
3820  022472  000000                          .WORD   0               ;BUFFER FOR ERROR
3821
3822
3823  022474  005037  022464          ZNPRD:  CLR     MCWNPR
3824  022500  005037  022466                  CLR     MCWNPR+2
3825  022504  005037  022470                  CLR     MCWNPR+4
3826  022510  000207                  RTS     PC              ;ZERO NPR DATA FILE
3827  022512  000240                  MCWEX:  NOP             ;MAINT CLK WRITE EXIT
3828
3829
```

```
3830                                    ;*****************************************************
3831                                    ;TEST   5       END OF TEST STRING
3832                                    ;*****************************************************
3833  022514  104400                    T5T5    SCOPE
3834  022516  012737  000001  025130            MOV     #1,@#ICOUNT     ;ITERATION COUNT
3835  022524  012737  000005  025126            MOV     #5,@#LSTSTN     ;SAVE TEST # FOR ERROR REPORT
3836  022532  012737  022540  025134            MOV     #SCP5,@#RETURN  ;SCOPE LOOP RETURN ADRS
3837  022540                                SCP5:
3838
3839
3840                                    .REM    <
3841
3842                                    THIS TEST FUNCTIONS AS A TERMINATOR FOR THE CHAINABLE TEST STRING,
3843                                    AS SUCH IT TRANSFERS CONTROL TO THE LOOP CONTROL SUBROUTINE.
3844
3845                                            >
3846
3847
3848  022542  000137  027150                    JMP     @#LPCNTL
```

```
3849                                        ;ISS DONE INTERRUPT SERVICE
3850  022544                                SEL.DONE:
3851  022544  032777  000200  150526              BIT     #DONE,@DXCS     ;CHECK DONE
3852  022552  001001                              BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3853  022554  104000                              ERROR                   ;FALSE INTERRUPT
3854  022556  042777  000200  150514              BIC     #DONE,@DXCS     ;CLEAR DONE
3855  022564  032777  000200  150506              BIT     #DONE,@DXCS
3856  022572  001401                              BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
3857  022574  104000                              ERROR                   ;DONE NOT CLEAR
3858  022576  012746  023022                      MOV     #SEL,X,-(SP)    ;FAKE A JSR PC,TT,TRACE
3859
3860                                        ;TT,TRACE, ROUTINE TO TRACE TUMBLE TABLE ENTRIES
3861                                        ;AND THE TTNDX
3862  022602                                TT;TRACE:
3863
3864  022602  010146                              MOV     R1;-(SP)
3865  022604  013701  023010                      MOV     @# TRACE,R1     ;LOAD R1 WITH SOFTWARE IT
3866  022610  020137  001440                      CMP     R1;@#TT         ;CHECK FOR BOTTOM OF TABLE
3867  022614  001005                              BNE     1$              ;BRANCH IF  NOT  BOTTOM
3868  022616  005737  003770                      TST     @#3770          ;LOOK AT  TOP OF TT
3869  022622  001401                              BEQ     .+4             ;BRANCH IF NO RAP AROUND
3870  022624  104002                              TRACER                  ;REPORT TT TRACE ERROR
3871  022626  000404                              BR      2$
3872  022630  005741                      1$:     TST     -(R1)           ;CHECK FOR TT OVERFLOW
3873  022632  001401                              BEQ     .+2             ;BRANCH IF NO RAP AROUND
3874  022634  104002                              TRACER                  ;TT OVERFLOW ERROR
3875  022636  005721                              TST     (R1)+           ;INC TO ENTRY
3876  022640  011127                      2$:     MOV     (R1),(PC)+      ;SAVE ENTRY ONE
3877  022642  000000                      SENRY1: 0                       ;HERE
3878  022644  023727  022642                      CMP     @#SENRY1,(PC)+  ;COMPARE SAVED ENTRY WITH
3879  022650  000000                      ENTRY1: 0                       ;EXPECTED ENTRY
3880  022652  001407                              BEQ     1$              ;BRANCH IF DXDS ENTRY OK
3881  022654  013737  022642  023016              MOV     @#SENRY1,@#TTWAS
3882  022662  013737  022650  023020              MOV     @#ENTRY1,@#TTSHOULD
3883  022670  104002                              TRACER                  ;REPORT TT TRACE ERROR
3884  022672  005037  022650              1$:     CLR     ENTRY1
3885  022676  005021                              CLR     (R1)+           ;CLEAR ENTRY AND ADVANCE POINTER
3886  022700  011127                              MOV     (R1),(PC)+      ;SAVE ENTRY TWO
3887
3888  022702  000000                      SENRY2: 0                       ;HERE
3889  022704  023727  022702                      CMP     @#SENRY2,(PC)+  ;COMPARE SAVED ENTRY WITH
3890  022710  000000                      ENTRY2: 0                       ;EXPECTED ENTRY
3891  022712  001411                      TT;T8:  BEQ     2$              ;BRANCH IF DXCA ENTRY OK
3892  022714  013737  022702  023016              MOV     @#SENRY2,@#TTWAS
3893  022722  013737  022710  023020              MOV     @#ENTRY2,@#TTSHOULD
3894  022730  104002                              TRACER                  ;REPORT TT TRACE ERROR
3895  022732  005037  022710                      CLR     ENTRY2
3896  022736  005021                      2$:     CLR     (R1)+           ;CLEAR
3897  022740  022701  004000                      CMP     #TST1,R1        ;CHECK FOR SOFTWARE
3898  022744  001002                              BNE     TT,T1           ;BRANCH IF NO OVERFLOW
3899  022746  013701  001440                      MOV     @#TT,R1
3900  022752  005037  022762              TT;T1:  CLR     @#TT,T2
3901  022756  117727  156366                      MOVB    @TTNDX,(PC)+    ;SAVE TTNDX
3902  022762  000000                      TT;T2:  0                       ;HERE
```

```
3923  022764  006337  022762          ASL     TT;T2           ;SCALE MOD(2)
3924  022770  063737  001440  022762  ADD     @#TT,@#TT,T2    ;ADD BASE OF TT TO INDEX
3925  022776  123701  022762          CMPB    @#TT,T2,R1      ;COMPARE TT POINTERS
3926  023002  001401                  BEQ     .+4             ;BRANCH IF HARDWARE AND SOFTWARE TT POINTERS MATCH
3927  023004  104002                  TRACER                  ;REPORT TT TRACE ERROR
3928  023006  010127                  MOV     R1,TTRACE(PC)+  ;SAVE TT TRACE
3929  023010  000000          TTRACE: 0                       ;MEME
3930  023012  012601                  MOV     (SP)+,R1
3931  023014  000207                  RTS     PC              ;RETURN
3932  023016  000000          TTWAS:  0       ;ACTUAL CONTENTS OF TT
3933  023020  000000          TTSHOULD: 0     ;EXPECTED CONTENTS OF TT
3934
3935  023022  000002          SEL.X1  RTI
3936
3937                          ;SUBROUTINE TO INIT DX FOR TT TRACING
3938
3939  023024  042777  077777  156256  TRAINT: BIC     #77777,@DXMD    ;DESELECT
3940  023032  112777  000108  156402          MOVB    #SM,@DST        ;RESPONSE TO TEST IO
3941  023040  113737  027452  022710  TI'.01  MOVB    @#DEV,@#ENTRY2  ;SECOND TT ENTRY = DXCA
3942  023046  113737  027454  022711          MOVB    @#XMD,@#ENTRY2+1        !
3943  023054  113777  027454  156246          MOVB    @#XMD,@CUCR     ;LOAD COMMAND
3944  023062  113777  027452  156236          MOVB    @#DEV,@CUAR     ;LOAD COMMAND IN CUAR
3945  023070  052777  000100  156202          BIS     #INTEN,@DXCS    ;SET INTERRUPT ENABLE
3946  023076  032777  000100  156174          BIT     #INTEN,@DXCS    ;VERIFY SET
3947  023104  001001                  BNE     .+4             ;BRANCH IF NO ERROR CONDITION
3948  023106  104000                  ERROR                   ;INTEN NOT SET
3949  023110  013777  001270  156150          MOV     @#DXPNT,@DXIS   ;LOAD INT STATUS
3950  023116  012777  022544  156140          MOV     #SEL,DONE,@DXIV ;LOAD INT VECTOR
3951  023124  000207                  RTS     PC
3952
3953
3954
3955                          ;FAST ISS SELECTOR CH ONLY
3956
3957  023126                  FASTISS:
3958  023126  053777  027452  156194          BIS     DEV,@DXMD       ;PUT DEVICE ADRS ON OUT TAGS
3959  023134  052777  004000  156146          BIS     #ADRO,@DXMD     ;RAISE ADRS-OUT
3960  023142  052777  060000  156140          BIS     #HLDO!SELO,@DXMD        ;RAISE SELECT-OUT, HOLD-OUT
3961  023150  042777  004000  156132          BIC     #ADRO,@DXMD     ;REMOVE ADRS-OUT
3962  023156  043777  027452  156124          BIC     DEV,@DXMD       ;REMOVE ADRS
3963  023164  053777  027454  156116          BIS     CMD,@DXMD       ;PUT COMMAND ON OUT TAGS
3964  023172  052777  002000  156110          BIS     #CMDO,@DXMD     ;RAISE CMD-OUT
3965  023200  043777  027454  156102          BIC     CMD,@DXMD       ;REMOVE CMD
3966  023206  042777  002000  156074          BIC     #C DO,@DXMD     ;REMOVE CMD-OUT
3967  023214  105737  027454                  TSTB    CMD             ;TEST FOR "TEST I/O" COMMAND
3968  023220  001403                  BEQ     FISS1           ;CLEAR SELO,HLDO IF TIO CMD
3969  023222  105777  156114                  TSTB    @BUSI           ;TEST BUSI FOR ZERO STATUS
3970  023226  001403                  BEQ     FISS2           ;DON'T CLEAR SELO,HLDO ON 0 STATUS
3971  023230  042777  060000  156092  FISS1:  BIC     #HLDO!SELO,@DXMD        ;CLEAR SELO AND HLDO
3972  023236  052777  001000  156044  FISS2:  BIS     #SRVO,@DXMD     ;RELEAVE STATUS
3973  023244  042777  001000  156036          BIC     #SRVO,@DXMD     ;
3974  023252  000207                  RTS     PC
3975
3976                          ;SEL CH ISS
```

```
3957
3958  P23254                                SEL.ISSI
3959  P23254  P93777  P27492  155844                BIS     DEV,PCUAR       ;PRESET CSR/ADD REG DEV ADDRESS
3960  P23262  P42777  P00400  156036                BIC     #4 0,PCUAR      ;PARITY RESET
3961  P23270  P93777  P27492  156012                BIS     DEV,PDXMD       ;PUT DEVICE ADRS ON OUT TAGS
3962  P23276  P92777  P04000  156004                BIS     #ADRO,PDXMD     ;RAISE ADRS-OUT
3963  P23304  P92777  P60000  155776                BIS     #HLDO!SELO,PDXMD        ;RAISE SELECT-OUT, HOLD-OUT
3964  P23312  P42777  P04000  155770                BIC     #ADRO,PDXMD     ;REMOVE ADRS-OUT
3965  P23320  P43777  P27492  155762                BIC     DEV,PDXMD       ;REMOVE ADRS
3966  P23326  P93777  P27454  155754                BIS     CMD,PDXMD       ;PUT COMMAND ON OUT TAGS
3967  P23334  P92777  P02000  155746                BIS     #CMDO,PDXMD     ;RAISE CMD-OUT
3968  P23342  P43777  P27454  155740                BIC     CMD,PDXMD       ;REMOVE CMD
3969  P23350  P42777  P02000  155732                BIC     #CMDO,PDXMD     ;REMOVE CMD-OUT
3970  P23356  P92777  P01000  155724                BIS     #SRVC,PDXMD     ;RELEASE STATUS
3971  P23364  P42777  P01000  155716                BIC     #SRVC,PDXMD     ;
3972  P23372  P00207                                RTS     PC
3973
3974                                        ;CHKPHS, ROUTINE TO CHECK CONTROL BITS FOR CORRECT PHASE
3975
3976  P23374  P12527                        CHKPHS: MOV     (R5)+,(PC)+     ;SAVE EXPECTED PHASE
3977  P23376  P00000                        SPHS:   2                       ;HERE
3978  P23400  P17727  155710                        MOV     PDXCB,(PC)+     ;SAVE CONTROL BITS
3979  P23404  P00000                        SCB:    2                       ;HERE
3980  P23406  P42737  107777  023404                BIC     #107777,SCB     ;CLEAR ALL BUT PHASE FLOPS
3981  P23414  P23737  P23376  023404                CMP     SPHS,SCB        ;COMPARE SAVED PHASE WITH EXPECTED
3982  P23422  001401                                BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
3983  P23424  104000                                ERROR                   ;PHASE ERROR
3984  P23426  P00205                                RTS     R5              ;RETURN
3985
3986                                        ;PHST, CHECK PHASE AND STATE CONTROL BITS
3987
3988  P23430  P17627  000000                PHST:   MOV     @(SP),(PC)+     ;SAVE EXPECTED PHASE AND STATE
3989  P23434  P00000                        SPHST:  0                       ;HERE
3990  P23436  P62716  000002                        ADD     #2,@SP          ;INC RETURN PC
3991  P23442  P17727  155646                        MOV     @PDXCB,(PC)+    ;SAVE CONTROL BITS
3992  P23446  000000                        SCB1:   0                       ;HERE
3993  P23450  P42737  103777  023446                BIC     #103777,SCB1    ;CLEAR ALL BUT PHASE & STATE
3994  P23456  023737  023434  023446                CMP     SPHST,SCB1      ;EXPECTED VS ACTUAL
3995  P23464  001416                                BEQ     PHSTE           ;EXIT IF OK
3996  P23466  000004  P23524                        TYPE    ,PHSTER
3997  P23472  011627                                MOV     @SP,(PC)+       ;SAVE ERROR ORIGIN
3998  P23474  000000                        PSTMP:  0                       ;HERE
3999  P23476  162737  P00002  023474                SUB     #2,@#PSTMP      ;
4000  P23504  P10546                                MOV     TTY,-(SP)       ;SAVE TTY
4001  P23506  013705  023474                        MOV     PSTMP,TTY               ;TYPE IN OCTAL
4002  P23512  004737  P32066                        JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4003  P23516  012605                                MOV     (SP)+,TTY       ;RESTORE TTY
4004  P23520  104000                                ERROR
4005  P23522  000207                        PHSTE:  RTS     PC              ;RETURN
4006  P23524  050137  040510  042523        PHSTER: .ASCIZ  "-PHASE OR STATE ERROR AT: "
4007  P23532  047440  P20122  052123
4008  P23540  052101  020105  051105
4009  P23546  047522  020122  052101
4010  P23554  020072     000
```

```
4211                    023568                  .EVEN
4212                                            ;ROUTINE TO ISSUE N MAINT. CLOCK PULSES
4213
4214  023568  012527                CLK1:   MOV     (R5)+,(PC)+     ;SAVE
4215  023562  000000                CLKC1:  0                       ;CLOCK COUNT HERE
4216  023564  005737  023562                TST     CLKC            ;TEST FOR ZERO COUNT
4217  023570  001435                        BEQ     CLKE            ;BRANCH IF COUNT EMPTY
4218  023572  032737  002000  177570        BIT     #BIT10,SWR      ;TEST FOR SINGLE STEP
4219  023600  001423                        BEQ     CLK1            ;BRANCH IF AUTO CLOCK
4220  023602  000004  036257                TYPE    ,CRLF
4221  023606  010546                        MOV     TTY,-(SP)       ;SAVE TTY
4222  023610  010505                        MOV     R5,TTY          ;TYPE IN OCTAL
4223  023612  004737  032066                JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4224  023616  012605                        MOV     (SP)+,TTY       ;RESTORE TTY
4225  023620  000004  036255                TYPE    ,SPACE
4226  023624  012737  000003  023646        MOV     #BPT,1$         ;RESTORE BREAK POINT TRAP
4227  023632  012737  000240  032612        MOV     #NOP,0,UIN      ;CODE FOR ODT RESTORE
4228  023640  012737  023646  032546        MOV     #1$,0,ADR1      ;TELL ODT BREAK LEGAL
4229  023646  000003                1$:     BPT                     ;BREAK TO ODT
4230  023650  052777  000001  159442  CLK11:  BIS     #MCLKP,@DXES    ;ISSUE MAINT CLK PULSE
4231  023656  005337  023562                DEC     CLKC            ;DEC CLOCK COUNT
4232  023662  001372                        BNE     CLK1            ;CONTINUE IF COUNT NOT ZERO
4233  023664  000205                CLKE:   RTS     R5              ;RETURN
4234
4235                                            ;ROUTINE TO FORCE DX INTO TIME STATE 1
4236
4237  023666  032777  004000  159428  TIMS1:  BIT     #TSSF,@DXCB     ;CHECK TIME STATE
4238  023674  001010                        BNE     1$              ;BRANCH IF TS1
4239  023676  052777  000001  159414        BIS     #MCLKP,@DXES    ;ADVANCE TO TS1
4240  023704  032777  004000  159402        BIT     #TSSF,@DXCB     ;TS1?
4241  023712  001001                        BNE     .+2             ;BRANCH IF NO ERROR CONDITION
4242  023714  104000                        ERROR                   ;TIME STATE MALFUNCTION
4243  023716  000207                1$:     RTS     PC
4244
4245
4246
4247                                            ;ROUTINE TO COPY PARO BIT INTO CLKO
4248  023720  032777  000400  159362  COPARO: BIT     #PARO,@DXMO
4249  023726  001407                        BEQ     1$
4250  023730  052737  001000  024174        BIS     #CLKO,@#MIMAP
4251  023736  052737  001000  023764        BIS     #CLKO,@#NOMI    ;NO MI MAP
4252  023744  000406                        BR      3$
4253  023746  042737  001000  024174  1$:   BIC     #CLKO,@#MIMAP
4254  023754  042737  001000  023764        BIC     #CLKO,@#NOMI    ;
4255  023762  000207                3$:     RTS     PC
4256  023764  000000                NOMI:   0               ;MASK TO SEE IF MI IS UNREADABLE
4257
4258                                            ;ZEROTT: ROUTINE TO ZERO TUMBLE TABLE
4259
4260  023766                          ZEROTT:
4261  023766  010146                        MOV     R1,-(SP)
4262  023770  010246                        MOV     R2,-(SP)
4263  023772  013701  001440                MOV     TT,R1
4264  023776  012702  000400                MOV     #256.,R2
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4065  024002  005021                  2TT1:  CLR     (R1)+
4066  024004  005302                         DEC     R2
4067  024006  001375                         BNE     2TT1
4068  024010  012602                         MOV     (SP)+,R2
4069  024012  012601                         MOV     (SP)+,R1
4070  024014  000207                         RTS     PC
4071
4072                                  ;TTZERO, ROUTINE TO VERIFY TT ZERO
4073
4074  024016                        TTZERO:
4075  024016  010146                         MOV     R1,-(SP)
4076  024020  010246                         MOV     R2,-(SP)
4077  024022  013701  001440                 MOV     TT,R1
4078  024026  012702  000400                 MOV     #256.,R2
4079  024032  005721                TTZ1:    TST     (R1)+
4080  024034  001401                         BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
4081  024036  104000                         ERROR                   ;ILLEGAL TT ENTRY
4082  024040  005302                         DEC     R2
4083  024042  001373                         BNE     TTZ1
4084  024044  012602                         MOV     (SP)+,R2
4085  024046  012601                         MOV     (SP)+,R1
4086  024050  000207                         RTS     PC
4087
4088                                  ;ROUTINE TO VERIFY THAT NO UNEXPECTED CHANGE
4089                                  ;HAS OCCURRED IN ANY REGISTER
4090
4091                                  ;THIS ROUTINE DOES NOT LOOK AT THE PHASE CONTROL OR
4092                                  ;TIME STATE FLIP FLOP SO THAT THIS ROUTINE
4093                                  ;MAY BE USED IN EITHER THE MAINTENANCE OR
4094                                  ;FREE RUNNING CLOCK MODE
4095
4096  024052  027727  155216          CHKREG: CMP     @DXDS,(PC)+     ;COMPARE DXDS WITH
4097  024056  000000                  DSMAP:  0                       ;DS MAP
4098  024060  001401                         BEQ     .+4             ;BRANCH IF NO ERROR
4099  024062  104001                         MAPERR                  ;REPORT MAP ERROR
4100  024064  027727  155200                 CMP     @DXCA,(PC)+     ;COMPARE DXCA WITH
4101  024070  000000                  CAMAP:  0                       ;CA MAP
4102  024072  001401                         BEQ     .+4             ;BRANCH IF NO ERROR
4103  024074  104001                         MAPERR                  ;REPORT MAP ERROR
4104  024076  027727  155170                 CMP     @DXCS,(PC)+     ;COMPARE DXCS WITH
4105  024102  000000                  CSMAP:  0                       ;CS MAP
4106  024104  001401                         BEQ     .+4             ;BRANCH IF NO ERROR
4107  024106  104001                         MAPERR                  ;REPORT MAP ERROR
4108  024110  027727  155166                 CMP     @DXOS,(PC)+     ;COMPARE DXOS WITH
4109  024114  000000                  OSMAP:  0
4110  024116  001401                         BEQ     .+4             ;BRANCH IF NO ERROR
4111  024120  104001                         MAPERR                  ;REPORT MAP ERROR
4112  024122  027727  155156                 CMP     @DXBA,(PC)+     ;COMPARE BUS ADRS WITH
4113  024126  000000                  BAMAP:  0                       ;BUS ADRS MAP
4114  024130  001401                         BEQ     .+4             ;BRANCH IF NO ERROR
4115  024132  104001                         MAPERR                  ;REPORT MAP ERROR
4116  024134  027727  155146                 CMP     @DXBC,(PC)+     ;COMPARE BYTE COUNT WITH
4117  024140  000000                  BCMAP:  0                       ;BYTE COUNT MAP
4118  024142  001401                         BEQ     .+4             ;BRANCH IF NO ERROR
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4119  024144  104001                          MAPERR                  ;REPORT MAP ERROR
4120  024146  027727  155136                  CMP     @DXMO,(PC)+     ;COMPARE MAINTENACE-OUT WITH
4121  024152  000000          MOMAP:  0       ;MAINTENANCE-OUT MAP
4122  024154  001401                          BEQ     .+4             ;BRANCH IF NO ERROR
4123  024156  104001                          MAPERR                  ;REPORT MAP ERROR
4124
4125  024160  323777  023764  155124          CMP     @#MOMI,@DXMI    ;TEST FOR UNREADABILITY
4126  024166  001405                          BEQ     CKRG1           ;BRANCH IF UNREADABLE
4127  024170  027727  155116                  CMP     @DXMI,(PC)+     ;COMPARE MAINTENANCE-IN WITH
4128  024174  000000          MIMAP:  0       ;MAINTENANCE-IN MAP
4129  024176  001401                          BEQ     .+4             ;BRANCH IF NO ERROR
4130  024200  104001                          MAPERR                  ;REPORT MAP ERROR
4131  024202  017727  155106          CKRG1:  MOV     @DXCB,(PC)+     ;SAVE DXCB
4132  024206  000000          SDXCB:  0       ;HERE
4133                                  ;*****************************  MOD APR 74 *******************************
4134                                  ;+              MODULO ADDRESS MODIFICATION
4135  024212  053737  024342  024230          BIS     CBMAPS,CBMAP
4136                                  ;*****************************  MOD APR 74 *******************************
4137  024216  042737  074000  024206          BIC     #PHS71,@#SDXCB  ;CLEAR PHASE & STATE FLOPS
4138  024224  023727  024206                  CMP     @#SDXCB,(PC)+   ;COMPARE SAVED DXBC - PHS71 WITH
4139  024230  000000          CBMAP:  0       ;CONTROL BIT MAP
4140  024232  001401                          BEQ     .+4             ;BRANCH IF NO ERROR
4141  024234  104001                          MAPERR                  ;REPORT MAP ERROR
4142  024236  017727  155056                  MOV     @DXES,(PC)+     ;SAVE DX EXTRA SIGNAL
4143  024242  000000          SDXES:  0       ;HERE
4144  024244  023727  024242                  CMP     @#SDXES,(PC)+   ;COMPARE SAVED ES WITH MAP
4145  024252  000000          ESMAP:  0       ;ES MAP
4146  024252  001401                          BEQ     .+4             ;BRANCH IF NO ERROR
4147  024254  104001                          MAPERR                  ;REPORT MAP ERROR
4148
4149  024256  032777  000002  155034          BIT     #MCLKEN,@DXES   ;CHECK FOR MAINTENANCE MODE
4150  024264  001005                          BNE     CHKEND          ;BRANCH IF MAINT MODE
4151  024266  027727  155024                  CMP     @D'ND,(PC)+     ;COMPARE NPR DATA WITH
4152  024272  000000          NDMAP:  0       ;NPR DATA MAP
4153  024274  001401                          BEQ     .+4             ;BRANCH IF NO ERROR
4154  024276  104001                          MAPERR                  ;REPORT MAP ERROR
4155                                  ;*****************************  MOD APR 74 *******************************
4156                                  ;+              MODULO ADDRESS MODIFICATION
4157  024300  043737  024342  024230  CHKEND: BIC     CBMAPS,CBMAP
4158  024306  005037  024342                  CLR     CBMAPS
4159  024312  000207                  RTS     PC                      ;RETURN
4160                                  ;ADDRESS OF MAPS
4161  024314  024056                  ADRDSM: DSMAP
4162  024316  024070                  ADRCAM: CAMAP
4163  024320  024172                  ADRCSM: CSMAP
4164  024322  024114                  ADROSM: OSMAP
4165  024324  024126                  ADRBAM: BAMAP
4166  024326  024140                  ADRBCM: BCMAP
4167  024330  024152                  ADRMOM: MOMAP
4168  024332  024174                  ADRMIM: MIMAP
4169  024334  024230                  ADRCBM: CBMAP
4170  024336  024272                  ADRNDM: NDMAP
4171  024340  024250                  ADRESM: ESMAP
4172                                  ;*****************************  MOD APR 74 *******************************
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D1

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4173                                        ;*          MODULO ADDRESS MODIFICATION
4174  024342  000000                        CBMAPS: ?
4175                                        ;************************ MOD APR 74 ********************************
4176                                        ;DXRES, ROUTINE TO ISSUE DX RESET AND SETUP TABLES
4177                                        ;TO TRACE THE TTNDX AND THE TUMBLE TABLE ENTRIES
4178
4179  024344  042777  000002  154746  DXRES:  BIC     #MCLKEN,@DXES   ;CLEAR MAINT CLK
4180  024352  042777  000200  154720          BIC     #DONE,@DXCS     ;CLEAR DONE & LOCKO
4181  024360  032777  000200  154712          BIT     #DONE,@DXCS     ;VERIFY DONE CLEAR
4182  024366  001401                          BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
4183  024370  104000                          ERROR                   ;DONE NOT ZERO
4184  024372  052777  000001  154700          BIS     #DXFRS,@DXCS    ;ISSUE DX RESET
4185  024400  004737  023766                  JSR     PC,@#ZEROTT     ;CLEAR TT
4186  024404  004737  024462                  JSR     PC,RESMAP       ;CLEAR REG MAP(EXCEPT OPLO)
4187  024410  052777  000010  154722          BIS     #TIMDIS,@DXES   ;SET TIMER DISABLE
4188  024416  004737  023720                  JSR     PC,@#COPARO     ;COPY PARO INTO CLKO MAP
4189  024422  004737  024052                  JSR     PC,CHKREG       ;VERIFY NO UNEXPECTED REG CHANGE
4190  024426  004737  024016                  JSR     PC,TTZERO       ;VERIFY NO TT ENTRIES
4191  024432  013737  001440  023010          MOV     @#TT,TTRACE     ;INIT SOFTWARE TT POINTER
4192  024440  105777  154704                  TSTB    @TTNDX          ;VERIFY TTNDX ZERO
4193  024444  001401                          BEQ     .+4             ;BRANCH IF NO ERROR CONDITION
4194  024446  104000                          ERROR                   ;TTNDX NOT ZERO
4195  024450  005037  022650                  CLR     @#ENTRY1
4196  024454  005037  022710                  CLR     @#ENTRY2
4197  024460  000207                          RTS     PC
4198
4199
4200                                        .REM    *
4201
4202                                        THIS SUBROUTINE RESTORES THE TRACE MAP TO THE STATE THE REGISTERS
4203                                        SHOULD BE IN FOLLOWING A DX RESET.
4204
4205                                                *
4206                                        ;************************ MOD APR 74 ********************************
4207                                        ;*          STORAGE REDUCTION MOD
4208
4209  024462  005037  024056          RESMAP: CLR     @#DSMAP
4210  024466  005037  024078                  CLR     @#EAMAP
4211  024472  005037  024102                  CLR     @#XSMAP
4212  024476  053737  001430  024114          BIS     SPN,OSMAP
4213  024504  105037  024114                  CLRB    @#ISMAP
4214  024510  005037  024126                  CLR     @#FAMAP
4215  024514  005037  024140                  CLR     @#BCMAP
4216                                        ;************************ MOD APR 74 ********************************
4217  024520  012737  100000  024152          MOV     #OPLO,@#MOMAP
4218  024526  012737  000400  024174          MOV     #PARI,@#MIMAP
4219                                        ;************************ MOD APR 74 ********************************
4220  024534  005037  024230                  CLR     @#CBMAP
4221  024540  005037  024272                  CLR     @#IDMAP
4222  024544  005037  024342                  CLR     @#CBMAPS
4223  024550  012737  000010  024290          MOV     #TIMDIS,@#ESMAP
4224  024556  000207                          RTS     PC
4225
4226
```

E-1

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                                        ;INTERRUPT HANDLERS
                                ;
024560  104070                FALSE:  ERROR                   ;FALSE OR UNEXPECTED INTERRUPT
024562  000002                        RTI
                                ;
024564  032777  000200  154536  INTR:   BIT     #DONE,@DXCS     ;TEST DONE
024572  001001                        BNE     .+4             ;BRANCH ON DONE
024574  104070                        ERROR                   ;FALSE INTERRUPT
024576  042777  000200  154474        BIC     #DONE,@DXCS     ;CLEAR INT CONDITION
024604  052737  100000  024614        BIS     #INTOK,INTPAS   ;SET INT PASS FLAG
024612  000002                        RTI
                                ;
024614  000000                INTPAS: .       ;INTERRUPT PASS FLAG
                                ;
                                ;
                                ;INTERR, ROUTINE TO TEST FOR SUCCESSFUL INTERRUPT
                                ;
024616                          INTERR:
024616  032737  100000  024614        BIT     #INTOK,INTPAS   ;DID INTERRUPT OCCUR
024624  001405                        BEQ     IRR             ;BRANCH IF NOT
024626  062716  000002        IRR2:   ADD     #2,@SP          ;INC RETURN PC
024632  042737  100000  024614        BIC     #INTOK,INTPAS   ;CLEAR PASS FLAG
024642  000207                IRR:    RTS     PC
                                ;
                                ;EMULATOR DECODER ROUTINE
                                ;
024642                          EMTDECODER:
024642  011646                        MOV     @R6,-(R6)       ;DUPLICATE PC ON STACK
024644  162716  000002                SUB     #2,@R6          ;POINT PC TO EMT INST.
024652  017616  000000                MOV     @(R6),@R6       ;MOV EMT INST ONTO STACK
024656  121627  000024                CMPB    @R6,#28.        ;TEST THAT CALL IS WITHIN LIMITS
024662  101401                        BLOS    EMTOK           ;BRANCH IF WITHIN LIMITS
024664  104000                        ERROR
024666  006116          EMTOK:  ROL     @R6             ;EMT ARGUMENT X 2.
024672  042716  177001                BIC     #177001,@R6     ;CLEAR HIGH BYTE
024676  062716  024704                ADD     #EMTAG,@R6      ;FORM ADRS OF ROUTINE ADRS
024702  017616  000000                MOV     @(R6),@R6       ;PUT ROUTINE ADRS ON STACK
024706  000136                        JMP     @(R6)+          ;JUMP TO ROUTINE
                                                        ;TAGS FOR EMT CALL
                                ;
024704                          EMTAG:                  ;BEGINNING OF EMT TABLE
                                ;
024704  000024                .BLKW   28.             ;RESERVE 16. WORDS FOR ADRS LIST
                                ;SCOPE LOOP AND CONTROL SUBROUTINE
                                ;
024754  105777  154416          SCOPEC: TSTB    @TKS
024760  100014                        BPL     SCOPEM
024762  017727  154412                MOV     @TKB,(PC)+
024766  000000                DTMP:   .
024770  042737  000200  024766        BIC     #200,DTMP
024776  123727  024766  000003        CMPB    DTMP,#3
```

F7

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4281  025004  001002                        BNE     SCOPEM
4282  025006  000137  026214                JMP     @#JON1,0
4283  025012  032737  040000  177570  SCOPEM: BIT     #BIT14,SR       ;TEST FOR SCOPE
4284  025020  001012                        BNE     SCOPEB          ;BRANCH IF SCOPE SELECTED
4285  025022  032737  004000  177570        BIT     #BIT11,SR       ;TEST FOR ITERATIONS
4286  025030  001020                        BNE     SCOPEA          ;EXIT IF ITERATIONS INHIBITED
4287  025032  005237  025102                INC     SCOPEF          ;INCREMENT ITERATION COUNT
4288  025036  023737  025102  025100        CMP     SCOPEF,ICOUNT   ;TEST FOR COMPLETION OF ITERATIONS
4289  025044  001410                        BEQ     SCOPEC          ;BRANCH IF COMPLETE
4290  025046  012737  177777  027444  SCOPEB: MOV     #-1,ONESHOT     ;SO YOU CAN SCOPE ON ONCE ONLY CODE
4291  025054  005726                        TST     (SP)+           ;POP RETURN PC
4292  025056  012637  177776                MOV     (SP)+,PS        ;RESTOR PROCESSOR STATUS
4293  025062  000177  000010                JMP     @RETURN         ;
4294  025066  011637  025104  SCOPEC: MOV     @SP,RETURN      ;SET UP SCOPE RETURN ADRS
4295  025072  005037  025102  SCOPEA: CLR     SCOPEF          ;CLEAR ITERATION COUNT
4296  025076  000002                        RTI
4297  025100  000001          ICOUNT: 1                       ;NUMBER OF REQUESTED ITERATIONS
4298  025102  000000          SCOPEF: 0                       ;ITERATION COUNT
4299  025104  004000          RETURN: TST1                    ;DEFAULT RETURN
4300  025106                  TSTABLE:                        ;BEGINNING OF TABLE OF TEST ADDRESSES
4301          025206          .=.+100                         ;TEST ADDRESS LIST
4302
4323
4324
4325                          ;ENTRY POINT FOR MAP ERRORS
4326  025206                  T.MAPERR:
4327  025206  012737  177777  026072                MOV     #-1,ERFLG       ;FLAG THAT THIS IS  MAP ERROR
4328  025214  000137  025356                        JMP     @#DEF
4329  025220  000000          TERPC:  0               ;ORIGIN OF TRACE ERROR
4330                          ;TUMBLE TABLE TRACE ERROR TRAP
4331  025222                  T.TRACER:
4332  025222  012737  177776  026072                MOV     #-2,ERFLG
4333  025230  000004  036574                        TYPE    ,TRCM1
4334  025234  010546                                MOV     TTY,-(SP)       ;SAVE TTY
4335  025236  013705  026120                        MOV     ERTSTN,TTY              ;TYPE ERTSTN IN OCTAL
4336  025242  004737  032076                        JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
4337  025246  012605                                MOV     (SP)+,TTY       ;RESTORE TTY
4338  025250  000004  036626                        TYPE    ,TMCM   ;TRACE ERROR AT;
4339  025254  010546                                MOV     TTY,-(SP)       ;SAVE TTY
4340  025256  013705  025220                        MOV     TERPC,TTY               ;TYPE IN OCTAL
4341  025262  004737  032066                        JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4342  025266  012605                                MOV     (SP)+,TTY       ;RESTORE TTY
4343  025270  000004  036726                        TYPE    ,TMC1
4344  025274  010546                                MOV     TTY,-(SP)       ;SAVE TTY
4345  025276  013705  025016                        MOV     TTWAS,TTY               ;TYPE IN OCTAL
4346  025302  004737  032066                        JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4347  025306  012605                                MOV     (SP)+,TTY       ;RESTORE TTY
4348  025310  000004  036750                        TYPE    ,TMC2
4349  025314  010546                                MOV     TTY,-(SP)       ;SAVE TTY
4350  025316  013705  025026                        MOV     TTSHOULD,TTY            ;TYPE IN OCTAL
4351  025322  004737  032066                        JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4352  025326  012605                                MOV     (SP)+,TTY       ;RESTORE TTY
4353  025330  032701  000002                        BIT     #BIT1,R1        ;TEST FOR 0X55 OR 0XAA
4354  025334  001003                                BNE     1$              ;BR IF 0XAA
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4335  025336  000024  036772          TYPE    ,TYDS
4336  025342  000402                  BR      2$
4337  025344  000024  037017    1$:   TYPE    ,TTCA
4338  025350                    2$:
4339  025350  000402                  BR      DEP
4340
4341                              ;ENTRY POINT FOR MOST ERRORS
4342
4343  025352                    T.ERROR:
4344  025352  005037  026072          CLR     ERFLG           ;FLAG THIS AS  NORMAL ERROR
4345  025356  005237  026124    DEP:  INC     ERRCNT          ;INC ERROR COUNT
4346  025362  010037  026130          MOV     R0,ER0          ;SAVE R0
4347  025366  010137  026132          MOV     R1,ER1          ;SAVE R1
4348  025372  010237  026134          MOV     R2,ER2          ;SAVE R2
4349  025376  010337  026136          MOV     R3,ER3          ;SAVE R3
4350  025402  010437  026140          MOV     R4,ER4          ;SAVE R4
4351  025406  010537  026142          MOV     R5,ER5          ;SAVE R5
4352  025412  032737  020000  177570    BIT     #BIT13,SR       ;TEST FOR INHIBIT  PRINT
4353  025420  001131                  BNE     PERRPC          ;BRANCH IF INHIBITED
4354  025422  000004  036310          TYPE    ,ERPC
4355  025426  011627                  MOV     @SP,(PC)+       ;SAVE ERROR PC +2
4356  025430  000000            ETMP0:  0                       ;HERE
4357  025432  162737  000002  025430    SUB     #2,ETMP0        ;CORRECT PC
4358  025440  010546                  MOV     TTY,-(SP)       ;SAVE TTY
4359  025442  013705  025430          MOV     @#ETMP0,TTY             ;TYPE IN OCTAL
4360  025446  004737  032060          JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4361  025452  012605                  MOV     (SP)+,TTY       ;RESTORE TTY
4362  025454  032737  010000  177570    BIT     #BIT12,SR       ;TEST FOR SHORT ERROR REPORT
4363  025462  001110                  BNE     PERRPC          ;BRANCH IF SHORT SELECTED
4364  025464  022737  177776  026072    CMP     #-2,ERFLG
4365  025472  001410                  BEQ     1$
4366  025474  000004  036524          TYPE    ,MSG35          ;ERROR IN TEST)
4367  025500  010546                  MOV     TTY,-(SP)       ;SAVE TTY
4368  025502  013705  026126          MOV     ER_STN,TTY              ;TYPE ERTSTN IN OCTAL
4369  025506  004737  032070          JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
4370  025512  012605                  MOV     (SP)+,TTY       ;RESTORE TTY
4371  025514  000004  036453    1$:   TYPE    ,MSG20
4372  025520  042737  177400  024152    BIC     #177400,MOMAP   ;MASK OUT CUBDEV ADDRESS
4373  025526  010546                  MOV     TTY,-(SP)       ;SAVE TTY
4374  025530  013705  024152          MOV     MOMAP,TTY               ;TYPE IN OCTAL
4375  025534  004737  032060          JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4376  025540  012605                  MOV     (SP)+,TTY       ;RESTORE TTY
4377                              ;REGISTER DUMP ROUTINE
4378
4379  025542  005737  026072          TST     ERFLG
4380  025546  001456                  BEQ     PERRPC          ;BRANCH IF NOT MAP ERROR
4381  025550  000004  036545          TYPE    ,MSG36          ;MAP ERROR ORIGIN
4382  025554  016627  000004          MOV     4(SP),(PC)+     ;SAVE ERROR PC +2
4383  025560  000000            ETMP1:  0                       ;HERE
4384  025562  162737  000004  025560    SUB     #4,@#ETMP1      ;CORRECT PC
4385  025570  010546                  MOV     TTY,-(SP)       ;SAVE TTY
4386  025572  013705  025560          MOV     ETMP1,TTY               ;TYPE IN OCTAL
4387  025576  004737  032060          JSR     PC,PRINTR       ;TYPE LEADING ZERO'S
4388  025602  012605                  MOV     (SP)+,TTY       ;RESTORE TTY
```

```
4389  025674  000024  036144                  TYPE    ,RDH
4390  025610  012701  026274                  MOV     #ADRA,R1
4391  025614  012702  001274                  MOV     #DXDS,R2
4392  025620  012703  024314                  MOV     #ADRDSM,R3
4393  025624  012137  025642          RDMP3:  MOV     (R1)+,RDMP1
4394  025630  027273  000000  000000          CMP     @(R2),@(R3)     ;COMP MAP VS REGISTER
4395  025636  001416                          BEQ     RDMP2           ;DUMP ONLY ON DISCREPANCY
4396  025640  000004                          TYPE
4397  025642  000000                  RDMP1:  0
4398  025644  000004  036240                  TYPE    ,SPAC4
4399  025650  017205  000000                  MOV     @(R2),TTY       ;DUMP CONTENTS OF REGISTER
4400  025654  004737  032066                  JSR     PC,PRINTR
4401  025660  000004  036255                  TYPE    ,SPACE
4402  025664  017305  000000                  MOV     @(R3),TTY       ;DUMP CONTENTS OF MAP
4403  025670  004737  032066                  JSR     PC,PRINTR
4404  025674  023233                  RDMP2:  CMP     @(R2)+,@(R3)+   ;INC R2,R3
4405  025676  020127  026122                  CMP     R1,#ADRAE
4406  025702  001358                          BNE     RDMP3
4407  025704  032737  100000  177570  PERRPC: BIT     #HLTSW,SR       ;TEST FOR HALT ON ERROR
4408  025712  001422                          BEQ     ERRLOP          ;BRANCH IF NO HALT
4409  025714  032737  001000  177570          BIT     #BIT9,SR        ;TEST FOR INHIBIT ODT
4410  025722  001415                          BEQ     2$              ;BR IF ODT NOT SELECTED
4411  025724  000004  036257                  TYPE    ,CRLF
4412  025730  012737  000003  025792          MOV     #BPT,1$         ;RESTORE BREAK POINT TRAP
4413  025736  012737  000240  032612          MOV     #NOP,@,UIN      ;CODE FOR ODT RESTORE
4414  025744  012737  025752  032546          MOV     #1$,@,ADR1      ;TELL ODT BREAK LEGAL
4415  025752  000003                  1$:     BPT                     ;BREAK TO ODT
4416  025754  000401                          BR      ERRLOP
4417
4418
4419
4420
4421
4422
4423
4424
4425
4426
4427
4428
4429
4430
4431
4432
4433
4434
4435
4436
4437  025756  000000                  2$:     HALT                    ;HALT ON ERROR
4438
4439
4440  025760                          ERRLOP: 
4441  025760  013700  026130                  MOV     E,R0,#0         ;RESTORE R0
4442  025764  013701  026132                  MOV     E,21,#1         ;RESTORE R1
```

```
4443  026770  013772  026134                  MOV     E,R2,H2         ;RESTORE R2
4444  026774  013773  026136                  MOV     E,R3,H3         ;RESTORE R3
4445  027000  013774  026140                  MOV     E,R4,H4         ;RESTORE R4
4446  027004  013775  026142                  MOV     E,R5,H5         ;RESTORE R5
4447  027010  032737  040000  177570          BIT     #LOPSW,SR       ;TEST FOR SCOPE LOOP
4448  027016  001424                          BEQ     EX.R1
4449  027020  012706  001100                  MOV     #BEGIN,SP       ;REINIT STACK POINTER
4450  027024  012737  177777  027444          MOV     #-1,ONESHOT     ;REINIT ONESHOT TEST FLAGS
4451  027032  042777  000002  153208          BIC     #MKLKEN,@DXCS   ;CLEAR MAINT CLOCK
4452  027040  005077  153244                  CLR     @DXMO           ;SYSTEM RESET
4453  027044  052777  000001  153226          BIS     #DXFRS,@DXCS    ;DX RESET
4454  027052  004737  030710                  JSR     PC,PRLI         ;REINITIALIZE DX
4455  027056  013737  001272  177776          MOV     LESS1,PS        ;DX PRIORITY MINUS ONE
4456  027064  000177  177814                  JMP     @RETURN
4457
4458  027070  000002                  EXPR1:  RTI
4459  027072  000000                  ERFLG:  0               ;ERROR CONTROL FLAG =1=MAP ERROR
4460                                  ;LIST OF ASCII MESSAGE ADDRESSES
4461
4462  027074  036325                  ADRA1:  ADXDS
4463  027076  036334                          ADXCA
4464  027100  036343                          ADXCS
4465  027102  036352                          ADXOS
4466  027104  036361                          ADXBA
4467  027106  036370                          ADXBC
4468  027110  036377                          ADXMO
4469  027112  036406                          ADXMI
4470  027114  036415                          ADXCB
4471  027116  036424                          ADXND
4472  027120  036433                          ADXES
4473  027122  036442                  ADRAE1: ADXES1
4474
4475
4476
4477                                  ;ERROR COUNT
4478
4479  027124  000000                  ERRCNT: 0
4480  027126  000000                  ERTSTN: 0               ;TEST NUMBER
4481
4482
4483                                  ;REGISTER STORAGE FOR ERROR REPORTING
4484
4485  027130  000000                  E.R0:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4486  027132  000000                  E.R1:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4487  027134  000000                  E.R2:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4488  027136  000000                  E.R3:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4489  027140  000000                  E.R4:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4490  027142  000000                  E.R5:   0       ;SAVED REGISTERS FOR ERROR REPORTING
4491
4492                                  .SBTTL  MONITOR
4493
4494                                  ; ***************************************************************
4495  027144                          MONITOR:
4496                                  ; ***************************************************************
```

```
4497
4498
4499
4520  026144  012776  001100          MOV     #BEGIN,SP       ;SET UP STACK POINTER
4521  026150  012737  000340  177776  MOV     #LEVEL7,PS      ;MONITOR AT LEVEL 7
4522  026156  004737  027756          JSR     PC,@#MONDFLT    ;SET UP DEFAULT PARAMETERS
4523
4524  026162  012737  032224  000060  MOV     #TTY1,@#60      ;TTY KEYBOARD INT VEC
4525  026170  012737  000200  000062  MOV     #LEVEL4,@#62    ;LEVEL 4
4526  026176  000004  036200          TYPE    ,HOME           ;HOME UP AND ERASE SCREEN
4527
4528  026202  000004  001030          MI      TYPE    ,HEADER
4529  026206  012737  026330  026204  MOV     #RELOD,@#62     ;HEADER TEXT GETS WIPED BY MPRIS
4530
4531  026214  000005                  MON1.$1 RESET
4532  026216  005777  153156          TST     @TKB            ;CLEAR FLAG
4533  026222  052777  000100  153146  BIS     #INTEN,@TKS     ;SET INTERRUPT ENABLE
4534  026230  012706  001100          MOV     #BEGIN,SP       ;SET UP STACK POINTER
4535  026234  012737  000340  177776  MOV     #LEVEL7,PS      ;MONITOR AT LEVEL 7
4536  026242  000004  035020          TYPE    ,FSTART
4537  026246  104006                  KEY,TO,R0
4538  026250  122700  000104          CMPB    #'D,R0          ;D = DEFAULT PARAMETERS
4539  026254  001003                  BNE     1$
4520  026256  004737  027756          JSR     PC,@#MONDFLT
4521  026262  000403                  BR      2$
4522  026264  122700  000120          1$:     CMPB    #'P,R0          ;P = PREVIOUSLY SELECTED PARAMETERS
4523  026270  001002                  BNE     3$
4524  026272  000137  027034          2$:     JMP     @#MON1B
4525  026276  122700  000123          3$:     CMPB    #'S,R0          ;S = GO THROUGH AND SELECT PARAMETERS
4526  026302  001426                  BEQ     MON1
4527  026304  122700  000116          CMPB    #'N,R0          ;N = START AT THIS TEST #
4528  026310  001341                  BNE     MON1,@
4529  026312  000004  035676          TYPE    ,MSG9
4530  026316  104005                  ACCEPTO
4531  026320  013737  027470  027472  MOV     OCTNUM,FIRST,TST
4532  026326  000761                  BR      2$
4533
4534  026330  051137  046105  046517  RELOD:  .ASCIZ  "<RELOAD FOR HEADER TEXT>"
4535  026336  020124  047506  020122
4536  026344  042516  042101  051105
4537  026352  052040  054105  000124
4538                                  .EVEN
4539                                  ;SET UP TEST PARAMETERS
4540
4541  026360  004737  027756          MON11   JSR     PC,MONDFLT      ;SET UP DEFAULT PARAMETERS
4542  026364  000004  035676          TYPE    ,MSG9           ;FIRST TEST #
4543
4544  026370  104005                  ACCEPTO ;ACCEPT TEST NUMBER FROM KEYBOARD
4545
4546
4547  026372  005737  027470          TST     OCTNUM          ;TEST FOR DEFAULT
4548  026376  001423                  BEQ     MON3            ;BRANCH ON DEFAULT
4549  026400  013737  027470  027472  MOV     OCTNUM,FIRST,TST        ;LOAD FIRST TEST #
4550
```

K1

```
4551  026406  000024  035634          MON31   TYPE    ,MSG2           ;BASE ADDRESS:
4552
4553
4554  026412  104025                  ACCEPTO                         ;ACCEPT BASE ADDRESS  FROM KEYBOARD
4555
4556  026414  005737  027470          TST     OCTNUM                  ;TEST FOR DEFAULT
4557  026420  001403                  BEQ     MON4                    ;BRANCH IF DEFAULT
4558  026422  013737  027470  001202  MOV     OCINUM,DXBASE           ;LOAD NON-DEFAULT ADDRESS
4559
4560  026430  000024  036470          MON41   TYPE    ,MSG28          ;ACCEPT INTERRUPT VECTOR
4561  026434  104005                  ACCEPTO
4562  026436  005737  027470          TST     OCTNUM                  ;TEST FOR DEFAULT
4563  026442  001411                  BEQ     MON4,1                  ;BRANCH IF DEFAULT
4564  026444  013737  027470  001204  MOV     OCTNUM,DXIV             ;LOAD NON-DEFAULT INT VECTOR ADRS
4565  026452  062737  000002  027470  ADD     #2.,@#OCTNUM            ;FORM INT STATUS ADRS
4566  026460  013737  027470  001206  MOV     @#OCTNUM,@#DXIS         ;INT STATUS ADDRESS
4567
4568
4569  026466  000024  036101          MON4.1  TYPE    ,MSG12          ;PRIORITY
4570  026472  104025                  ACCEPTO         ;ACCEPT DX PRIORITY LEVEL
4571  026474  005737  027470          TST     OCTNUM                  ;TEST FOR DEFAULT
4572  026500  001425                  BEQ     MON6                    ;BRANCH ON DEFAULT
4573  026502  006337  027470          ASL     OCINUM                  ;SHIFT PRIORITY
4574  026506  006337  027470          ASL     OCINUM                  ;INTO PROCESSOR
4575  026512  006337  027470          ASL     OCTNUM                  ;PRIORITY BITS OF
4576  026516  006337  027470          ASL     OCTNUM                  ;PROCESSOR STATUS WORD
4577  026522  006337  027470          ASL     OCTNUM
4578  026526  013737  027470  001270  MOV     OCINUM,DXPRT            ;LOAD PRIORITY
4579  026534  005337  027470          DEC     OCTNUM
4580  026540  042737  000037  027470  BIC     #37,@#OCTNUM            ;CLEAR TN2VC
4581  026546  013737  027470  001272  MOV     OCTNUM,LESS1            ;PRIORITY TO ALLOW DX INTERRUPTS
4582
4583
4584
4585                                  ;GENERATE A LIST OF LEGAL ADDRESSES
4586
4587  026554  000004  035715          MON61   TYPE    ,MSG4           ;LEGAL ADDRESS LIST
4588  026560  012703  027512                  MOV     #LEGAL,ADRS,R3  ;START OF LEGAL ADRS TABLE
4589  026564  000004  036007          MON71   TYPE    ,MSG6           ;ADRS:
4590  026570  004737  031202                  JSR     PC,GETHEX       ;GET HEXADECIMAL CU ADDRESS
4591  026574  104007  031410                  PARITY  ,HEXNUM         ;PUT PARITY (ODD) ON ADRS
4592  026600  013723  031410                  MOV     HEXNUM,(R3)+    ;SAVE LEGAL ADDRESS
4593  026604  104006                          KEY,TO',R0
4594  026606  122700  000015                  CMPB    #CR,R0          ;ALL DONE?
4595  026612  001364                          BNE     MON7            ;CONTINUE LIST IF NOT <CR>
4596                                  ;*********************** MOD APR 74 ***************************
4597                                  ;*
4598                                  ;*                      ADDRESS RESPONSE MOD
4599                                  ;
4600  026614  013727  031410          VLUHEX: MOV     HEXNUM,(PC)+
4601  026620  000000                  VLUHEX10
4602  026622  042737  000400  026620          BIC     #400,VLUHEX
4603  026630  023727  026620  000376          CMP     VLUHEX,#376     ;TEST FOR > FF
4604  026636  003403                          BLE     1$              ;(OK) BRANCHES
```

```
4605  026640  000004  036126          TYPE,   MSG13           ;OUTPUT "# ILLEGAL ?" I.E. > "FF"
4606  026644  000747                  BR      MON7            ;TRY AGAIN
4607  026646  012723  177777  15$:    MOV     #-1,(R3)+       ;MARK END OF LIST
4608                                  ;*****************;********** MOD APR 74 **************************
4609                                  ;*                          #DEV/CU MOD
4610
4611                                  ;SET UP MAXIMUM NUMBER OF DEVICES PER CONTROL UNIT
4612                                  ;THIS INFORMATION DETERMINES WHAT THE SPW TABLE LOOKS LIKE
4613
4614  026652  000004  035654  MON5:  TYPE    ,MSG3           ;MAX # DEVICES/CU
4615  026656  104005                  ACCEPTO                 ;ACCEPT NUMBER OF DEVICES/CU
4616  026660  005737  027478          TST     OCTNUM          ;USE 16. ON DEFAULT
4617  026664  001003                  BNE     X1
4618  026666  000004  036126          TYPE,   MSG13           ;OUTPUT "# ILLEGAL ?" I.E. = "00"
4619  026672  000767                  BR      MON5            ;TRY AGAIN
4620
4621  026674  013727  027478  X1$:    MOV     OCTNUM,(PC)+
4622  026700  000000  RDXX:   .
4623  026702  005337  026700          DEC     RDXX            ;RANGE MODULO 1
4624  026706  013727  026620          MOV     VLUMEX,(PC)+
4625  026712  000000  MDXX:   .                               ;RANGE MASK
4626  026714  063737  026700  026712  ADD     RDXX,MDXX       ;SCALE
4627  026722  105137  026712          COMB    MDXX            ;FORM FINAL
4628  026726  042737  177400  026712  BIC     #177400,MDXX    ;CU PORTION CLR
4629
4630                                  ;*****************;********** MOD APR 74 **************************
4631                                  ;
4632  026734  013737  027478  027474          MOV     OCTNUM,MAX.DEV.CU
4633  026742  004737  030002  MON5.1: JSR     PC,CKCUA        ;CHECK FOR LEGAL NUMBER OF DEV PER CU
4634
4635
4636                                  ;GET COMMAND LIST
4637
4638                                  .REM    *
4639
4640                                  THIS ROUTINE ACCEPTS AN IBM COMMAND LIST FROM THE CONSOL.  ALL
4641                                  COMMANDS MUST BE NON ZERO (I.E.  TAB MUST BE TYPED WITH PARITY
4642                                  ADD).  WITH EACH COMMAND THE MONITOR ASKS FOR ITS ASSOCIATED DST
4643                                  STATUS.
4644
4645                                          *
4646
4647  026746  012704  027736  MON8:   MOV     #CMD.STAT,R4
4648  026752  012703  027676          MOV     #CMD,ADRS,R3
4649  026756  000004  036036          TYPE    ,MSG9           ;LEGAL CMD LIST
4650  026762  000004  036067  MON9:   TYPE    ,MSG10          ;CMD:
4651  026766  104005                  ACCEPTO         ;ACCEPT LEGAL COMMANDS FROM KEYBOARD
4652  026770  005737  027478          TST     OCTNUM
4653  026774  001417                  BEQ     MON10
4654  026776  104007  027478          PARITY  ,OCTNUM
4655  027002  013723  027478          MOV     OC.NUM,(R3)+
4656  027006  000004  036512          TYPE    ,MSG31          ;"STATUS: "
4657  027012  104005                  ACCEPTO
4658  027014  113724  027478          MOVB    OCTNUM,(R4)+
```

M1

```
4659  027024  104026                  MOV,TO;R3
4660  027022  120227  000015          CMPB    R0;#CR
4661  027026  001355                  BNE     MON9
4662  027030  112723  177777          MOV     #-1,(R3)+       ;CLEAR TERMINATOR
4663
4664
4665                                  ;ASK FOR DYNAMIC SWITCH SETTINGS ON CONSOL SWITCHES
4666
4667  027034                          MON1P1:
4668  027034  012737  177777  027444          MOV     #-1,ONESHOT
4669  027042  005037  026124                  CLR     ERRCNT
4670  027046  000024  036017                  TYPE    ,MSG7           ;SET DYNAMIC SWITCHES
4671  027052  104036                          MOV,TO,R0               ;TYPE ANYTHING
4672  027054  122700  000003                  CMPB    #3,R0           ;TEST FOR CONTROL C
4673  027060  001002                          BNE     MON11           ;GO IF NO CC
4674  027062  000137  026214                  JMP     @#CON1,0
4675
4676
4677                                  ;SET UP TABLES
4678
4679  027066  113727  177570          MON11:  MOVB    SWR,(PC)+       ;SAVE MODE CONTROL SWITCH SETTINGS
4680  027072  000000                  PARA1:  .
4681  027074  004737  030022                  JSR     PC;CKCUA        ;CMP ADRS VS MAX DEV PER CU
4682  027100  004737  030414                  JSR     PC;SPW,SETUP    ;SET UP STATUS POINTER WORDS
4683  027104  004737  032274                  JSR     PC,TT,CLR       ;CLEAR JUMBLE TABLE
4684  027110  004737  032552                  JSR     PC;DST,SETUP    ;SETUP DEVICE STATUS TABLE
4685  027114  004737  030312                  JSR     PC,ODAT         ;SET 360 SIM OUTPUT DATA FILE
4686  027120  004737  031076                  JSR     PC;REG,SETUP    ;SCALE ADDRESSES
4687
4688  027124                          LPCSU1:
4689  027124  012737  000001  027464          MOV     #1;DEVCNT       ;INIT DEVICE COUNT
4690  027132  012737  027512  027460          MOV     #LEGAL,ADRS,ACUA ;ADRS OF CU ADRS
4691  027140  117737  000314  027462          MOVB    @#A UA,CUADRS   ;CU ADDRESS
4692  027146  000460                          BR      LP%1
4693
4694  027150  000004  036203          LPCNTL1 TYPE    ,BELL
4695
4696  027154  062737  000001  027462          ADD     #1;CUADRS       ;
4697  027162  005237  027464                  INC     DEVCNT          ;INC DEVICE COUNT
4698  027166  023737  027464  027474          CMP     DEVCNT,MAX%DEV%,CU
4699  027174  003445                          BLE     LP%1
4700  027176  012737  000001  027464          MOV     #1,DEVCNT       ;INIT DEVICE COUNT
4701  027204  027727  000250  177777          CMP     @ACUA,#-1
4702  027212  001030                          BNE     LPC2
4703
4704                                  ;********************** MOD APR 74 ******************************
4705                                  ;*
4706                                  ;*                      OPLI TIMEOUT RESET MOD
4707                                  ;
4708  027214  012777  000001  152096          MOV     #1;@DXCS        ;DX RESET OPLI
4709
4710                                  ;********************** MOD APR 74 ******************************
4711                                  ;
4712  027222  000004  036205                  TYPE    ,ENDTST
```

A8

```
4713  027226  000004  036217          TYPE    ,ECM            ;ERROR COUNT MESSAGE
4714  027232  010546                  MOV     TT,-(SP)        ;SAVE TTY
4715  027234  013705  026124          MOV     ERRCNT,TTY              ;TYPE IN OCTAL
4716  027240  004737  032866          JSR     PC,PRINTR       ;TYPE LEADING ZEROS
4717  027244  112605                  MOV     (SP)+,TTY       ;RESTORE TTY
4718
4719                                  ;THE FOLLOWING CODE IS FOR INTERFACE WITH DDP AND ACT11
4720
4721  027246  013700  000042          MOV     @#42,R0         ;IF 42 = 0 REMAIN IN DX DIAGNSTIC
4722  027252  001405                  BEQ     LP:5
4723  027254  000005                  RESET                   ;LINK TO DDP OR ACT11
4724  027256                  LOGICAL:
4725  027256  004710                  JSR     PC,@R0
4726  027260  000240                  NOP
4727  027262  000240                  NOP
4728  027264  000240                  NOP
4729  027266  012737  027512  027400  LPC5:   MOV     #LEGAL,ADRS,ACUA
4730  027274  017737  000160  027462  LPC2:   MOV     @ACUA,CUADRS
4731  027302  062737  000002  027460          ADD     #2,ACUA
4732  027310  104007  027462          LPC1:   PARITY  ,CUADRS
4733  027314  013737  027462  027452          MOV     CU:DRS,DEV
4734  027322  013737  027452  027456          MOV     DEV,DEV,A       ;MULTI THREAD
4735  027330  023737  027464  027474          CMP     DEVCNT,MAX',DEV',CU
4736  027336  001404                  BEQ     LP:3
4737  027340  062737  000001  027456          ADD     #1,DEV,A
4738  027346  000403                  BR      LPC4
4739  027350  162737  000001  027456  LPC3:   SUB     #1,DEV,A
4740  027356  104037  027456          LPC4:   PARITY  ,DEV,A
4741
4742
4743  027362  004737  030710          MON12:  JSR     PC,PRE1         ;DO PRE INIT
4744  027366  012777  024560  151670          MOV     #FALSE,@DXIV    ;SET UP FALSE INTERRUPT VECTOR TRAP
4745  027374  013777  001270  151664          MOV     DXPRT,@DXIS     ;SET UP INTERRUPT PRIORITY
4746  027402  013700  027472                  MOV     FIRST,TST,R0    ;TEST FOR DEFAULT
4747  027406  001002                  BNE     MON13           ;BRANCH IF NOT DEFAULT
4748  027410  005237  027472                  INC     FIRST,TST       ;DEFAULT TEST NUMBER IS ONE
4749  027414  013737  027472  026126  MON13:  MOV     FIRST,TST,ERTSTN
4750  027422  006300                  ASL     R0
4751  027424  016037  025104  025104          MOV     TSTABLE-2(R0),@#RETURN
4752  027432  062737  000024  025104          ADD     #24,@#RETURN
4753  027440  000170  025104          MON14:  JMP     @TSTABLE-2(R0)  ;JUMP TO SELECTED TEST
4754
4755
4756                                  .SBTTL  MONITOR FILES
4757
4758                                  ; ONE PASS FLAGS
4759
4760          000001                  FIVESEC=1                       ;5 SEC OPLI TIMER TEST
4761  027444  177777                  ONESHOT:        -1              ;ONE PASS FLAGS
4762  027446  000000                  CARRY:  0                       ;CARRY COUNT
4763  027450  000000                  TMP:    0               ;TEMPORARY STORAGE
4764  027452  000020                  DEV:    20              ;DEVICE ADDRESS TO SELECT - MUST INCLDE PARITY
4765                                                          ; ( I.E, 441 IS DEV=1, CU=0)
4766  027454  000403                  CMD:    403             ;COMMAND TO PRESET - MUST INCLUDE PARITY
```

```
4767                                                    ; (423 IS BASIC NOP COMMAND)
4768
4769  027456  000421            DEV.A1:  421            ;SECOND DEVICE FOR DUAL TESTS
4770
4771
4772  027460  000000            ACUA1:   0              ;ADRS OF CU ADRS
4773
4774
4775  027462  000000            CUADRS:  0              ;CU ADRS
4776  027464  000000            DEVCNT:  0              ;DEVICE COUNT
4777
4778  027466  002000            OFFSET:  2000           ;OFFSET TO ADDRESS REGISTER
4779  027470  000000            OCTNUM:          0      ;OCTAL INPUT FROM TTY
4780  027472  000000            FIRST.TST:       0      ;FIRST TEST TO RUN
4781  027474  000000            MAX.DEV.CU:      0      ;MAXIMUM # OF DEVICES/CU
4782
4783                            ;DIAGNOSTIC VARIABLES
4784
4785  027476  000777            SSTAT:   777            ;SAVED STATUS
4786  027500  000000            SRCCNT:  0              ;SOURCE DATA
4787  027502  000000            DSTCNT:  0              ;DESTINATION DATA
4788  027504  000000            SAVDEV:  0              ;SAVED DEVICE ADDRESS
4789  027506  000000            TSSFT:   0              ;TSSF TRACE
4790  027510  000000            COUNT:   0              ;USED BY CH SIM TO COUNT BYTES TRANSFFERED
4791
4792
4793                            ;LEGAL ADDRESS LIST
4794
4795  027512                    LEGAL.ADRS:
4796
4797  027512  000000                    .WORD   0
4798  027514  000000                    .WORD   0
4799  027516  000000                    .WORD   0
4800  027520  000000                    .WORD   0
4801  027522  000000                    .WORD   0
4802  027524  000000                    .WORD   0
4803  027526  000000                    .WORD   0
4804  027530  000000                    .WORD   0
4805  027532  000000                    .WORD   0
4806  027534  000000                    .WORD   0
4807  027536  000000                    .WORD   0
4808  027540  000000                    .WORD   0
4809  027542  000000                    .WORD   0
4810  027544  000000                    .WORD   0
4811  027546  000000                    .WORD   0
4812  027550  000000                    .WORD   0
4813  027552  000000                    .WORD   0
4814
4815  027554                    SCALD.ADRS:
4816
4817  027554  000000                    .WORD   0
4818  027556  000000                    .WORD   0
4819  027560  000000                    .WORD   0
4820  027562  000000                    .WORD   0
```

```
4821  027564  000020          .WORD   2
4822  027566  000020          .WORD   2
4823  027570  000000          .WORD   0
4824  027572  000000          .WORD   0
4825  027574  000000          .WORD   0
4826  027576  000000          .WORD   0
4827  027600  000000          .WORD   0
4828  027602  000000          .WORD   0
4829  027604  000000          .WORD   0
4830  027606  000000          .WORD   0
4831  027610  000000          .WORD   0
4832  027612  000000          .WORD   0
4833  027614  000000          .WORD   0
4834
4835
4836                          ;LIST OF DEFAULT COMMANDS
4837
4838  027616                  DFLT.CMD:
4839
4840  027616  000400                  TIOC            ;TEST I/O COMMAND
4841  027620  000001                  WRITEC          ;WRITE COMMAND
4842  027622  000002                  READC           ;READ COMMAND
4843  027624  000403                  NOPC            ;NOP COMMAND
4844  027626  000004                  SENSEC          ;SENSE COMMAND
4845  027630  000405                  ILLC            ;ILLAGAL COMMAND
4846  027632  177777                  -1              ;LIST TERMINATOR
4847  027634  177777                  -1              ;LIST TERMINATOR
4848  027636  177777                  -1              ;LIST TERMINATOR
4849  027640  177777                  -1              ;LIST TERMINATOR
4850  027642  177777                  -1              ;LIST TERMINATOR
4851  027644  177777                  -1              ;LIST TERMINATOR
4852  027646  177777                  -1              ;LIST TERMINATOR
4853  027650  177777                  -1              ;LIST TERMINATOR
4854  027652  177777                  -1              ;LIST TERMINATOR
4855  027654  177777                  -1              ;LIST TERMINATOR
4856
4857
4858
4859
4860
4861                          ;DEFAULT STATUS LIST
4862
4863  027656                  DFLT.STAT:
4864  027656  000                     .BYTE   0
4865  027657  000                     .BYTE   0
4866  027660  002                     .BYTE   2
4867  027661  214                     .BYTE   CE!DE
4868  027662  000                     .BYTE   0
4869  027663  0F2                     .BYTE   UC
4870  027664  0?2                     .BYTE   UC
4871  027665  0E2                     .BYTE   UC
4872  027666  002                     .BYTE   UC
4873  027667  0E2                     .BYTE   UC
4874  027670  002                     .BYTE   UC
```

D8

```
4875  027671  002                    .BYTE   2
4876  027672  002                    .BYTE   2
4877  027673  002                    .BYTE   2
4878  027674  002                    .BYTE   2
4879  027675  002                    .BYTE   2
4880
4881
4882
4883                                 ;LIST OF LEGAL COMMANDS
4884
4885  027676                         CMD.ADRS:
4886
4887  027676  000000                 .WORD   0
4888  027700  000020                 .WORD   20
4889  027702  000000                 .WORD   0
4890  027704  000000                 .WORD   0
4891  027706  000000                 .WORD   0
4892  027710  000000                 .WORD   0
4893  027712  000000                 .WORD   0
4894  027714  000000                 .WORD   0
4895  027716  000000                 .WORD   0
4896  027720  000000                 .WORD   0
4897  027722  000000                 .WORD   0
4898  027724  000000                 .WORD   0
4899  027726  000000                 .WORD   0
4900  027730  000000                 .WORD   0
4901  027732  000000                 .WORD   0
4902  027734  000000                 .WORD   0
4903
4924                                 ;COMMAND STATUS
4925
4926  027736                         CMD.STAT:
4927
4928  027736  002                    .BYTE   2
4929  027737  000                    .BYTE   0
4930  027740  000                    .BYTE   0
4931  027741  000                    .BYTE   0
4932  027742  000                    .BYTE   0
4933  027743  000                    .BYTE   0
4934  027744  000                    .BYTE   0
4935  027745  000                    .BYTE   0
4936  027746  000                    .BYTE   2
4937  027747  000                    .BYTE   0
4938  027750  000                    .BYTE   0
4939  027751  000                    .BYTE   0
4940  027752  000                    .BYTE   0
4941  027753  000                    .BYTE   0
4942  027754  000                    .BYTE   0
4943  027755  000                    .BYTE   0
4944
4945
4946
4947
4948                                 ;SET UP DEFAULT PARAMETERS
```

```
4929
4930  ?27756                                  MONDFLT:
4931  ?27756  ?05037  ?22658                        CLR     @#ENTRY1        ;TT TRACE ENTRY1
4932  ?27762  ?05037  ?22718                        CLR     @#ENTRY2        ;TT TRACE ENTRY2
4933  ?27766  ?13737  ?01448  023018                MOV     @#TT,@#TTRACE   ;INIT TT TRACE
4934  ?27774  ?12737  176777  023764                MOV     #176777,@#NOMI  ;MI READABILITY MASK
4935  ?3?3?2  ?12737  177777  027444                MOV     #-1,ONESHOT     ;ONE PASS FLAGS
4936  ?3?310  ?05037  ?27472                        CLR     FIRST,TST       ;DEFAULT TEST #
4937  ?3?314  ?05037  ?26126                        CLR     ERRSTN          ;ERROR TEST NUMBER
4938  ?3?320  ?05037  ?26124                        CLR     ERRCNT          ;ERROR COUNT
4939  ?3?324  ?13737  ?30254  029184                MOV     @#?,FIRST,TST,@#RETURN  ;FIRST TEST
4940  ?3?332  ?13737  ?30256  001262                MOV     @#?,DXBASE,@#DXBASE     ;BASE ADDRESS
4941  ?30340  ?13737  ?30260  001264                MOV     @#?,DXIV,@#DXIV         ;INT VECTOR ADRS
4942  ?3?346  ?13737  ?30272  001266                MOV     @#?,DXIS,@#DXIS         ;INT STATUS ADRS
4943  ?3?354  ?13737  ?30262  001270                MOV     @#?,DXPRT,@#DXPRT               ;PRIORITY LEVEL
4944  ?30362  ?13737  ?30264  027474                MOV     @#?,MAX,DEV,CU,@#MAX,DEV,CU     ;MAX DEVICES
4945  ?30370  ?13737  ?30270  027476                MOV     @#?,DEV,A,@#DEV,A       ;SECOND DEVICE
4946  ?30376  ?13737  ?30266  027512                MOV     @#?,LEGAL,ADRS,@#LEGAL,ADRS     ;CU ADRS
4947  ?30404  ?12737  177777  027514                MOV     #-?,LEGAL,ADRS+2
4948  ?30412  ?12737  ?32400  001442                MOV     #DSTADRS,@#DST  ;INIT DST ADRS
4949  ?30420  ?12700  027616                        MOV     #DFLT,CMD,R0    ;ADRS OF DEFAULT CMD LIST
4950  ?3?424  ?12701  027676                        MOV     #CMD,ADRS,R1    ;ADRS OF LEGAL CMD LIST
4951
4952  ?3?430  ?12021                          MON21:  MOV     (R0)+,(R1)+     ;LOAD DEFAULT CMD LIST
4953  ?3?432  ?22710  177777                         CMP     #-1,R0          ;TEST FOR TERMINATOR
4954  ?3?436  001374                                  BNE     MON?2
4955  ?30440  ?12721  177777                         MOV     #-1,(R1)+       ;LOAD TERMINATOR
4956  ?3?444  ?12727  000020                         MOV     #12.,(PC)+
4957  ?3?450  000000                          MON2.0: ?
4958  ?3?452  ?12700  027656                         MOV     #DFLT,STAT,R0   ;DEFAULT STATUS
4959  ?3?456  ?12701  027736                         MOV     #CMD,STAT,R1    ;STATUS FOR EACH COMMAND
4960  ?3?462  112021                          MON2.1: MOVB    (R0)+,(R1)+
4961  ?3?464  005337  030150                         DEC     MON2.0
4962  ?3?470  001374                                  BNE     MON2.1
4963
4964  ?3?472  013737  027466  001436                MOV     OFFSET,SPW      ;LOAD ADRS OF SPW
4965  ?30500  013737  027466  001440                MOV     OFFSET,TT       ;LOAD ADRS OF TT
4966  ?30506  062737  001000  001440                ADD     #1'00,TT        ; "   "   "  "
4967  ?30514  005004                                  CLR     R4
4968  ?30516  012700  030016                         MOV     #0',TRYC,R0
4969  ?30522  020427  000020                 MON2.2: CMP     R4;#0,BKP+2     ;ALL DONE?
4970  ?30526  101011                                  BHI     MON2.3          ;JUMP IF YES
4971  ?30530  010004  032546                         MOV     R0;0,ADR1(R4)   ;RESET BKPT
4972  ?30534  012704  000003  032612                 MOV     #TRT,0,VIN(R4)  ;RESET CONTENTS OF TABLE
4973  ?30542  005004  032570                         CLR     0,-T(R4)        ;CLEAR COUNT
4974  ?30546  005724                                  TST     (R4)+           ;INCREMENT BY TWO
4975  ?30550  000764                                  BR      MON2.2
4976  ?30552  000207                          MON2.3: RTS     PC
4977                                          ;DEFAULT PARAMETERS
4978
4979  ?30554  004000                          D:.FIRST,TST:   TST1            ;FIRST TEST
4980  ?30556  176200                          D.DXBASE:       176200          ;BASE ADDRESS
4981  ?30560  000300                          D.DXIV:         300             ;INT VECTOR ADRS
4982  ?30562  000200                          D:.DXPRT:       LEVEL4          ;DX PRIORITY LEVEL
```

```
4983  P3P264  000020                  D.MAX.DEV.CU:  20              ;MAX # DEVICES PER CU
4984  P3P266  000020                  D.LEGAL.ADRS:  22J             ;DEFAULT CU ADRS
4985  P3P270  000421                  D.DEV.A:       421
4986  P3P272  000302                  D.DXIS:        302             ;INT STATUS ADRS
4987
4988
4989                                  .SBTTL  MONITOR SUBROUTINES
4990
4991                                  ;TT.CLR, CLEAR TUMBLE TABLE
4992
4993
4994  P3P274                          TT.CLR:
4995  P3P274  013701  001440                  MOV     TT,R1           ;BOTTOM OF TT
4996  P3P300  005021                  CL1:    CLR     (R1)+           ;CLEAR TT
4997  P3P302  020127  004000                  CMP     R1,#ENDTT               ;TEST FOR END OF TT
4998  P3P306  001374                          BNE     CL1             ;BRANCH IF NOT END
4999  P3P310  000207                          RTS     PC
5000
5001
5002                                  ;REINIT OUTPUT DATA
5003
5004
5005  P3P312                          ODAT:
5006  P3P312  010046                          MOV     R0,-(SP)
5007  P3P314  012600                          MOV     (SP)+,R0
5008  P3P316  000207                          RTS     PC
5009
5010
5011
5012
5013
5014
5015
5016
5017
5018
5019
5020
5021
5022
5023
5024
5025
5026
5027  P3P320                          T.PARITY:
5028  P3P320  017627  000000                  MOV     @(SP),(PC)+     ;FETCH ADDRESS OF SOURCE DATA
5029  P3P324  000000                  SDAPG:  0                       ;SOURCE DATA ADDRESS
5030  P3P326  017727  177772                  MOV     @SDAPG,(PC)+    ; FETCH SOURCE DATA
5031  P3P332  000000                  TDAT:   0                       ;SOURCE DATA
5032  P3P334  005027                          CLR     (PC)+
5033  P3P336  000000                  PRTY:   0
5034
5035  P3P340  106337  P3P332          PG2:    ASLB    TDAT
5036  P3P344  102002                          BVC     PG2
```

```
 5237  P3P346  P05137  P30336              COM     PRTY
 5238
 5239  P3P352  100337  P30332      PG3:    ASLB    TDAT
 5240  P3P356  201370                     BNE     PG2
 5241  P3P360  105737  P30336              TST     PRTY
 5242  P3P364  100404                     BMI     PG4
 5243  P3P366  052777  000400  177730     BIS     #PARC,@SDAPG    ;SET PARITY BIT
 5244  P3P374  000403                     BR      PG5
 5245  P3P376  042777  000400  177720  PG4:    BIC     #PARC,@SDAPG    ;CLEAR PARITY BIT
 5246
 5247  P3P404  062716  000002          PG5:    ADD     #2,@SP          ;ADD 2 TO RETURN PC
 5248  P3P410  000002                     RTI
 5249
 5250                                  ;SETUP SPW TABLE
 5251                                  ;********************** MOD APR 74 ****************************
 5252                                  ;*                  ADDRESS RESOLUTION MOD
 5253
 5254  P3P412  177400                  MARK:   177400
 5255
 5256  P3P414                          SPW.SETUP:
 5257  P3P414  012700  027512                 MOV     #LEGAL,ADRS,R0  ;FETCH ADRS OF LEGAL ADRS LINST
 5258  P3P420  012701  027554                 MOV     #SCALD,ADRS,R1  ;FETCH ADDRS OF SCALED LEGAL ADRS LIST
 5259
 5260  P3P424  012011                  SP.01:  MOV     (R0)+,@R1       ;MAKE DUPLICATE ADRS LIST
 5261  P3P426  043711  030412                 BIC     MARK,@R1        ;
 5262                                  ;********************** MOD APR 74 ****************************
 5263  P3P432  000311                         ASL     @R1             ;MAKE INDX MOD(2)
 5264  P3P434  063721  001436                 ADD     SPW,(R1)+       ;EQUALS REAL SPW ADRS
 5265  P3P440  021027  177777                 CMP     @R0,#-1         ;TEST FOR TERMINATOR
 5266  P3P444  001367                         BNE     SP.0            ;FETCH NEXT ADRS
 5267
 5268  P3P446  012721  177777                 MOV     #-2,(R1)+       ;MARK END OF SCALED ADRS LIST
 5269
 5270  P3P452  013701  001436                 MOV     SPW,R1          ;ADRS OF SPW
 5271  P3P456  013702  001442                 MOV     DST,R2          ;ADRS OF DST
 5272  P3P462  012700  027554          SP.11:  MOV     #SCALD,ADRS,R0
 5273  P3P466  020110                  SP.21:  CMP     R1,@R0          ;RUN THRU LIST
 5274  P3P470  001407                         BEQ     SP.3            ;BRANCH ON LEGAL ADRS
 5275  P3P472  005720                         TST     (R0)+
 5276  P3P474  022710  177777                 CMP     #-1,@R0         ;TEST FOR END OF LIST
 5277  P3P500  001372                         BNE     SP.2            ;BRANCH IF NOT ENT
 5278  P3P502  012721  031400                 MOV     #ERRDST,(R1)+   ;LOAD SPW WITH ERROR DST ADRS
 5279  P3P506  000407                         BR      SP.6
 5280  P3P510  013727  P27474          SP.31:  MOV     MAX,DEV,CU,(PC)+
 5281  P3P514  000000                  SP.41:  0
 5282  P3P516  010221                  SP.51:  MOV     R2,(R1)+
 5283  P3P520  005337  P30514                 DEC     SP.4
 5284  P3P524  001374                         BNE     SP.5
 5285  P3P526  020137  001440          SP.61:  CMP     R1,TT           ;TEST FOR END OF SPW
 5286  P3P532  002753                         BLT     SP.1
 5287  P3P534  001405                         BEQ     SP.7
 5288  P3P536  005726                         TST     (SP)+   ;POP STACK
 5289  P3P540  000004  P30652                 TYPE    ,INVN
 5290  P3P544  000137  026214                 JMP     @MON1,0 ;GO BACK TO MONITOR
```

```
5291  003550  000207                SP',7!   RTS     PC
5292                                !DEVICE STATUS TABLE SETUP
5293
5294
5295  003552                        DST.SETUP!
5296  003552  013701  001442                MOV     DST,R1
5297  003556  012727  000020                MOV     #1',,(PC)+
5298  003562  000000                DS',1!   F
5299  003564  012722  027736                MOV     #CMD,STAT,R2
5300  003570  112221                DS',2!   MOVB    (R2)+,(R1)+
5301  003572  005337  003562                DEC     DS,1
5302  003576  001374                        BNE     DS,2
5303  003600  000207                        RTS     PC
5304
5305                                !SUBROUTINE TO CHECK THAT CU ADDRESS AND THE NUMBER OF DEVICES
5306                                !PER CU IS LEGAL
5307
5308  003602  012700  027512        CKCUA!  MOV     #LEGAL,ADRS,R0  !
5309  003606  005027                CKC1!   CLR     (P.)+
5310  003610  000000                CKC2!   F
5311  003612  111037  030610                MOVB    @R0,@#CKC2              !FETCH CU ADDRESS
5312                                !************************** MOD APR 74 ******************************
5313                                !*
5314                                !*                      ADDRESS RANGE MOD
5315                                !
5316  003616  122737  000020  027474  CKC3!   CMPB    #20,@#MAX,DEV,CU        !CHECK LIMIT 16.
5317
5318                                !************************** MOD APR 74 ******************************
5319                                !
5320  003624  103005                        BHIS    CKC4    !BRANCH IF WITHIN LIMITS
5321  003626  000004  030652                TYPE    ,IDVN   !ILLEGAL NUMBER OF DEVICES PER CU
5322  003632  012716  026652                MOV     #MON9,(SP)      !CHANGE RETURN PC
5323  003636  000207                        RTS     PC
5324  003640  005720                CKC4!   TST     (R0)+
5325  003642  021027  177777                CMP     @R5',#-1
5326  003646  001357                        BNE     CKC1
5327  003650  000207                        RTS     PC
5328  003652  044537  046114  043505  IDVN!   ,ASCIZ  "-ILLEGAL # OF DEVICES PER CU -
5329  003660  046101  021440  047440
5330  003666  020106  042504  044526
5331  003674  042503  020123  042520
5332  003702  020122  052503  000040
5333                                .EVEN
5334
5335                                !PRE-INIT SUBROUTINE
5336
5337  003710  012737  031044  000004  PRE1!   MOV     #PREITO,4
5338  003716  012737  000340  000036          MOV     #LEVEL7,6
5339  003724  005077  150370                  CLR     @UXES           !CLEAR MAINT CLK
5340  003730  004737  031050                  JSR     PC,RESRES       !DX RESET AND RESTORE
5341                                !THE FOLLOWING INSTRUCTION GET MODIFIED UPON THE COMPLETION
5342                                !OF THE SYSTEM RESET TEST,IF SCOPE PROBLEMS DEVELOP BEFORE THIS TEST
5343                                !PASSES THIS INST, CAN BE PATCHED TO A TESET,NOP,
5344  003734  004737  031042          PRE1.1! JSR     PC,@#NOCLR              !MODIFIED TO CLRMO
```

```
5145  031740  005077  160334          CLR     @DXCS           ;CLR DONE,LOCKO
5146  031744  004737  031050          JSR     PC;RESRES       ;DX RESET AND RESTORE
5147  031750  013777  001436  160324  MOV     SP%,@DXOS
5148  031756  023777  001436  160316  CMP     SP%,@DXOS
5149  031764  001401                  BEQ     .+2             ;BRANCH IF NO ERROR CONDITION
5150  031766  104000                  ERROR                   ;
5151  031770  052777  000010  160322  BIS     #TIMDIS,@DXES   ;TIMER DISABLE
5152  031776  032777  000010  160314  BIT     #TIMDIS,@DXES
5153  032004  001001                  BNE     .+2             ;BRANCH IF NO ERROR CONDITION
5154  032006  104000                  ERROR                   ;
5155  032010  012737  000006  000034  MOV     #6,4
5156  032016  012737  000000  000036  MOV     #HALT,6
5157  032024  004737  023766          JSR     PC,ZEROTT       ;ZERO TUMBLE TABLE
5158  032030  004737  024016          JSR     PC,TTZERO       ;VERIFY TT ZERO
5159  032034  000207                  RTS     PC
5160
5161
5162
5163
5164
5165
5166  032036  005077  160246  CLRHO:  CLR     @DXMC   ;DO SYSTEM RESET
5167  032042  000207  NOCLR:  RTS     PC
5168
5169  032044  104030          PREIT0: ERROR           ;PREINIT TIME OUT ERROR
5170
5171
5172  032046  000002                  RTI
5173
5174
5175                          ;DX RESET AND RESTORE ROUTINE
5176
5177
5178
5179
5180
5181
5182
5183
5184
5185
5186  032050                  RESRES:
5187
5188  032050  042777  000200  160222          BIC     #DONE,@DXCS     ;CLEAR LOCKO
5189  032056  012777  000001  160214          MOV     #DXFRS,@DXCS    ;DX RESET
5190  032064  013737  001440  023810          MOV     @#_T,TTRACE     ;RELOAD SOFT TT POINTER
5191  032072  000240                          NOP             ;INSERT RESET 1.E."5" HERE IF REQUIRED
5192  032074  000207                          RTS     PC
5193
5194
5195
5196
5197
5198                          ;REGISTER ADDRESS SETUP ROUTINE
```

```
5199
5200  031076                          REG.SETUP:
5201  031076  013700  001202                MOV     DXBASE,R0               ;FETCH BASE ADRS
5202  031102  012701  001274                MOV     #DXDS,R1                ;FETCH ADRS OF DXDS ADRS
5203  031106  010021                  RS:,1: MOV     R0,(R1)+
5204  031110  062700  000002                ADD     #2,R0           ;INC TO NEXT DX ADRS
5205  031114  020127  001326                CMP     R1,#DXES1+2
5206  031120  001372                        BNE     RS:,1
5207
5208  031122  104537  031156                JSR     R5,SBYTE                ;SETUP BYTE REF REG'S
5209
5210  031126  001276                        DXCA
5211  031130  001326                        CUAR
5212
5213  031132  001302                        DXDS
5214  031134  001332                        CUSR
5215
5216  031136  001310                        DXMO
5217  031140  001336                        BUSO
5218
5219  031142  001312                        DXMI
5220  031144  001342                        BUSI
5221
5222  031146  001320                        DXES
5223  031150  001346                        MISC
5224
5225  031152  177777                        -1
5226
5227  031154  000207                        RTS     PC
5228
5229  031156                          SBYTE:
5230  031156  112500                        MOV     (R5)+,R0
5231  031160  012501                        MOV     (R5)+,R1
5232  031162  011021                        MOV     @R0,(R1)+
5233  031164  111011                        MOV     @R5,@R1
5234  031166  005221                        INC     (R2)+
5235  031170  021527  177777                CMP     @R5,#-1
5236  031174  001370                        BNE     SBYTE
5237  031176  005725                        TST     (R5)+   ;POP OVER TERMINATOR
5238  031200  000205                        RTS     R5
5239
5240
5241                                  ;ACCEPT HEX NUMBER FROM TTY
5242
5243  031202  005037  031410          GET.HEX: CLR    HEXNUM          ;CLEAR HEXADECIMAL NUMBER LOCATION
5244  031206  010246                        MOV     R2,-(SP)        ;SAVE R2
5245  031210  010146                        MOV     R1,-(SP)        ;SAVE R1
5246  031212  010046                        MOV     R0,-(SP)        ;SAVE R0
5247  031214  005001                  ACPTH:: CLR     R1              ;
5248  031216  104006                  ACPTH.1:        KEY.TO,R0       ;FETCH AN ASCII CHAR FROM KEYBOARD
5249  031220  120027  000003                CMPB    R0,#3           ;CONTROL C?
5250  031224  001002                        BNE     AH.2
5251  031226  000137  026214                JMP     @#MON1,0
5252  031232  122700  000177          AH.2:: CMPB   #177,R0         ;TEST FOR RUBOUT
```

```
5253  031236  001424                        BEQ     RUBOUH
5254  031240  122700  000015                CMPB    #15,R0          ;TEST FOR <CR>
5255  031244  001424                        BEQ     CARGH
5256  031246  120027  000040                CMPB    R0,#40          ;EXIT IF SPACE
5257  031252  001421                        BEQ     CARGH
5258  031254  120027  000000                CMPB    R0,#0           ;TEST FOR VALID HEX NUMBER
5259  031260  002413                        BLT     RUBOUH
5260  031262  120027  000071                CMPB    R0,#'9
5261  031266  003021                        BGT     AHEX
5262  031270  042700  177760        AH:'3:  BIC     #177760,R0      ;CONVERT ASCII TO HEX
5263  031274  006301                        ASL     R1
5264  031276  006301                        ASL     R1
5265  031300  006301                        ASL     R1
5266  031302  006301                        ASL     R1
5267  031304  050001                        BIS     R0,R1           ;CHALK'M UP
5268  031306  000743                        BR      ACPTH,1         ;FETCH NEXT CHAR
5269
5270  031310  000004  036243        RUBOUH: TYPE    ,,QUES          ;TYPE?
5271  031314  000737                        BR      ACPTH
5272  031316  010137  031410        CARGH:  MOV     R1,HEXNUM       ;PLACE HEX NUMBER HERE
5273  031322  012600                        MOV     (SP)+,R0                ;RESTORE R0
5274  031324  012601                        MOV     (SP)+,R1                ;RESTOR R1
5275  031326  012602                        MOV     (SP)+,R2        ;RESTORE R2
5276  031330  000207                        RTS     PC
5277
5278  031332  005002                AHEX:   CLR     R2
5279  031334  120062  031412        AHEX0:  CMPB    R0,ATBL(R2)     ;LOOK THRU ASCII TABLE
5280  031340  001406                        BEQ     AHEX1           ;BRANCH ON MATCH
5281  031342  005202                        INC     R2
5282  031344  126227  031412  000000        CMPB    ATBL(R2),#0     ;LOOK FOR END OF TABLE
5283  031352  001370                        BNE     AHEX0           ;BRANCH IF NOT END
5284  031354  000755                        BR      RUBOUH          ;ERROR ON NO MATCH
5285  031356  116202  031422        AHEX1:  MOVB    HTBL(R2),R0     ;LOAD BINARY OF FIND
5286  031362  000742                        BR      AH,3
5287
5288
5289
5290                                ;********************** MOD APR 74 ****************************
5291                                ;
5292
5293          031400                .=:1377+1
5294
5295                                ; ILLEGAL OR MALFUNCTIONNING CUAR ERROR STATUS TABLE MODULO 8
5296
5297  031400                        ERRDST:
5298  031400      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5299  031401      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5300  031402      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5301  031403      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5302  031404      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5303  031405      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5304  031406      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5305  031407      002                       .BYTE   UC              ;UNIT CHECK ENTRIES
5306
```

```
5307  031410  000000                  HEXNUM: 0                       ;HEX NUMBER
5308  031412  041101  042103  043105  ATBL:   .ASCII  'ABCDEF'
5309  031420  000020                  .WORD   .
5310  031422     012      013      014 HTBL:   .BYTE   10.,11.,12.,13.,14.,15.
5311  031425     015      016      017
5312
5313                                  ;ACCEPT OCTAL NUMBER FROM TTY
5314  031430                          T.ACCEPTO:
5315  031430  005037  027470                  CLR     OCTNUM          ;CLEAR OCTAL NUMBER LOCATION
5316  031434  010146                          MOV     R1,-(SP)        ;SAVE R1
5317  031436  010046                          MOV     R0,-(SP)        ;SAVE R0
5318  031440  005001                  ACPTO:  CLR     R1              ;
5319  031442  104006                  ACPTO.1:        KEV,TO,R0       ;FETCH AN ASCII CHAR FROM KEYBOARD
5320  031444  120027  000003                  CMPB    R0,#3           ;CONTROL C?
5321  031450  001002                          BNE     AO.2
5322  031452  000137  026214                  JMP     @#MON1,0
5323  031456  122700  000177          AO.2:   CMPB    #177,R0         ;TEST FOR RUBOUT
5324  031462  001423                          BEQ     RUBOUT
5325  031464  122700  000015                  CMPB    #15,R0          ;TEST FOR <CR>
5326  031470  001423                          BEQ     CARG
5327  031472  120027  000040                  CMPB    R0,#40          ;EXIT IF SPACE
5328  031476  001420                          BEQ     CARG
5329  031500  120027  000060                  CMPB    R0,#60          ;TEST FOR VALID OCTAL NUMBER
5330  031504  002412                          BLT     RUBOUT
5331  031506  120027  000067                  CMPB    R0,#67
5332  031512  003007                          BGT     RUBOUT
5333  031514  042700  177770                  BIC     #177770,R0      ;CONVERT ASCII TO OCTAL
5334  031520  006301                          ASL     R1
5335  031522  006301                          ASL     R1
5336  031524  006301                          ASL     R1
5337  031526  050001                          BIS     R0,R1           ;CHALK'M UP
5338  031530  000744                          BR      ACPTO,1         ;FETCH NEXT CHAR
5339
5340  031532  000004  036243          RUBOUT: TYPE    ,,QUES          ;TYPE?
5341  031536  000740                          BR      ACPTO
5342  031540  010137  027470          CARG:   MOV     R1,OCTNUM       ;PLACE OCTAL NUMBER HERE
5343  031544  012600                          MOV     (SP)+,R0                ;RESTORE R0
5344  031546  012601                          MOV     (SP)+,R1                ;RESTOR R1
5345  031550  000002                          RTI                     ;RETURN
5346
5347                                  ;FETCH AN ASCII CHARACTER FROM KEYBOARD
5348
5349  031552                          T.KEY.TO,R0:
5350  031552  105777  147620                  TSTB    @TKS            ;TEST FOR DONE
5351  031556  100375                          BPL     .-2             ;WAIT FOR KEYBOARD
5352  031560  117700  147614                  MOVB    @TKB,R0         ;FETCH CHAR
5353  031564  117777  147610  147612          MOVB    @TKB,@TPB       ;ECHO
5354  031572  004737  031604                  JSR     PC,TTYFLG       ;WAIT FOR DONE
5355  031576  042700  177600                  BIC     #177600,R0      ;7 BIT ASCII
5356  031602  000002                          RTI
5357                                  ;TEST FOR TRANSMITTER DONE
5358
5359  031604                          TTYFLG:
5360  031604  105777  147572          2$:     TSTB    @TPS
```

```
5361  *31612  100375                      BPL     2$
5362  *31612  *00207                      RTS     PC
5363                                .SBTTL  TTY ASCII OUTPUT ROUTINE
5364
5365
5366  *31614  *32737  *20020  177570 ,IOT:  BIT     #BIT13,SR       ;TEST FOR INHIBIT PRINT
5367  *31622  *01040                      BNE     ,IOTE
5368  *31624  *10537  *31732              MOV     TTY,,SAV        ;SAVE TTY
5369  *31630  *17*** *00020              MOV     @(5),TTY        ;GET ADDRESS TO BE TYPED
5370  *31634  122715  *02644      ,MORE:  CMPB    #':,(TTY)       ;TERMINATOR?
5371  *31642  *01425                      BEQ     ,TERM
5372  *31642  105715                      TSTB    (TTY)           ;TERMINATOR?
5373  *31644  *01423                      BEQ     ,TERM
5374  *31646  122715  *00071              CMPB    #11*(TTY)       ;RESTORE OLD SEQUENCE
5375  *31652  001416                      BEQ     ,REST
5376  *31654  122715  002137              CMPB    #'_,(TTY)       ;SET UP CR LF
5377  *31660  001426                      BEQ     ,CRLF
5378  *31662  105777  147514              TSTB    @TPS
5379  *31666  100375                      BPL     .-6
5380  *31670  112577  147510              MOVB    (TTY)+,@TPB
5381  *31674  000757                      BR      ,MORE
5382  *31676  005235              ,CRLF:  INC     TTY
5383  *31700  *10546                      MOV     TTY,-(6)
5384  *31702  012775  *31734              MOV     #,CAR,TTY
5385  *31706  *00752                      BR      ,MORE
5386  *31710  012605              ,REST:  MOV     (6)+,TTY
5387  *31712  *00750                      BR      ,MORE
5388  *31714  004737  *31600      ,TERM:  JSR     PC,TTYFLG       ;WAIT FOR DONE
5389  *31720  *13725  *31732              MOV     ,SAV,TTY
5390  *31724  062716  *00002      ,IOTE:  ADD     #2,(6)  ;POP
5391  *31730  000002                      RTI
5392
5393  *31732  000000              ,SAV:   0
5394  *31734  005015  001002  001022      ,CAR:   ,ASCII  <CR><LF><2><2><2><2><2><2><1>
5395  *31742  001022     001
5396          *31746              .EVEN
5397  *31746  *00000              ,TYPE:  0
5398                              .SBTTL  SAVE AND RESTORE REGISTERS
5399                              ;SAVE REGS 0 TO 4 SUBROUTINE,
5400  *31750  *12637  *32006      T.SAVRG: MOV    (6)+,SVRPC      ;SAVE PC AND PSW,
5401  *31754  *12637  032010              MOV     (6)+,SVRPSW
5402  *31760  010546                      MOV     %5,-(6)
5403  *31762  *10446                      MOV     %4,-(6) ;SAVE REGS 0 - 4
5404  *31764  010346                      MOV     %3,-(6)         ;IN STACK,
5405  *31766  *10246                      MOV     %2,-(6)
5406  *31770  010146                      MOV     %1,-(6)
5407  *31772  010046                      MOV     %0,-(6)
5408  *31774  *13746  *32010              MOV     SVRPSW,-(6)     ;RESTORE PC AND PSW,
5409  032000  *13746  032006              MOV     SVRPC,-(6)
5410  032004  000002                      RTI                     ;EXIT,
5411  032006  000000              SVRPC:  0
5412  032010  000000              SVRPSW: 0
5413                              ;RESTORE REGS 0 TO 4 SUBROUTINE,
5414  032012  012637  032050      T.RSTRG: MOV    (6)+,RSTPC      ;SAVE PC AND PSW,
```

```
5415  032016  012637  032052          MOV     (6)+,RSTPSW
5416  032022  012600                  MOV     (6)+,%0         ;RESTORE REGS 0 - 4
5417  032024  012601                  MOV     (6)+,%1         ;FROM STACK.
5418  032026  012602                  MOV     (6)+,%2
5419  032030  012603                  MOV     (6)+,%3
5420  032032  012604                  MOV     (6)+,%4
5421  032034  012605                  MOV     (6)+,%5
5422
5423  032036  013746  032052          MOV     RSTPSW,-(6)     ;RESTORE PC AND PSW.
5424  032042  013746  032050          MOV     RSTPC,-(6)
5425  032046  000002                  RTI                     ;EXIT
5426  032050  000000          RSTPC:  0
5427  032052  000000          RSTPSW: 0
5428                          .SBTTL  OCTAL DUMP ROUTINE
5429
5430  032054  000000  000000  000000  PRINT2: .WORD   0,0,0,0
5431  032062  000000
5432  032064     000     000          PRINT3: .BYTE   0,0
5433
5434  032066  112737  000001  032064  PRINTR: MOVB    #1,PRINT3       ;SET ZERO FILL SWITCH
5435  032074  000402                  BR      .+4
5436  032076  005037  032064          PRINTS: CLR     PRINT3          ;SUPRESS LEADING ZEROS
5437  032102  112737  177772  032065          MOVB    #-6,PRINT3+1    ;SET COUNT
5438  032110  032737  020000  177570          BIT     #BIT13,@R
5439  032116  001041                  BNE     PRTE
5440  032120  010446                  MOV     %4,-(6)         ;SAVE R4
5441  032122  012704  032054          MOV     #PRINT2,%4      ;SET POINTER TO FIRST ASCII CHAR.
5442  032126  105014                  CLRB    (4)             ;CLEAR FIRST BYTE
5443  032130  000405                  BR      PRINTF          ;ROTATE FIRST BIT
5444  032132  105014          PRINTL: CLRB    (4)             ;CLEAR BYTE OF CHARACTER
5445  032134  006105                  ROL     TTY             ;ROTATE BIT INTO C
5446  032136  106114                  ROLB    (4)             ;PACK IT
5447  032140  006105                  ROL     TTY             ;ROTATE BIT INTO C
5448  032142  106114                  ROLB    (4)             ;PACK IT
5449  032144  006105          PRINTF: ROL     TTY             ;ROTATE BIT INTO C
5450  032146  106114                  ROLB    (4)             ;PACK IT
5451  032150  105714                  TSTB    (4)
5452  032152  001402                  BEQ     .+6
5453  032154  105237  032064          INCB    PRINT3
5454  032160  105737  032064          TSTB    PRINT3          ;CHECK FILL SWITCH
5455  032164  001402                  BEQ     .+8
5456  032166  152724  000060          BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
5457  032172  105237  032065          INCB    PRINT3+1
5458  032176  001355                  BNE     PRINTL          ;REPEAT
5459  032200  022704  032054          CMP     #PRINT2,%4
5460  032204  001002                  BNE     .+8
5461  032206  112724  000060          MOVB    #'0,(4)+
5462  032212  105014                  CLRB    (4)
5463  032214  000004  032054          TYPE    ,PRINT2         ;TYPE IT
5464  032220  012604                  MOV     (6)+,%4         ;RESTORE R5
5465  032222  000207          PRTE:   RTS     %7
5466                          ;TTY WATCH DOG FOR CONTROL C
5467          000003          CNTLC=3                         ;ASCII CONTROL C
5468
```

```
5469  032224  117727  147150          TTYI1:  MOVB    @TKB,(PC)+      ;SAVE CHAR
5470  032230  000000                  SCHAR:  .WORD   0               ;WHERE
5471  032232  042737  000200  032230          BIC     #200,@#SCHAR    ;SEVEN LEVEL ASCII
5472  032236  122737  000003  032230          CMPB    #CNTLC,@#SCHAR  ;CHECK FOR CONTROL C
5473  032246  001004                          BNE     TTYI0
5474  032250  000004  032274                  TYPE    ,ACLC   ;TYPE CONTROL C
5475  032254  000137  026214                  JMP     @#MON1,0
5476  032260  004737  031004          TTYI0:  JSR     PC,TTYFLG
5477  032264  113777  032230  147112          MOVB    @#SCHAR,@TPB    ;ECHO CHARACTER
5478  032272  000002                          RTI
5479
5480  032274  041536      000         ACLC:   .ASCIZ  <136><103>
5481          032320                  .EVEN
5482
5483          032400                  .=.+1377+1              ;FORM MOD(400) BOUNDRY
5484
5485          032400                  DSPADRS=.               ;DEFAULT DST
5486
5487  032400      000                         .BYTE   2       ;TIO
5488  032401      000                         .BYTE   0       ;WRITE
5489  032402      000                         .BYTE   0       ;READ
5490  032403      014                         .BYTE   CE!IDE  ;NOP
5491  032404      000                         .BYTE   0       ;SENSE
5492
5493  032405      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5494  032406      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5495  032407      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5496  032410      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5497  032411      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5498  032412      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5499  032413      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5500  032414      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5501  032415      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5502  032416      002                         .BYTE   UC      ;ILLEGAL ,UNIT CHECK
5503          032420                  .EVEN
5504
5505  032420                  T.PCH1:
5506  032420  000012                          .BLKW   10.
5507
5508  032444                  T.PCH2:
5509  032444  000012                          .BLKW   10.
5510
5511  032470                  T.PCH3:
5512  032470  000012                          .BLKW   10.
5513
5514                          .SBTTL  ODT
5515
5516                          ;   ODT-11X -- V006A
5517
5518                          ; COPYRIGHT 1969,1972, DIGITAL EQUIPMENT CORPORATION
5519
5520          000000          R0      =       %0      ; REGISTER
5521          000001          R1      =       %1      ;  NAMING
5522          000002          R2      =       %2      ;   CONVENTIONS
```

```
5523            000003                  R3      =       %3
5524            000004                  R4      =       %4
5525            000005                  R5      =       %5
5526            000006                  SP      =       %6
5527            000007                  PC      =       %7
5528            177776                  ST      =       177776          ;STATUS REGISTER
5529            032514                  0,TMP   =       .
5530            032514                  .       =       0,TMP
5531
5532            000016                  0,BKP   =       16              ;NUMBER OF BREAKPOINTS+1 MULT. BY 2
5533            000014                  0,TVEC  =       14              ;TRT VECTOR LOCATION
5534            000340                  0,STM   =       340             ;PRIORITY MASK = STATUS REGISTER
5535            000020                  0,TBT   =       20              ;T-BIT MASK = STATUS REGISTER
5536            000003                  TRT     =       000003          ;TRT INSTRUCTION
5537
5538
5539            177562                  0,RDB   =       177562  ;R DATA BUFFER
5540            177560                  0,RCSR  =       177560  ;R C/SR
5541            177566                  0,TDB   =       177566  ;T DATA BUFFER
5542            177564                  0,TCSR  =       177564  ;T C/SR
5543                                    ; INITIALIZE ODT
5544                                    ;  USE 0,ODT FOR A NORMAL ENTRY
5545                                    ;  USE 0,ODT+2 TO RESTART ODT + WIPING OUT ALL BREAKPOINTS
5546                                    ;  USE 0,ODT+4 TO RE-ENTER (I.E. + FAKE A BREAKPOINT)
5547
5548            032634                  .=.+120                 ;SAVE ROOM FOR ODT STACK
5549
5550    032634  012777  000010  146496  0,ODT:  MOV     #TIMDIS,@DXES   ;DISABLE TIMER
5551    032642  000421                  BR      0,START         ;NORMAL ENTRY
5552    032644  000425                  BR      0,RST           ;RESTART
5553    032646  013737  177776  032534  0,ENTR: MOV     ST,0,UST        ;RE-ENTER :- SAVE STATUS
5554    032654  013737  000016  177776          MOV     0,TVEC+2,ST     ;SET UP LOCAL STATUS
5555    032662  012737  032634  032532          MOV     #ODT,0,UPC      ;FAKE THE PC
5556    032670  112737  177777  035553          MOVB    #-1,0,P         ;DISALLOW PROCEED
5557    032676  105037  035551                  CLRB    0,S
5558    032702  000137  034534                  JMP     0,BK1
5559
5560    032706  012706  032514          0,START: MOV    #0,URB,SP       ;SET UP STACK
5561    032712  010637  032530                  MOV     SP,0,USP        ;FAKE THE SAVED STACK
5562    032716  000413                  BR      0,RST1
5563    032720  004037  035030          0,RST:  JSR     0,0,SVR         ;SAVE REGISTERS
5564    032724  004537  035244                  JSR     5,0,RLM         ;REMOVE ALL BREAKPOINTS
5565    032730  113704  032536                  MOVB    0,PRI,R4        ;GET ODT PRIORITY
5566    032734  106004                  RORB    R4              ;SHIFT
5567    032736  106004                  RORB    R4              ;  INTO
5568    032740  106004                  RORB    R4              ;   POSITION
5569    032742  110437  177776                  MOVB    R4,ST           ;STORE IN STATUS
5570    032746  105037  035551          0,RST1: CLRB    0,S             ;DISABLE SINGLE INSTRUCTION FOR NOW
5571    032752  112737  177777  035553          MOVB    #-1,0,P         ;DISALLOW PROCEED
5572    032760  012737  000340  000016          MOV     #0,STM,0,TVEC+2 ;STATUS WORD TO TRT VECTOR+2
5573    032766  012737  034516  000014          MOV     #0,BRK,0,TVEC   ;PC TO TRT VECTOR
5574    032774  000137  033752                  JMP     0,@ALL          ;CLEAR BREAKPOINT TABLES
5575
5576
```

```
                                        ; SPECIAL NAME HANDLER
                                        ;  DEPENDS UPON THE EXPLICIT ORDER OF THE TWO TABLES O'TL AND O.JR0
                                        
 033036  004537  035424        O'REGT: JSR     5,0,GET         ;SPECIAL NAME, GET ONE MORE CHARACTER
 033042  012704  035414                MOV     #O'TL,R4        ;TABLE START ADDRESS
 033046  120024                O'RSP:  CMPB    R0,(R4)+        ;IS THIS THE CORRECT CHARACTER?
 033050  001413                        BEQ     0,SP            ;JUMP IF YES
 033052  022704  035416                CMP     #O'TL+O.LG,R4   ;IS THE SEARCH DONE?
 033056  101373                        BHI     0,RSP           ;BRANCH IF NOT
 033060  042700  177770                BIC     #177770,R0      ;MASK OFF OCTAL
 033064  010004                        MOV     R0,R4
 033066  006304                O.SP1:  ASL     R4
 033070  062704  032514                ADD     #O'URB,R4       ;GENERATE ADDRESS
 033074  005202                        INC     R2              ;SET FOUND FLAG
 033076  000471                        BR      0,SCAN          ;GO FIND NEXT CHARACTER
 033100  162704  035401        O'SP:   SUB     #O'TL+7,R4      ;GO FIND NEXT CHARACTER
 033104  000770                        BR      0,SP1
                                        
                                        ; + HANDLER - OPEN INDEXED ON THE PC
                                        
 033106  004537  033172        O.ORPC: JSR     5,0,TCLS        ;TEST WORD MODE AND CLOSE
 033112  061202                        ADD     @R2,R2          ;COMPUTE
 033114  005202                        INC     R2
 033116  005202                        INC     R2              ;   NEW ADDRESS
 033120  010237  035542        O.PCS:  MOV     R2,O.CAD        ;UPDATE CAD
 033124  000137  033344                JMP     0,OP2A          ;GO FINISH UP
 033130  004537  033172        O.ORAB: JSR     5,0,TCLS                ;TEST WORD MODE AND CLOSE
 033134  011202                        MOV     @R2,R2          ;GET ABSOLUTE ADDRESS
 033136  000770                        BR      0,PCS
 033140  004537  033172        O.ORRB: JSR     5,0,TCLS        ;TEST AND CLOSE
 033144  011201                        MOV     @R2,R1          ;COMPUTE NEW ADDRESS
 033146  110101                        MOVB    R1,R1           ;EXTEND THE SIGN
 033150  006301                        ASL     R1              ;R2=2(@R2)
 033152  005201                        INC     R1              ;   +2
 033154  005201                        INC     R1
 033156  060102                        ADD     R1,R2           ;   +PC
 033160  000757                        BR      0,PCS
 033162  004737  035462        O.TCLS: JSR     PC,O.CLSE       ;CLOSE CURRENT CELL
 033166  022737  000002  035540        CMP     #2,O.BW         ;ONLY WORD MODE ALLOWED
 033174  001003                        BNE     0,TCL1          ;BRANCH IF ERROR
 033176  013702  035542                MOV     O.CAD,R2        ;CURRENT ADDRESS IN R2
 033202  000205                        RTS     R5
 033204  005726                O'TCL1: TST     (SP)+
 033206  000411                        BR      0,ERR           ;POP A WORD AND SHOW THE ERROR
                                        
                                        ;       PROCESS S = SINGLE INSTRUCTION MODE
                                        
 033210  005702                O'SNGL: TST     R2              ;SEE IF TURN ON OR TURN OFF
 033212  001003                        BNE     0,SI1           ;BRANCH IF TURNING IT ON
 033214  105037  035551                CLRB    O.S             ;CLEAR THE FLAG
 033220  000410                        BR      0,OCD           ;CONTINUE THE SCAN
 033222  112737  177777  035551  O'SI1:  MOVB    #-1,O.S ;SET THE FLAG
 033230  000404                        BR      0,OCD
                                        ; COMMAND DECODER & CUT11X
```

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5631
5632                                    ; ALL REGISTERS MAY BE USED (R0-R5).
5633
5634  033174  012700  000077    0,ERR:  MOV     #7,R0           ;  7 TO BE TYPED
5635  033200  004537  035370            JSR     5,.,$TYP        ; OUTPUT ?
5636  033204  005037  035540    0,DCD:  CLR     0,$W            ;CLOSE ALL
5637  033210  004537  035522            JSR     5,.,CRLS        ;TYPE  <CR><LF>.
5638  033214  005003            0,DCD2: CLR     R3              ;R3 IS A SAVE REGISTER FOR R2
5639  033216  005005                    CLR     R5              ;R5 IS A SAVE REGISTER FOR R4
5640  033220  005004            0,DCD1: CLR     R4              ; R4 CONTAINS THE CONVERTED OCTAL
5641  033222  005002                    CLR     R2              ; R2 IS THE NUMBER FOUND FLAG
5642  033224  004537  035404    0,SCAN: JSR     5,0,GET         ;GET A CHAR, RETURN IN R0
5643  033230  022700  000060            CMP     #'0,R0          ;COMPARE WITH ASCII 0
5644  033234  101013                    BHI     0,CLGL          ;CHECK LEGALITY IF NON-NUMERIC
5645  033236  022700  000067            CMP     #'9,R0          ;COMPARE WITH ASCII 7
5646  033242  103410                    BLO     0,CLGL          ;CHECK LEGALITY IF NOT OCTAL
5647  033244  042700  177770            BIC     #177770,R0      ;CONVERT TO BCD
5648  033250  006304                    ASL     R4              ; MAKE ROOM
5649  033252  006304                    ASL     R4              ;  IN
5650  033254  006304                    ASL     R4              ;    R4
5651  033256  060004                    ADD     R0,R4           ;PACK THREE BITS IN R4
5652  033260  005202                    INC     R2              ;R2 WAS NUMERIC FLAG
5653  033262  000760                    BR      0,SCAN          ;   AND TRY AGAIN
5654  033264  005001            0,CLGL: CLR     R1              ;CLEAR INDEX
5655  033266  120061  033565    0,LGL1: CMPB    R0,0,LGCH(R1)   ;DO THE CODES MATCH?
5656  033272  001405                    BEQ     0,LGL2          ;JUMP IF YES
5657  033274  005201                    INC     R1              ; SET INDEX FOR NEXT SEARCH
5658  033276  020127  000023            CMP     R1,#0,CLGT      ;IS THE SEARCH DONE?
5659  033302  103334                    BHIS    0,ERR           ;    OOPS!
5660  033304  000770                    BR      0,LGL1          ;RE-LOOP
5661  033306  006301            0,LGL2: ASL     R1              ;MULTIPLY BY TWO
5662  033310  000171  033314            JMP     @0,LGDR(R1)     ;GO TO PROPER ROUTINE
5663
5664  033314  033362            0,LGDR: 0,SEMI  ;
5665  033316  033370                    0,WRC   ;  /    OPEN WORD
5666  033320  033402                    0,BYT   ;  \    OPEN BYTE
5667  033322  033464                    0,CRET  ;  CARRIAGE RETURN    CLOSE
5668  033324  033000                    0,REGT  ;  $  REGISTER OPS
5669  033326  034310                    0,GO    ;  G  GO TO ADDRESS K
5670  033330  033476                    0,OP1   ;  <LF>  MODIFY, CLOSE, OPEN NEXT
5671  033332  033050                    0,ORPC  ;  .  OPEN RELATED, INDEX = PC
5672  033334  033472                    0,OLD   ;  <  RETURN TO OLD SEQUENCE AND OPEN
5673  033336  033624                    0,BACK  ;  ^  OPEN PREVIOUS
5674  033340  034010                    0,OFST  ;  O  OFFSET
5675  033342  034124                    0,WSCH  ;  W  SEARCH WORD
5676  033344  034120                    0,EFF   ;  E  SEARCH EFFECTIVE ADDRESS
5677  033346  033646                    0,BKPT  ;  B  BREAKPOINTS
5678  033350  034420                    0,PROC  ;  P  PROCEED
5679  033352  033072                    0,ORAB  ;  @  OPEN RELATED, ABSOLUTE
5680  033354  033102                    0,ORRB  ;  >  OPEN RELATED, REL. BRANCH
5681  033356  033152                    0,SNGL  ;  S  SINGLE INSTRUCTION MODE
5682  033360  026214                    MON1,#                  ;RETURN TO DIAGNOSTIC MONITOR
5683            000046            0,LGL   .       ,-0,LGDR        ;LGL MUST EQUAL 2X CHLGT ALWAYS
5684
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```
5685                                    ; SEMI-COLON PROCESSOR
5686
5687  033362  012703                    O.SEMI: MOV     R2,R3    ;A SEMI-COLON HAS BEEN RECEIVED
5688  033364  010403                            MOV     R4,R3    ;NUMERIC FLAG TO R3, CONTENTS TO R3
5689  033366  000714                            BR      O.DCD1           ;GO BACK FOR MORE
5690
5691                                    ; PROCESS / AND \ = OPEN WORD OR BYTE
5692
5693  033370  012737  000002  039540    O.WRD:  MOV     #2,O.BW          ;OPEN WORD
5694  033376  000404                            BR      O.WB1
5695  033400  006104                    O.BYT1: ROL     R4               ;GET THE ADDRESS BACK
5696  033402  012737  000001  039540    O.BYT:  MOV     #1,O.BW          ;OPEN BYTE
5697  033410  005702                    O.WB1:  TST     R2               ;GET VALUE IF R2 IS NON-ZERO
5698  033412  001404                            BEQ     O.WRD1           ;SKIP OTHERWISE
5699  033414  010437  035544                    MOV     R4,O.DOT         ;PUT VALUE IN DOT
5700  033420  010437  035542                    MOV     R4,O.CAD         ;    ALSO IN CAD
5701  033424  022737  000001  039540    O.WRD1: CMP     #1,O.BW          ;CHECK BYTE MODE
5702  033432  001407                            BEQ     O.WRD2           ;JUMP IF BYTE
5703  033434  013704  035542                    MOV     O.CAD,R4
5704  033440  006204                            ASR     R4               ;MOVE ONE BIT TO CARRY
5705  033442  103756                            BCS     O.BYT1           ;JUMP IF ODD ADDRESS
5706  033444  017700  002672                    MOV     @O.CAD,R0        ;GET CONTENTS OF WORD
5707  033450  000402                            BR      O.WRD3
5708  033452  117700  002664    O.WRD2: MOVB    @O.CAD,R0        ;GET CONTENTS OF BYTE
5709  033456  004537  035276    O.WRD3: JSR     5,0.CADV         ;GO GET AND TYPE OUT @CAD
5710  033462  000654                            BR      O.DCD2           ;GO BACK TO DECODER
5711
5712                                    ; PROCESS CARRIAGE RETURN
5713
5714  033464  004737  035462    O.CRET: JSR     PC,O.CLSE        ;CLOSE LOCATION
5715  033470  000645                    O.DCDA: BR      O.DCD            ;RETURN TO DECODER
5716
5717                                    ; PROCESS <LF>, OPEN NEXT WORD
5718
5719  033472  105237  035556            O.OLD:  INCB    O.SEQ            ;SET NEED O.DOT TO O.CAD MOVE
5720  033476  005737  035540            O.OP1:  TST     O.BW             ;<LF> RECEIVED
5721  033502  001634                    O.ERR2: BEQ     O.ERR            ;ERROR IF NOTHING IS OPEN
5722  033504  004737  035462                    JSR     PC,O.CLSE        ;CLOSE PRESENT CELL
5723  033510  105737  035556                    TSTB    O.SEQ            ;SEE IF < COMMAND
5724  033514  001403                            BEQ     O.OP5            ;BRANCH IF NOT
5725  033516  013737  035544  039542            MOV     O.DOT,O.CAD      ;GO TO THE FORMER STREAM
5726  033524  105037  035556            O.OP5:  CLRB    O.SEQ            ;CLEAR THE FLAG
5727  033530  063737  035540  039542            ADD     O.BW,O.CAD       ;GENERATE NEW ADDRESS
5728  033536  013737  035542  039544    O.OP2:  MOV     O.CAD,O.DOT      ;INITIALIZE DOT
5729  033544  004537  035514    O.OP2A: JSR     5,O.CRLF         ;<CR><LF>
5730  033550  013746  035540            MOV     O.BW,-(SP)       ;SAVE BW
5731  033554  012737  000002  039540            MOV     #2&O.BW          ;SET TO TYPE FULL WORD ADDRESS
5732  033562  013700  035542                    MOV     O.CAD,R0         ;NUMBER TO TYPE
5733  033566  004537  035276                    JSR     5,O.CADV         ; TYPE OUT ADDRESS
5734  033572  011637  035540                    MOV     @SP,O.BW         ;RESTORE BW
5735  033576  022726  000001                    CMP     #1,(SP)+         ;IS IT BYTE MODE?
5736  033602  001405                            BEQ     O.OP3            ;JUMP IF YES
5737  033604  012700  000057                    MOV     #'/,R0           ;TYPE A /
5738  033610  004537  035370            O.OP4:  JSR     5,O.FTYP
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5739  033614  000773                      BR      0,WRD1          ;GO PROCESS IT
5740  033616  012778  000134      0,OP3:  MOV     #'\,R8          ;TYPE A \
5741  033622  000772                      BR      0,OP4
5742
5743                              ; PROCESS ^, OPEN PREVIOUS WORD
5744
5745  033624  005737  035940      0,BACK: TST     0,BW            ; ^ RECEIVED
5746  033630  001724                      BEQ     0,ERR2          ;ERROR IF NOTHING OPEN
5747  033632  004737  035462              JSR     PC,0,CLSE
5748  033636  163737  035940  035942      SUB     0,BW,0,CAD      ;GENERATE NEW ADDRESS
5749  033644  000734                      BR      0,OP2           ;GO DO THE REST
5750
5751                              ; B HANDLER - SET AND REMOVE BREAKPOINTS
5
5753  033646  012778  035616      0,BKPT: MOV     #0,TRTC,R8
5754  033652  006304                      ASL     R4              ;MULTIPLY NUMBER BY TWO
5755  033654  005703                      TST     R3
5756  033656  001423                      BEQ     0,REMB          ;IF R3 IS ZERO GO REMOVE BREAKPOINT
5757  033660  006205                      ASR     R5              ;GET ONE BIT TO CARRY
5758  033662  103514                      BCS     0,ERR1          ;BADNESS IF ODD ADDRESS
5759  033664  006305                      ASL     R5              ;RESTORE ONE BIT
5760  033666  062704  032946              ADD     #0,ADR1,R4
5761  033672  005702                      TST     R2
5762  033674  001007                      BNE     0,SET1          ;JUMP IF SPECIFIC CELL
5763  033676  020814      0,SET:  CMP     R8,@R4          ;IS THIS CELL FREE?
5764  033700  001405                      BEQ     0,SET1          ;JUMP IF YES
5765  033702  020427  032564              CMP     R4,#0,BKP+0,ADR1        ;ARE WE AT THE END OF OUR ROPE
5766  033706  103102                      BHIS    0,ERR1          ;YES, THERE IS NOTHING FREE
5767  033710  005724                      TST     (R4)+           ;INCREMENT BY TWO
5768  033712  000771                      BR      0,SET
5769  033714  020427  032564      0,SET1: CMP     R4,#0,BKP+0,ADR1
5770  033720  101075                      BHI     0,ERR1          ;ERROR IF TOO LARGE
5771  033722  010514                      MOV     R5,@R4          ;SET BREAKPOINT
5772  033724  000661                      BR      0,DCDA          ;RETURN
5773
5774  033726  005702      0,REMB: TST     R2
5775  033730  001410                      BEQ     0,RALL          ;GO REMOVE ALL
5776  033732  020427  000010              CMP     R4,#0,BKP
5777  033736  101066                      BHI     0,ERR1          ;JUMP IF NUMBER TOO LARGE
5778  033740  010064  032546              MOV     R8,0,ADR1(R4)   ;CLEAR BREAKPOINT
5779  033744  005064  032578              CLR     0,CT(R4)        ;CLEAR COUNT ALSO
5780  033750  000647      0,DCDB: BR      0,DCDA
5781  033752  005004      0,RALL: CLR     R4
5782  033754  012708  035616              MOV     #0,TRTC,R8
5783  033760  020427  000020      0,RM1:  CMP     R4,#0,BKP+2     ;ALL DONE?
5784  033764  101241                      BHI     0,DCDA          ;JUMP IF YES
5785  033766  010064  032546              MOV     R8,0,ADR1(R4)   ;RESET BKP?
5786  033772  012764  000003  032612      MOV     #3,0,UIN(R4)    ;RESET CONTENTS OF TABLE
5787  034000  005064  032578              CLR     0,CT(R4)        ;CLEAR COUNT
5788  034004  005724                      TST     (R4)+           ;INCREMENT BY TWO
5789  034006  000764                      BR      0,RM1
5790
5791                              ; PROCESS 0, COMPUTE OFFSET
5792
```

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5793  034010  022737  000002  035540  0,OFST: CMP   #2,0,BW        ;CHECK WORD MODE
5794  034016  001036                  BNE   0,ERR1        ;ERROR IF NOT CORRECT MODE
5795  034020  012700  000040          MOV   #' ,R0        ;TYPE ONE BLANK
5796  034024  004537  035370          JSR   5,0,FTYP      ;  AS A SEPARATOR
5797  034030  005703                  TST   R3            ;WAS SEMI-COLON TYPED?
5798  034032  001430                  BEQ   0,ERR1        ;NO, CALL IT AN ERROR
5799  034034  163705  035542          SUB   0,CAD,R5      ;COMPUTE
5800  034040  005305                  DEC   R5
5801  034042  005305                  DEC   R5            ;    16 BIT OFFSET
5802  034044  010502                  MOV   R5,R2
5803  034046  004537  035276          JSR   5,0,CADV      ;NUMBER IN R0 - WORD MODE
5804  034052  013500                  MOV   R5,R0
5805  034054  006200                  ASR   R0            ;DIVIDE BY TWO
5806  034056  103414                  BCS   0,OF1         ;ERROR IF ODD
5807  034060  022700  177620          CMP   #-200,R0      ;COMPARE WITH -200
5808  034064  003011                  BGT   0,OF1         ;DO NOT TYPE IF OUT OF RANGE
5809  034066  022700  000177          CMP   #177,R0       ;COMPARE WITH +177
5810  034072  002406                  BLT   0,OF1         ;DO NOT TYPE IF OUT OF RANGE
5811  034074  005337  035540          DEC   0,BW          ;SET TEMPORARY BYTE MODE
5812  034100  004537  035276          JSR   5,',CADV      ;NUMBER IN R0 - BYTE MODE
5813  034104  005237  035540          INC   0,BW          ;RESTORE WORD MODE
5814  034110  000137  033214          JMP   0,#CD2        ;ALL DONE
5815
5816  034114  000137  033174  0,ERR1: JMP   0,ERR         ;INTERMEDIATE HELP
5817
5818                                  ; SEARCHES - $MSK   HAS THE MASK
5819                                  ;            $MSK+2 HAS THE FWA
5820                                  ;            $MSK+4 HAS THE LWA
5821
5822  034120  005201          0,EFF:  INC   R1            ;SET EFFECTIVE SEARCH
5823  034122  000401                  BR    0,WDS
5824  034124  005001          0,WSCH: CLR   R1            ;SET WORD SEARCH
5825  034126  005703          0,WDS:  TST   R3            ;CHECK FOR OBJECT FOUND
5826  034130  001771                  BEQ   0,ERR1        ;ERROR IF NO OBJECT
5827  034132  012737  000002  035540          MOV   #2,0,BW       ;SET WORD MODE
5828  034140  013702  032542          MOV   0,MSK+2,R2    ;SET ORIGIN
5829  034144  013704  032540          MOV   0,MSK,R4      ;SET MASK
5830  034150  005104                  COM   R4
5831  034152  020237  032544  0,WDS2: CMP   R2,0,MSK+4    ; IS THE SEARCH ALL DONE?
5832  034156  101274                  BHI   0,#CDB        ;  YES
5833  034160  011200                  MOV   @R0,R0        ; GET OBJECT
5834  034162  005701                  TST   R1            ;NO
5835  034164  001027                  BNE   0,EFF1        ;BRANCH IF EFFECTIVE SEARCH
5836  034166  010046                  MOV   R0,-(SP)
5837  034170  010503                  MOV   R5,R3         ;EXCLUSIVE OR
5838  034172  040500                  BIC   R5,R0         ; IS DONE
5839  034174  042603                  BIC   (SP)+,R3              ;  IN A VERY
5840  034176  050003                  BIS   R0,R3         ;    FANCY MANNER HERE
5841  034200  040403                  BIC   R4,R3         ;AND RESULT WITH MASK
5842  034202  001016          0,WDS3: BNE   0,.+34        ;RE-LOOP IF NO MATCH
5843  034204  010446                  MOV   R4,-(SP)      ;REGISTERS R2,R4, AND R5 ARE SAFE
5844  034206  004537  035514          JSR   5,0,CRLF
5845  034212  010200                  MOV   R2,R0         ;GET READY TO TYPE
5846  034214  004537  035276          JSR   5,0,CADV      ;  TYPE ADDRESS
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5847  034220  212700  000057          MOV     #'/,R0          ;SLASH TO R0
5848  034224  004537  035370          JSR     5,0,PTYP        ;TYPE IT
5849  034230  011200                  MOV     @R2,R0          ;GET CONTENTS
5850  034232  004537  035276          JSR     5,0,CADV        ;TYPE CONTENTS
5851  034236  012604                  MOV     (SP)+,R4        ; RESTORE R4
5852  034240  005722          0$:MOS4:  TST     (R2)+           ;INCREMENT TO NEXT CELL AND
5853  034242  000743                  BR      0,MOS2          ;     RETURN
5854  034244  020005          C.EFF1:  CMP     R0,R5           ; IS (X)=K?
5855  034246  001755                  BEQ     0,MOS3          ;TYPE IF EQUAL
5856  034250  010003                  MOV     R0,R3           ;(X) TO R3
5857  034252  060203                  ADD     R2,R3           ;(X)=X
5858  034254  005203                  INC     R3
5859  034256  005203                  INC     R3              ;(X)=X+2
5860  034260  020305                  CMP     R3,R5           ;IS (X)=X+2=K?
5861  034262  001747                  BEQ     0,MOS3          ;BRANCH IF EQUAL
5862  034264  042700  177400          BIC     #177400,R0      ;WIPE OUT EXTRANEOUS BITS
5863  034270  110002                  MOVB    R0,R2
5864  034272  000257                  CCC
5865  034274  006300                  ASL     R0              ;MULTIPLY BY TWO
5866  034276  005200                  INC     R0
5867  034300  005200                  INC     R0
5868  034302  060200                  ADD     R2,R0           ;ADD PC
5869  034304  020005                  CMP     R0,R5           ;IS THE RESULT A PROPER REL. BRANCH?
5870  034306  000735                  BR      0,MOS3
5871
5872                          ; PROCESS G = GO
5873
5874  034312  005703          0$:GO1:  TST     R3              ;WAS K) TYPED?
5875  034312  001700                  BEQ     0,ERR1          ; TYPE ?<CR,LF> IF NOT
5876  034314  112737  000021  039593  MOVB    #0,@#P=3,0$:P   ;CLEAR PROCEED
5877  034322  006205                  ASR     R5              ;CHECK LOW ORDER BIT
5878  034324  103673                  BCS     0,ERR1          ;ERROR IF ODD NUMBER
5879  034326  006305                  ASL     R5              ;RESTORE WORD
5880  034330  010537  032532          MOV     R5,0$:UPC       ;SET UP NEW PC
5881  034334  112737  000340  177776  MOVB    #0$:STM,@#ST            ;SET HIGH PRIORITY
5882  034342  004537  035176          JSR     5,0,@#STT       ;RESTORE TELETYPE
5883  034346  105037  035532  0$:TBIT: CLRB    0$:T            ;CLEAR
5884  034352  052737  000020  032534  BIS     #0$:TBT,0$:UST  ;     BOTH T-BIT FLAGS
5885  034360  105737  035551          TSTB    0,@#            ;SEE IF WE NEED A T BIT
5886  034364  001005                  BNE     0,$02           ;IF NOT GO NOW
5887  034366  042737  000020  032534  BIC     #0$:TBT,0$:UST  ;SET TH T BIT
5888  034374  004537  035120  0$:G01:  JSR     5,0,@#SB        ;RESTORE BREAKPOINTS
5889  034400  004537  035066  0$:G02:  JSR     5,0,@#SR        ;RESTORE REGISTERS
5890  034404  013746  032534          MOV     0$:UST,-(SP)    ;     AND STATUS
5891  034410  013746  032532          MOV     0$:UPC,-(SP)    ;     AND PC
5892                          ;************************** MOD APH 74 **************************
5893                          ;*                          11/40,11/45 RTT
5894                          ;*                          TRACE TRAP MOD
5895  034414  000002          0$:ESRTI: RTI
5896  034416  000002          RTX:     RTI                    ;MODIFIED FOR 11/40,11/45 TO RTT
5897                          ;************************** MOD APH 74 **************************
5898                          ;
5899
5900                          ; PROCESS P = PROCEED
```

```
5971                                    ; ONLY ALLOWED AFTER A BREAKPOINT
5972
5973
5974  034420  113720  035553        C.PROC: MOVB    C.P,R0
5975  034424  105720                        TSTB    R0                      ;CHECK LEGALITY OF PROCEED
5976  034426  002632                        BLT     C,ERR1                  ;NOT LEGAL
5977  034430  705702                        TST     R2                      ;CHECK FOR ILLEGAL COUNT
5978  034432  001036                        BNE     C,ERR1                  ;JUMP IF ILLEGAL
5979  034434  005723                        TST     R3                      ;WAS COUNT SPECIFIED?
5980  034436  001402                        BEQ     C,PR1                   ;NO
5981  034440  010560  032570                MOV     R5,C,CT(R0)             ;YES, PUT AWAY COUNT
5982  034444  112737  000340  177776  C.PR1:  MOVB    #0!STM,ST               ;FORCE HIGH PRIORITY
5983  034452  004537  035170                JSR     5,C,RSTT                ;RESTORE TTY
5984  034456  123727  035553  000016  C.C1:  CMPB    C,P,#0,BKP              ;SEE IF A REAL ONE OR A FAKE
5985  034464  003338                        BGT     C,TBIT                  ;BRANCH IF FAKE
5986  034466  105737  035551                TSTB    C,S                     ;SEE IF SINGLE INSTRUCTION MODE
5987  034472  001325                        BNE     C,TBIT                  ;IF SO EXIT NOW
5988  034474  112737  000340  177776        MOVB    #0,STM,ST               ;SET HIGH PRIORITY
5989  034502  105237  035552                INCB    C,T                     ;SET T-BIT FLAG
5990  034506  052737  000020  032534        BIS     #0 TBT,C,UST            ;SET T-BIT
5991  034514  000731                        BR      C,$02
5992
5993                                    ; BREAKPOINT HANDLER
5994  034516  012637  032532        C.BRK:  MOV     (SP)+,C,UPC             ;PRIORITY IS 7 UPON ENTRY
5995  034522  012637  032534                MOV     (SP)+,C,UST             ;SAVE STATUS AND PC
5996  034526  112737  000021  035553        MOVB    #0,BKP+3,C,P            ;TELL IP THAT WE CAN CONTINUE
5997  034534  004537  035038        C.BK1:  JSR     5,C,SVR                 ;SAVE VARIOUS REGISTERS
5998  034540  105737  035552                TSTB    C,T                     ;CHECK FOR T-BIT SET
5999  034544  001300                        BNE     C,TBIT                  ;JUMP IF SET
6000  034546  004537  035244                JSR     5,C,REM                 ;REMOVE BREAKPOINTS
6001  034552  105737  032536                TSTB    C,PRI                   ;CHECK IF PRIORITY
6002  034556  100003                        BPL     C,BK2                   ; IS AS SAME AS USER PGM
6003  034560  113705  032534                MOVB    C,UST,R5                ;PICK UP USER UST IF SO
6004  034564  000427                        BR      C,BK3
6005  034566  113705  032536        C.BK2:  MOVB    C,PRI,R5                ;OTHERWISE PICK UP ACTUAL PRIORITY
6006  034572  000257                        CCC                             ;CLEAR CARRY
6007  034574  106005                        RORB    R5                      ;SHIFT LOW ORDER BITS
6008  034576  106005                        RORB    R5                      ;  INTO
6009  034600  106005                        RORB    R5                      ;    HIGH ORDER
6010  034602  106005                        RORB    R5                      ;      POSITION
6011  034604  110537  177776        C.BK3:  MOVB    R5,ST                   ;PUT THE STATUS AWAY WHERE IT BELONGS
6012  034610  013705  032532                MOV     C,UPC,R5                ;GET PC, IT POINTS TO THE TRT
6013  034614  105737  035551                TSTB    C,S                     ;SEE IF IT WAS SINGLE INSTRUCTION FUN
6014  034620  100432                        BMI     C,B4                    ;IF SO HANDLE THERE
6015  034622  005745                        TST     -(R5)
6016  034624  010537  032532                MOV     R5,C,UPC
6017  034630  012704  000016                MOV     #0,BKP,R4               ;GET A COUNTER
6018  034634  020564  032546        C.B1:   CMP     R5,C,ADR1(R4)           ;COMPARE WITH LIST
6019  034640  001427                        BEQ     C,B2                    ;JUMP IF FOUND
6020  034642  005304                        DEC     R4
6021  034644  005304                        DEC     R4
6022  034646  002372                        BGE     C,B1                    ;RE-LOOP UNTIL FOUND
6023  034650  004537  035150                JSR     5,C,SVTT                ;SAVE TELETYPE STATUS
6024  034654  004537  035514                JSR     5,#,CRLF
```

```
5955  P34662  012774  235560          MOV   #0,@0,R4      ;ERROR, NOTHING FOUND
5956  P34664  P12773  035561          MOV   #0,@0+1,R3
5957  P34670  P04537  P35446          JSR   5,0,TYPE      ;OUTPUT "BE" FOR BAD ENTRY
5958  P34674  010520                   MOV   R5,R0
5959  P34676  P62737  P00002  032532   ADD   #2,0,UPC     ;POP OVER THE ADJUSTMENT ABOVE
5960  P34704  P00445                   BR    0,B3          ; OK CONTINUE
5961  P34706  112774  P00020  0,B41   MOVB  #0,BKP+2,R4   ;SET BREAK POINT HIGH + 1
5962  P34712  P10564  P32546          MOV   R5,0,ADR1(R4) ;STORE NEXT PC VALUE FOR TYPE OUT
5963  P34716  P00400                   BR    0,B2
5964  P34720  110437  P35553  0,B21   MOVB  R4,0,P        ;ALLOW PROCEED
5965  P34724  P05364  P32570          DEC   0,CT(R4)
5966  P34730  P03252                   BGT   0,C1          ;JUMP IF REPEAT
5967  P34732  012764  P00001  032570   MOV   #1,0,CT(R4)   ;RESET COUNT TO 1
5968  P34740  004537  P35150          JSR   5,0,SVTT      ;SAVE TELETYPE STATUS, R4 IS SAFE
5969  P34744  P12700  P00102          MOV   #B,R0
5970  P34750  P04537  P35370          JSR   5,0,PTYP      ;TYPE "B"
5971  P34754  113700  P35553          MOVB  0,P,R0        ;CONVERT BREAKPOINT NUMBER TO ASCII
5972  P34760  P02700  P00140          ADD   #140,R0
5973  P34764  P06200                   ASR   R0
5974  P34766  004537  P35370          JSR   5,0,PTYP
5975  P34772  012700  P00073          MOV   #":,R0
5976  P34776  004537  P35370          JSR   5,0,PTYP      ; TYPE
5977  P35002  012737  000002  035540   MOV   #2,0,BW       ; SET WORD MODE
5978  P35010  113704  035553          MOVB  0,P,R4
5979  P35014  P16400  032546          MOV   0,ADR1(R4),R0 ;GET ADDRESS OF BREAK
5980  P35020  004537  P35270  0,B31    JSR   5,0,CADV      ;TYPE ADDRESS
5981  P35024  P00137  P33204          JMP   0,DCD         ;GO TO DECODER
5982                                  ; SAVE REGISTERS R0-R6
5983                                  ;   INTERNAL STACK
5984
5985  P35030  P12637  P35546  0,SVR1   MOV   (SP)+,0,XXX  ;PICK REGISTER FROM STACK AND SAVE
5986  P35034  P10637  032530          MOV   SP,0,USP      ;SAVE USER STACK ADDRESS
5987  P35040  012706  032530          MOV   #0,USP,SP     ;SET TO INTERNAL STACK
5988  P35044  P10546                   MOV   R5,-(SP)      ;SAVE
5989  P35046  P10446                   MOV   R4,-(SP)      ; REGISTERS
5990  P35050  P10346                   MOV   R3,-(SP)      ;1
5991  P35052  010246                   MOV   R2,-(SP)      ; THRU
5992  P35054  010146                   MOV   R1,-(SP)      ;   5
5993  P35056  013746  P35546          MOV   0,XXX,-(SP)   ;PUT SAVED REGISTER ON STACK
5994  P35062  005746                   TST   -(SP)
5995  P35064  P00200                   RTS   R0
5996
5997                                  ; RESTORE REGISTERS R0-R6
5998
5999  P35066  005726           0,RSR1  TST   (SP)+         ;POP THE EXTRA CELL
6220  P35070  012637  035546           MOV   (SP)+,0,XXX   ;GET R0 FROM STACK
6201  P35074  P12601                   MOV   (SP)+,R1      ;RESTORE
6202  P35076  P12602                   MOV   (SP)+,R2      ; REGISTERS
6203  P35100  012603                   MOV   (SP)+,R3      ;  1
6204  P35102  012604                   MOV   (SP)+,R4      ;  THRU
6205  P35104  012605                   MOV   (SP)+,R5      ;    5
6206  P35106  013706  032530          MOV   0,USP,SP      ;RESTORE USER STACK
6207  P35112  013746  P35546          MOV   0,XXX,-(SP)   ;PUT R0 ON USER STACK
6208  P35116  P00200                   RTS   R0
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6039
6040                                    ; RESTORE BREAKPOINTS 0-7
6041
6042  035120  012704  000010          0',RSB1:  MOV     #0',BKP,R4        ;RESTORE ALL BREAKPOINTS
6043  035124  017464  032546  032612  0',RS11:  MOV     #0',ADR1(R4),0,UIN(R4)   ;SAVE CONTENTS
6044  035132  013774  035010  032546            MOV     0,TRTC,#0,ADR1(R4)       ;REPLACE WITH TRAP
6045  035140  005304                             DEC     R4
6046  035142  005304                             DEC     R4
6047  035144  002367                             BGE     0,RS1             ;RE-LOOP UNTIL DONE
6048  035146  000205                             RTS     R5                ;  THEN QUIT
6049
6050                                    ; SAVE TELETYPE STATUS
6051
6052  035150  113737  177560  035554  0',SVTT1: MOVB    0,RCSR,0,CSR1     ;SAVE R C/SR
6053  035156  113737  177564  035555            MOVB    0,TCSR,0,CSR2     ;SAVE T C/SR
6054  035164  105037  177560                    CLRB    0,RCSR            ;CLEAR ENABLE AND MAINTENANCE
6055  035170  105037  177564                    CLRB    0,TCSR            ;  BITS IN BOTH C/SR
6056  035174  000205                             RTS     R5
6057
6058                                    ; RESTORE TELETYPE STATUS
6059
6060  035176  004537  035514          0',RSTT1: JSR     5,0,CRLF
6061  035202  105737  177564                    TSTB    0,TCSR            ;WAIT READY
6062  035206  100375                             BPL     .-2               ;  ON PRINTER
6063  035210  032737  004000  177560            BIT     #4000,0,RCSR      ;CHECK BUSY FLAG
6064  035216  001403                             BEQ     0,RSE1            ;SKIP READY LOOP IF NOT BUSY
6065  035220  105737  177560                    TSTB    0,RCSR            ;WAIT READY
6066  035224  100375                             BPL     .-4               ;    ON READER
6067  035226  113737  035554  177560  0',RSE1:  MOVB    0,SR1,0,RCSR      ;RESTORE
6068  035234  113737  035555  177564            MOVB    0,SR2,0,TCSR      ;  THE STATUS REGISTERS
6069  035242  000205                             RTS     R5
6070
6071                                    ; REMOVE BREAKPOINTS 0-7
6072                                    ;   IN THE OPPOSITE ORDER OF SETTING
6073
6074  035244  105737  035551          0,REM1:   TSTB    0,S               ;SEE IF SINGLE INSTRUCTION IS GOING
6075  035250  001011                             BNE     0,R2              ;EXIT IF SO
6076  035252  005004                             CLR     R4                ;REMOVE ALL BREAKPOINTS
6077  035254  016474  032612  032546  0,R11:    MOV     0,UIN(R4),#0,ADR1(R4)    ;CLEAR BREAKPOINT
6078  035262  005204                             INC     R4
6079  035264  005204                             INC     R4
6080  035266  020427  000010                    CMP     R4,#0,BKP
6081  035272  003770                             BLE     0,R1              ;RE-LOOP UNTIL DONE
6082  035274  000205                  0,R21:     RTS     R5                ;THEN QUIT
6083
6084                                    ; TYPE OUT CONTENTS OF WORD OR BYTE WITH ONE TRAILING SPACE
6085                                    ; WORD IS IN R0
6086
6087  035276  012703  000006          0,CADV1:  MOV     #6,R3             ;# OF DIGITS
6088  035302  012704  177776                    MOV     #-2,R4            ;# OF BITS FIRST-3
6089  035306  022737  000001  035548            CMP     #1,0,BW           ;SEE IF WORD MODE
6090  035314  001004                             BNE     0,SPC             ;BRANCH IF SO
6091  035316  162703  000003                    SUB     #3,R3             ;ONLY DO 3 DIGITS
6092  035322  005204                             INC     R4                ;DO 2 BITS FIRST
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6263  035324  000378                  SWAB    R4              ;AND TURN R8 AROUND
6264  035326  010046                  MOV     R2,-(SP)        ;SAVE R8
6265  035330  062704  000003  C.SPC1  ADD     #3,R4           ;COMPUTE THE NUMBER OF BITS TO DO
6266  035334  005008                  CLR     R8
6267  035336  006116                  ROL     (SP)            ;GET A BIT
6268  035340  006108                  ROL     R8              ;SCOPE IT AWAY
6269  035342  005304                  DEC     R4              ;DECREMENT COUNTER
6270  035344  003374                  BGT     C.V1            ;LOOP IF MORE BITS NEEDED
6271  035346  062708  000260          ADD     #'0,R8          ;CONVERT TO ASCII
6272  035352  004537  035372          JSR     R5,C.PTYP       ;TYPE IT
6273  035356  005303                  DEC     R3              ;SEE IF MORE DIGITS TO DO
6274  035360  003363                  BGT     C.V2            ;LOOP IF SO
6275  035362  112708  000040          MOVB    #' ,R8          ;SET UP FOR TRAILING SPACE
6276  035366  005726                  TST     (SP)+           ;GET RID OF JUNK AND FALL THRU TO PTYP
6277
6278                                  ; TYPE ONLY ONE CHARACTER (CONTAINED IN R8)
6279
6280  035370  105737  177564  C.PTYP: TSTB    @#TCSR
6281  035374  100375                  BPL     .-4
6282  035376  110837  177566          MOVB    R8,@#TDB
6283  035402  000205          C.PTYP1: RTS    R5
6284                                  ; GENERAL CHARACTER INPUT ROUTINE -- ODT11X
6285                                  ; CHARACTER INPUT GOES TO R8
6286
6287  035404  105737  177560  C.GET:  TSTB    @#RCSR          ;WAIT FOR
6288  035410  100375                  BPL     .-4             ;  INPUT FROM KBD
6289  035412  113708  177562          MOVB    @#RBUF,R8       ;GET CHARACTER - STRIP OFF PARITY
6290  035416  042708  177600          BIC     #177600,R8      ;STRIP OFF PARITY FROM CHARACTER
6291  035422  120027  000012          CMPB    R8,#12          ;SEE IF A <LF>
6292  035426  001406                  BEQ     C.GET1          ;IF SO SAVE THE PAPER
6293  035430  004537  035370          JSR     5,C.PTYP        ;ECHO CHARACTER
6294  035434  001763                  BEQ     C.GET           ;IGNORE NULLS
6295  035436  122720  000040          CMPB    #40,R8          ;CHECK FOR SPACES
6296  035442  001760                  BEQ     C.GET           ;IGNORE SPACES
6297  035444  000205          C.GET1: RTS     R5
6298
6299                                  ; GENERAL CHARACTER OUTPUT ROUTINE - ODT11X
6300                                  ;  ADDRESS OF FIRST BYTE IN R4,
6301                                  ;  ADDRESS OF LAST BYTE IN R3, (R3)>(R4)
6302
6303  035446  020304          C.TYPE: CMP     R3,R4           ;CHECK FOR COMPLETION
6304  035450  103754                  BLO     C.TYP1          ; EXIT WHEN DONE
6305  035452  112420                  MOVB    (R4)+,R8        ;GET A CHARACTER
6306  035454  004537  035370          JSR     5,C.PTYP        ;TYPE ONE CHARACTER
6307  035460  000772                  BR      C.TYPE          ;LOOP UNTIL DONE
6308
6309                                  ; CLOSE WORD OR BYTE AND EXIT,
6310                                  ; UPON ENTERING, R2 HAS NUMERIC FLAG, R4 HAS CONTENTS
6311
6312  035462  005702          C.CLSE: TST     R2              ;IF NO NUMBER WAS TYPED THERE IS
6313  035464  001412                  BEQ     C.CLS1          ;NO CHANGE TO THE OPEN CELL
6314  035466  022737  000001  035540  CMP     #1,C.BW
6315  035474  001404                  BEQ     C.CLS2          ;JUMP IF BYTE MODE
6316  035476  101005                  BHI     C.CLS1          ;JUMP IF ALREADY CLOSED
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6117  035500  010477  000036          MOV     R4,@0,CAD       ;STORE WORD
6118  035504  000422                  BR      0,CLS1
6119  035506  110477  000030  0,CLS2: MOVB    R4,@0,CAD       ;STORE BYTE
6120  035512  000207          0,CLS1: RTS     PC
6121
6122  035514  012703  035563  0,CRLF: MOV     #0,CR+1,R3      ;LWA <CR,LF>
6123  035520  000402                  BR      0,CRS
6124  035522  012703  035564  0,CRLS: MOV     #0,CR+2,R3      ;LWA <CR,LF>+
6125  035526  012704  035562  0,CRS:  MOV     #0,CR,R4        ;FWA
6126  035532  004537  035446          JSR     5,0,TYPE        ;TYPE SOMETHING
6127  035536  000205                  RTS     R5
6128
6129  035540  000000          0,BW:   0                       ; =0 = ALL CLOSED,
6130                                                          ; =1 = BYTE OPEN,
6131                                                          ; =2 = WORD OPEN
6132  035542  000000          0,CAD:  0                       ; CURRENT ADDRESS
6133  035544  000000          0,DOT:  0                       ; ORIGIN ADDRESS
6134  035546  000000          0,XXX:  ,WORD   0               ;TEMPORARY STORAGE
6135  035550      000         0,WDFG: ,BYTE   0               ;SEARCH FLAG = 1 = EFFECTIVE
6136                                                          ;            = 0 = WORD
6137  035551      000         0,S:    ,BYTE   0               ;SINGLE INSTRUCTION FLAG
6138                                                          ;0 IF NOT ACTIVE
6139                                                          ;=1 IF ACTIVE
6140                                                          ;NO BREAK POINTS MAY BE SET WHILE IN
6141                                                          ;SINGLE INSTRUCTION MODE
6142  035552      000         0,T:    ,BYTE   0               ;  T-BIT FLAG
6143  035553      000         0,P:    ,BYTE   0               ;PROCEED FLAG = -2 IF MANUAL ENTRY
6144                                                          ;               -1 IF NO PROCEED ALLOWED
6145                                                          ;               0=7 IF PCEED ALLOWED
6146  035554      000         0,CSR1: ,BYTE   0               ;SAVE CELL = R C/SR
6147  035555      000         0,CSR2: ,BYTE   0               ;SAVE CELL = T C/SR
6148  035556      000         0,SEQ:  ,BYTE   0               ;FLAG FOR < COMMAND
6149
6150              035560              ,EVEN
6151  035560  042502          0,BD:   ,WORD   "BE
6152
6153  035562      015         0,CR:   ,BYTE   015     ;  <CR>
6154  035563      012                 ,BYTE   015     ;  <LF>
6155  035564      052                 ,BYTE   '*      ;  *
6156
6157  035565      073         0,LGCH: ,BYTE   ':      ;  :
6158  035566      057                 ,BYTE   '/      ;  /
6159  035567      134                 ,BYTE   '\      ;  \
6160  035570      015                 ,BYTE   015     ;  CARRIAGE RETURN
6161  035571      044                 ,BYTE   '$      ;  $
6162  035572      107                 ,BYTE   'G      ;  G
6163  035573      012                 ,BYTE   012     ;  <LF>
6164  035574      137                 ,BYTE   '-      ;  -
6165  035575      074                 ,BYTE   '<      ;  <
6166  035576      136                 ,BYTE   '^      ;  ^
6167  035577      117                 ,BYTE   'O      ;  O
6168  036000      127                 ,BYTE   'W      ;  W
6169  036001      105                 ,BYTE   'E      ;  E
6170  036002      102                 ,BYTE   'B      ;  B
```

```
6171  035003     120                    .BYTE   'P      ; P
6172  035004     100                    .BYTE   '@      ; @
6173  035005     076                    .BYTE   '>      ; >
6174  035006     123                    .BYTE   'S      ; S
6175  035007     003                    .BYTE   003             ;CONTROL C
6176             000023          O.CLGT  =       .-O.LGCM                ;TABLE LENGTH
6177
6178  035010     123             O.TL:  .BYTE   'S      ;DO      1
6179  035011     120                    .BYTE   'P      ;NOT     2
6180  035012     115                    .BYTE   'M      ;CHANGE  3
6181  035013     000                    .BYTE   0       ;THE     4
6182  035014     000                    .BYTE   0       ;ORDER   5
6183  035015     122                    .BYTE   'R      ;HERE    6
6184             000026          O.LG    =       .-O.TL
6185                                     .EVEN
6186  035016     000073          O.TRTC: TRT                     ;TRACE TRAP PROTOTYPE
6187
6188                             ;THE ORDER OF THE FOLLOWING ENTRIES IS CRITICAL
6189
6190             035020          O.ASMB  =       .               ;SAVE PC
6191             032514          .       =       O.ODT+120       ;ODT'S STACK IMMEDIATELY PRECEDES ODT
6192
6193  032514     000000          O.UR0:  0       ;USER R0
6194  032516     000000                  2       ;      R1
6195  032520     000000                  0       ;      R2
6196  032522     000000                  0       ;      R3
6197  032524     000000                  0       ;      R4
6198  032526     000000                  0       ;      R5
6199  032530     000000          O.USP:  0       ;USER SP
6200  032532     000000          O.UPC:  0       ;USER PC
6201  032534     000000          O.UST:  0       ;USER ST
6202  032536     000007          O.PRI:  7       ;ODT PRIORITY
6203  032540     000000          O.MSK:  0       ;MASK
6204  032542     000000                  0       ;LOW LIMIT
6205  032544     000000                  0       ;HIGH LIMIT
6206
6207                             ; BREAK POINT LISTS, ADR1 = ADDRESS OF BREAKPOINT,CT = COUNT,
6208                             ;   UIN = CONTENTS
6209
6210  032546                     O.ADR1:
6211             032570          .       =       .+O.BKP+4
6212  032570                     O.CT:
6213             032612          .       =       .+O.BKP+4
6214  032612                     O.UIN:
6215             032634          .       =       .+O.BKP+4
6216             035020          .       =       O.ASMB          ;RESTORE PC
6217
6218                             .SBTTL  MESSAGES
6219             000012          LF=12
6220             000015          CR=15
6221             035020          TO=.                    ;SAVE PC
6222             001630          .=ENDSTR                ;PUT ONCE ONLY ASCII IN SPW
6223  001630                     HEADER:
6224                             ;=                      HEADER TEXT MOD
```

```
                                        ;************************ MOD APR 74 **********************************
                                        .NLIST  BEX
(1)  P31630  246537  244521  042116             .ASCII  "*MAINDEC-11-DZDXF-D-D MAINTENANCE CLOCK 2 (APR 74) "
(1)                                     ;*                      HEADER TEXT MOD
                                        ;************************ MOD APR 74 **********************************
(1)                                     ;*                      HEADER TEXT MOD
(1)  P31713     137  247500  020122             .ASCII  "*FOR DYNAMIC SWITCH REGISTER SETTINGS"
(1)  P31760  251537  242505  053040             .ASCII  "*SEE PROGRAM LISTING PAGE #1"
(1)  P32014  257537  254524  042520             .ASCII  "*'TYPE:   <D>,DEFAULT PARAMETERS"
(1)  P32054  220137  220040  020040             .ASCII  "*         <P>,PREVIOUS PARAMETERS"
(1)  P32114  220137  220040  020040             .ASCII  "*         <S>,SELECT PARAMETERS"
(1)  P32152  220137  220040  020040             .ASCIZ  "*         <N>,START THIS TEST NUMBER"
(1)                                     ;*                      HEADER TEXT MOD
(1)                                     ;************************ MOD APR 74 **********************************
(1)          035620                     .=PD            ;RESTORE PC
(1)          235620                     ENDSTR=.
(1)  235620  257537  226124  020120     FSTART: .ASCIZ  "*'D,P,S,N? "
(1)
(1)  P35634  241137  251521  020105     MSG2:   .ASCIZ  "*BASE ADDRESS: "
(1)  P35654  242137  253105  041511     MSG3:   .ASCIZ  "*DEVICES PER CU: "
(1)  P35676  252137  251525  020124     MSG5:   .ASCIZ  "*'EST NUMBER: "
(1)  P35715     137  254524  042520     MSG6:   .ASCIZ  "*'YPE CU ADRS'S IN HEX <CR><LF>; <CR><CR> TERMINATES LIST"
(1)  P36007     137  042101  051522     MSG6:   .ASCIZ  "*ADRS: "
(1)  P36017     137  042523  020124     MSG7:   .ASCIZ  "*'ET SWITCHES="
(1)  P36036  246137  051511  020124     MSG9:   .ASCIZ  "*LIST ALL LEGAL COMMANDS"
(1)  P36067     137  047503  040515     MSG10:  .ASCIZ  "*COMMAND:"
(1)  P36101     137  054104  053040     MSG12:  .ASCIZ  "*'X PRIORITY LEVEL: "
(1)  P36126  220137  220075  040111     MSG13:  .ASCIZ  "* = ILLEGAL ?"
(1)
(1)
(1)  P36144  251137  243505  052123     RDM:    .ASCIZ  "*REGSTR = SHOULD BE =  WAS"
(1)  P36200  217435     000             HOME:   .ASCIZ  <33><37>
(1)  P36203     207     000             BELL:   .ASCIZ  <207>
(1)  P36205     137  247105  020104     ENDTST: .ASCIZ  "*END TEST"
(1)  P36217     137  042440  051122     ECM:    .ASCIZ  "= ERRORS DETECTED: "
(1)  P36243     077  000137             .QUES:  .ASCIZ  "?*"
(1)  P36246  220040  020040  020040     SPAC4:  .ASCIZ  <40><40><40><40>
(1)  036255     040     000             SPACE:  .ASCIZ  <40>
(1)  P36257     137     000             CRLF:   .ASCIZ  "*'
(1)  P36261     137  054524  042520     STALL:  .ASCIZ  "*TYPE IN STALL COUNT: "
(1)  P36310  057537  051105  047522     ERPC:   .ASCIZ  "*=ERROR PC: "
(1)
(1)  P36325     137  054104  051504     ADXDS:  .ASCIZ  "*DXDS:"
(1)  P36334  242137  241530  030101     ADXCA:  .ASCIZ  "*DXCA:"
(1)  P36343     137  054104  051503     ADXCS:  .ASCIZ  "*DXCS:"
(1)  036352  242137  247530  030123     ADXOS:  .ASCIZ  "*DXOS:"
(1)  P36361     137  054104  040502     ADXBA:  .ASCIZ  "*DXBA:"
(1)  036370  242137  241130  030103     ADXBC:  .ASCIZ  "*DXBC:"
(1)  036377     137  054104  047515     ADXMO:  .ASCIZ  "*DXMO:"
(1)  036406  242137  246530  030111     ADXMI:  .ASCIZ  "*DXMI:"
(1)  P36415     137  054104  041103     ADXCB:  .ASCIZ  "*DXCB:"
(1)  P36424  242137  247130  030104     ADXND:  .ASCIZ  "*DXND:"
(1)  P36433     137  P54104  051505     ADXES:  .ASCIZ  "*DXES:"
(1)  P36442  242137  242530  030523     ADXES1: .ASCIZ  "*DXES1: "
```

```
(1)                                     ;************************** MOD APR 74 ******************************
(1)                                     ;*                          ERROR TEXT "^D
(1)
(1)  "36453    137  "41440  040525  "SG26:  .ASCIZ  "* CUADRS/"01"
(1)                                     ;************************** MOD APR 74 ******************************
(1)  "36478  393137  "41525  047524  "SG28:  .ASCIZ  "*VECTOR ADDRESS: "
(1)  "36512  "51537  "40524  052524  "SG31:  .ASCIZ  "*STATUS: "
(1)  "36524  "42537  "51122  051117  "SG35:  .ASCIZ  "*ERROR IN TEST: "
(1)  "36545    137  "51117  043511  "SG36:  .ASCIZ  "* RIGIN OF MAP ERROR: "
(1)  "36574  052137  020124  051124  TRCM1:  .ASCIZ  "*TT TRACE ERROR IN TEST: "
(1)  "36626  047537  044522  047107  TRCM:  .ASCIZ  "*'RIGN OF LAST TT TRACE UPDATE: "
(1)  "36667      40  052502  054523  ABSYM:  .ASCIZ  " BUSY ENABLE  "
(1)  "36706  052515  052114  052111  AMUXM:  .ASCIZ  "MULTIPLEXER  CH"
(1)  "36726  042537  052110  054522  TRC1:  .ASCIZ  "*ENTRY WAS      !"
(1)  "36750  042537  052116  054522  TRC2:  .ASCIZ  "*ENTRY SHOULD BE!"
(1)  "36772  042537  052116  054522  TTDS:  .ASCIZ  "*ENTRY WAS FROM DXUS"
(1)  "37017    137  "47105  051124  TTCA:  .ASCIZ  "*ENTRY WAS FROM DXCA"
(1)                                     .LIST   BEX
 6227          000001                   .END
```

```
ABSVM   #36667          6226#
ACCEPT= 104BF5           925#   4938    4544    4554    4561    457B    461B    4651    4657
ACLC    #32274          5474    5480#
ACPTVM  #31214          5247#   5271
ACPTVM. #31216          5248#   5268
ACPTD   #31443          5318#   5341
ACPTD.  #31442          5319#   5338
ACUA    #27463          4698=   4691    4721    4729=   473F    4731=   4772#
ADRA    #26374          4398    4462#
ADRAE   #26122          4485    4473#
ADRBAM  #24324          4165#
ADRBCM  #24326          4166#
ADRCAM  #24316          4162#
ADRCBM  #24334          4169#
ADRCSM  #24323          4163#
ADRDSM  #24314          4161#   4392
ADRECC= #000002          761#   1954    1557    1867    197F    215B    2159
ADRECD= #000001          762#   1958    1561    1971    1874    2154    2157
ADRESM  #24340          4171#
ADRI  = #100F0           748#   2163    2166    2215    2218
ADRMIM  #24332          4168#
ADRMOM  #24330          4167#
ADRWDM  #24336          4170#
ADRC  = #040000          728#   1944    1545    155B    1553    185?    189B    1863    1866    2135    2136    2143    2146
                        3939    3941    3962    3964
ADRSM   #24322          4164#
ADXBA   #36361          4406    6226#
ADXBC   #36373          4407    6226#
ADXCA   #36334          4463    6226#
ADXCB   #36415          4478    6226#
ADXCS   #36343          4464    6226#
ADXDS   #36325          4462    6226#
ADXES   #36433          4472    6226#
ADXES1  #36442          4473    6226#
ADXMI   #36486          4469    6226#
ADXMO   #36377          4468    6226#
ADXWD   #36424          4471    6226#
ADXOS   #36352          4465    6226#
AHEX    #31332          5261    5278#
AHEX2   #31334          5279#   5283
AHEX1   #31356          5288    5289#
AH.2    #31232          5258    5252#
AH.3    #31278          5262#   5286
AMUXM   #36706          6226#
AO.2    #31456          5321    5323#
ATBL    #31412          5279    5282    5308#
ATTEN = #000200          718#
ATTN  = #000200          871#
BA    = #000010          786#
BALF  = #000010          759#   2691    2694    2795    2798    2885    2888    3808    3811    3864    3867    3875    3878
                        3129    3132    3283    3286    3389    3388    343B    3441    3453    3456    3535    3538
BAMAP   #24126          1711=   2824=   2218=   2364=   2408=   2372=   241F=   2491=   2599=   2712=   2884=   2814=   2954=
                        2982=   3137=   3163=   3292=   3641=   3657=   4113#   4165    4214=
BC    = #000012          787#
```

```
BCMAP   024143          2587#  2748#  2893#  3816#  3887#  3215#  3287#  3405#  3599#  4117#  4186   4215#
BEGIN   001100          994    958#   99F    4449   458F   4514
BELL    003203          4694   6226#
BGN3    001216          98F    984#
BGN1    001238          985    987#
BGN2    001244          988    998#
BIT3  * 00F3F1          849#
BIT1  * 00F4F2          848#   4333
BIT10 * 0020F3          839#   883    4018
BIT11 * 0040F0          838#   882    4285
BIT12 * 0100F0          837#   881    4362
BIT13 * 0200F0          836#   988    4352   5366   5438
BIT14 * 0400F0          835#   879    4283
BIT15 * 1000F3          834#   978
BIT2  * 00F0F4          847#
BIT3  * 00F013          846#
BIT4  * 00F023          845#
BIT5  * 00F040          844#
BIT6  * 00F100          843#
BIT7  * 00F2F0          842#
BIT8  * 00F400          841#
BIT9  * 001003          848#   2361   2364   2395   4489
BSY   * 00F023          713#   874#
BSYEN * 004000          693#   1621   1934
BSYS  * 00F400          677#
BUSI    001342          1035#  1113   2104   2283   2286   2823   2826   2913   2916   3029   3186   3949   5228
BUSO    001336          1038#  1929   1668   1842   1981   3419#  3422   3457   3482   3581   3543   5217
BUSOB   001352          1044#
BYPAS * 00F1F0          756#   1047   1978   1981   1982   2891   2894   2223   2226   2274   2277   2410   2419
                        2683   2686   2877   2888   3377   3388   3402   3405   3449   3452
CA    * 00F0F2          783#
CAMAP   024072          1582#  1671#  1815#  1984#  2222#  2639#  2643#  2788#  2932#  2958#  3098#  3141#  3333#
                        3337#  3946#  4101#  4162   4212#
CARG    031540          5326   5328   5342#
CARGH   031316          5255   5257   5272#
CARRY   027446          4702#
CB    * 00002F          798#
CBMAP   024230          1597#  1561#  1638#  1643#  1664#  1728#  1733#  1753#  1781#  187F#  1874#  1951#  1956#
                        1977#  2041#  2046#  2066#  2094#  2118#  2153#  2157#  2226#  223F#  2234#  2248#  2257#
                        2277#  2414#  2419#  2423#  2427#  2439#  2473#  2477#  2497#  2518#  2522#  2526#  2627#
                        2682#  2686#  2698#  2694#  2698#  2782#  2716#  2728#  2724#  2733#  2738#  2752#  2756#
                        2768#  2769#  2798#  2798#  2818#  2846#  2854#  2888#  2888#  2928#  2941#  2945#  2962#
                        2973#  2977#  2993#  3011#  3047#  3067#  3078#  3082#  3132#  3153#  3171#  3175#  3182#
                        3198#  3202#  3206#  3218#  3329#  3376#  338F#  3384#  3388#  3392#  3396#  3485#  3441#
                        3452#  3456#  3538#  3842#  3258#  3569#  3683#  3607#  3611#  3615#  3626#  3638#  3661#
                        3665#  3669#  3684#  3698#  3094#  3729#  3733#  3737#  3741#  3755#  3759#  3767#  4139#
                        4139#  4157#  4169   4220#
CBMAPS  024342          4135   4157   4158#  4174#  4222#
CE    * 00F010          868#   1113   4067   5498
CHDEND* 002040          688#
CHEND * 00F012          714#
CHENDS* 001000          676#   2322   2323
CHIS  * 00F200          678#   1677   1680   1998   1993   227F   2273   2576   3278
CHKEND  024300          4150   4157#
```

```
CHKPWS  P23374          3976#
CHKREG  P24052          1505    1510    1522    1536    1539    1562    1569    1589    1583    1624    165P    1713    1746
                        1798    1767    1818    1829    1839    1949    1852    1875    1878    1893    1896    1937    1963
                        2026    2059    2071    2788    2122    2131    2158    2167    2174    2189    2248    2249    2265
                        2278    2291    2294    2329    2333    2343    2373    2428    2452    2487    2498    2585    2531
                        2538    2541    2648    2654    2659    2679    2783    2729    2742    2761    2885    2855    2859
                        2866    2872    2894    2986    2933    2967    2987    3881    3F17    3848    3888    3183    3154
                        3176    3216    3342    3348    3353    3365    3397    3413    3442    347P    3478    3493    351P
                        3573    3579    3616    3674    3685    3699    3784    3742    3768    4294#   4189
CKCUA   P3P6P2          4033    4081    5138#
CKC1    P3P6P6          5189#   5126
CKC2    P3P618          5118#   5111*
CKC3    P3P616          5116#
CKC4    P3P648          512P    5124#
CKRG1   P24272          4126    4131#
CLK     P23569          1511    1528    1532    1537    1548    1563    1574    1581    1594    162P    1654    1719    1747
                        1763    1768    1824    1833    1849    185P    1861    1876    1887    1894    1987    1941    1967
                        2032    2068    2076    2081    2123    2127    2139    2159    2168    2172    2179    2191    2211
                        2241    2258    2279    2292    2312    233P    2347    2381    2432    2441    2462    2498    2581
                        2511    2534    2539    2655    2661    2673    2785    2726    2743    2762    2886    2839    2856
                        2861    2867    2873    2895    2188    2987    2911    2934    2968    2988    2995    3882    3819
                        3858    3858    3869    3889    3184    3123    3155    3177    3349    3355    3367    3398    3411
                        3428    3438    3444    3474    3488    3491    3499    3587    3512    3531    3575    3581    3617
                        3635    3643    3679    3788    3788    3743    4814#
CLKC    P23562          4815#   4816    4831*
CLKE    P23664          4817    4833#
CLKC  * P01888           743#   2181    2184    4858    4851    4853    4854
CLK1    P23658          4819    4838#   4832
CLRPC   P31836          5166#
CL1     P30388          4996#   4998
CMD     P27454          2176*   2177    2178    2219    2222    2574*   2636    2639    3268*   333P    3333    3922    3923
                        3943    3949    3947    3966    3968    4766#
CMDCHN* P8P8P4           683#
CMDO  * P02888           729#   2187    2188    2193    2196    2386    2387    2314    2317    3944    3946    3967    3969
CMDREJ* P8P8P1           685#
CMD.AD  P27676          4648    4889#   495P
CMD.ST  P27736          4647    4988#   4959    5P99
CNTLC * P88883          5467#   5472
CONI    P01344          1836#
CONO    P01343          1831#
CONDR   P01354          1845#
COPARO  P23728          1535    1848    3428    3486    3589    3648    4848#   4188
COUNT   P27518          2582*   2583    2584    2745    2889*   289P    3P12*   3813    3883*   3884    3211*   3212    3275*
                        3276    3277    3461*   3462    3565    3555*   3556    357P    4798#
CR    * P8P815          4594    4662    5394    6228#
CRLF    P36257          4828    4411    6226#
CS    * P8P884           784#
CSMAP   P241P2          2341    2481*   2581*   2592*   2653*   2669*   3267*   3286*   3347*   3362*   4185#   4163    4211*
CS12  * P82882           694#
CS12  * P17883           692#
CUADRS  P27462          4691*   4696*   4738*   4732    4733    4775#
CUAR    P01326          1828#   1498*   1499    1668    1597    1811*   1812    1981    2818    2184    264P    3334    3924*
                        3959*   3962*   5211
CUBSY * P88488           696#   1613    1665    1926    1978
```

```
CUCR    001330          1721#  2219   2636   2777   2782   2913   2922   2932   2955   2958   3095   3098   3126
                        3189   3111   3138   3141   3337   3543   3546   3593   3719   3923#
CUDE.D= 007023          6818   2594   3187   3233   3299   3799
CUDX  = 000403          7528   2587   2692   2757   2762   2787   2797   2917   2928   2942   2945   3179   3182
                        3381   3384   3539   3542   3684   3627   3629   3639   3662   3665   3738   3733   3756
                        3759
CUE   = 000048           873#
CUE.D = 000043           712#
CUFBM = 000073           698#
CUDR    001334          1726#
CUSR    001332          1825#  2188   2183   2268   2781   2784   2829   2829   2946   2949   3829   3833   3791
                        3894   3142   3145   3457   3488   3587   3713   5214
DE    = 000004           869#  1113   4867   5498
DEV     027452          1498   1499   1582   1528   1529   1534   1671   1811   1812   1815   1841   1842   1847
                        1984   2118   2648   2643   3436   3334   3337   3921   3924   3938   3942   3959   3961
                        3965   4733#  4734   4764#
DEVC.T  027464          4689#  4697#  4698   4707#  4735   4776#
DEVE.D= 000004           715#
DEV.A   027456          4734#  4737#  4739#  4748   4769#  4945#
DFLT.C  027016          4838#  4949
DFLT.S  027056          4863#  4958
DIMAGB  005078          1698#  1699#  1738#  1784#  1788   1711   1741   1744
DIMAGO  005118          1782#  1783#  1784
DOPLIN= 000002           864#
DONE  = 000208           697#  2478   2481   2546   2547   3226   3229   3795   3798   3851   3854   3855   4188
                        4181   4239   4238   5188
DS    = 000000           782#
DSCRSP= 000002           777#
DSMAP   024056          1688#  1993#  2273#  2323#  2538#  3198#  3698#  4897#  4161   4239#
DST     001442          1892#  2239   3928#  4948#  5071   5896
DSTADR= 032400          1892   4948   5485#
DSTCNT  027502          4787#
DST.SE  038552          4684   5899#
DS'.1   030562          5898#  5181#
DS'.2   037570          5188#  5182
DTMP    024766          4278#  4279#  4288
DUNREA  004566          1686   1613#
DXBA    001304          1886#  1788   2021   2282   2218   2361   2365   2369   2372   2397   2448   2595#  2596
                        2599   2789   2912   2888   2884   2811   2814   2951   2954   2979   2982   3134   3137
                        3168   3163   3288#  3289   3292   3631   3638   3641   3654   3697   3768   4112
DXBASE  001262           997#  4558#  4948#  5281
DXBC    001306          1887#  2583#  2584   2587   2745   2748   2897   2893   3813   3818   3884   3887   3212
                        3215   3238   3276#  3277   3388   3462   3556   3559   4116
DXCA    001276          1883#  2337   2466   2644   3938   3883   4108   5218
DXCB    001314          1818#  1589   1513   1554   1958   1635   1648   1647   1661   1725   1738   1758   1778
                        1822   1926   1867   1871   1948   1953   1968   1974   2838   2843   2863   2891   2115
                        2158   2154   2223   2227   2431   2245   2254   2274   2375   2378   2411   2418   2428
                        2424   2436   2478   2474   2494   2515   2519   2523   2558   2554   2687   2613   2618
                        2624   2679   2683   2687   2691   2695   2699   2713   2717   2721   2738   2734   2749
                        2753   2757   2766   2787   2795   2815   2843   2851   2877   2885   2917   2938   2942
                        2959   2978   2974   2998   3188   3844   3864   3879   3879   3129   3158   3168   3172
                        3179   3195   3199   3283   3287   3381   3387   3318   3322   3373   3377   3381   3385
                        3389   3393   3482   3438   3449   3453   3535   3539   3547   3566   3688   3684   3688
                        3612   3619   3622#  3623   3627   3658   3662   3666   3681   3687   3691   3726   3738
```

```
                    3734    3738    3745    3748*   3752    3756    3764    3979    3991    4237    4847    4131
DXCS    001300      1084#   1613    1621    1665    1784*   1926    1934    1978    2347*   2478    2546*   2547    2553*
                    2581    2588*   2589    2649*   2658    2667*   2669    3226    3229*   3263*   3264    3267    3281*
                    3282    3343*   3344    3354*   3359    3795    3798*   3851    3854*   3859    3925*   3926    4184
                    4188*   4181    4184*   4235    4538*   4453*   4708*   5149*   5188*   5189*
DXDS    001274      1082#   1677    1735    199F    2348    227?    2387    232?    2336    2481    2484    2487    2527
                    3187    3198    3695    3698    4396    4391    5202
DXES    001322      1012#   1583*   1754    1783*   1810*   2067    2482    2542*   2543    2681*   2683    2615*   322F*
                    3221    3296*   3297    3389*   3769*   4032*   4259*   4142    4149    4179*   4187*   4451*   5139*
                    5191*   5152    5222    5558*
DXES1   001324      1014#   5289
DXF1  = 000073      783#
DXFD  = 00F0F5      784#
DXFRS = 007001      782#    1784    2553    4184    4453    5189
DXFST = 000007      785#
DXIS    001266      999#    3929*   4566*   4745*   4942*
DXIV    001264      998#    2338*   2339*   2593*   3287*   393F*   4564*   4744*   4941*
DXMI    001312      1089#   1187    111F    1485    1687    1684    168A    1918    1928    1997    2081    2187    2183
                    2181    2219    2266    2287    2324    2353    262F    2791    2832    2838    2847    2881    2926
                    2963    3004    3025    3037    3243    306F    3115    3121    3146    3183    3248*   3314    3486
                    3466    3487    3523    3551    367F    3677    4125    4127    5219
DXMO    001310      1088#   1185    1528*   1544*   1545    155F    157F*   1571    1576    159F*   1591    1598    1782*
                    1841*   1857*   1858    1863    1883*   1884    1889    1983*   1984    1989    2135*   2136    2143
                    2178*   2177*   2187*   2188    2193    2388    2386*   2389    2314    2344*   2349    2429*   2632
                    2635    2868*   2899*   2982    2994*   2997    3F18*   3021    3849*   3854    3868*   3871    3122*
                    3125    3239*   3326    3329    3429*   3434    3479*   3498*   3511*   3516    3642*   3645    3649
                    3919*   3938*   3939*   3948*   3941*   3942*   3943*   3944*   3945*   3946*   3951*   3952*   3953*
                    3961*   3962*   3963*   3964*   3965*   3966*   3967*   3968*   3969*   3978*   3971*   4048    4128
                    4452*   5168*   5216
DXMOB   001322      1013#
DXNO    001316      1011#   1741    2054    2200    2236    2239    225A    2263    2481    2466    2469    2644    2647
                    2739    2771    2775    2781    2785    2819    2822    2983    2986    3F99    3182    3164    3167
                    3191    3194    3338    3341    3587    359F    3596    3599    3712    3713    3716    3722    3723
                    4151
DXOS    001302      1085#   1124*   1781    2814    2264    2386    4188    5147*   5148    5213
DXPRT   000178      1088#   3929    4578*   4745    4943*
DXRES   024344      1497    1818    2573    3262    4179#
DXTO  = 00F020      778#
D.DEV'. 030278      4945    4989#
D.DXBA  030256      4948    4988#
D'.DXIS 030272      4942    4986#
D'.DXIV 030268      4941    4981#
D'.DXPR 030262      4943    4982#
D.FIRS  030254      4939    4979#
D'.LEGA 03F266      4946    4984#
D.MAX'. 030264      4944    4985#
E     = 000013      915#    928#    921#    922#    923#    924#    925#    926#    927#    928#    929#    938#
EC    = 000001      1467#
ECM     036217      4713    6228#
EMCR    013864      2784#
EMTABL= 024732      916#    928#    921#    922#    923#    924#    925#    926#    927#    928#    929#    938#
EMTAG   024704      916     4269    4278#
EMTDEC  024642      946     4258#
EMTOK   024664      4261    4263#
```

```
ENDE'. = 020000          0918
ENDSTR= 035620          1158#   0222    0226#
ENDTST  036205          4712    0220#
ENDTY = 004000          1466#   4997
ENTRY1  022650          2336*   2570*   2594*   3270*   3879#   3882    3884*   4195*   4931*
ENTRY2  022710          2337*   3892#   3893    3895*   3921*   3922*   4196*   4932*
ERFLG   026072          4307*   4312*   4344*   4364    4379    4459#
ERPC    036310          4354    0220#
ERRCNT  026124          4345*   4479#   4669*   4715    4938*
ERRDST  031420          1159    1168    1161    1162    1163    1164    1165    1166    1167    1168    1169    1178    1171
                        1172    1173    1174    1178    1179    118F    1181    1182    1183    1184    1185    1186    1187
                        1188    1189    1190    1191    1192    1193    1197    1198    1199    120F    1201    1202    1203
                        1204    1209    1206    1207    1208    1209    121F    1211    1212    1216    1217    1218    1219
                        122F    1221    1222    1223    1224    1225    1226    1227    1228    1229    123F    1231    1235
                        1236    1237    1238    1239    124F    1241    1242    1243    1244    1245    1246    1247    1248
                        1249    125F    1254    1255    1456    1257    1258    1259    126F    1261    1262    1263    1264
                        1265    1266    1267    1268    1269    1273    1274    1275    1276    1277    127F    1279    128F
                        1281    1282    1283    1284    1285    1286    1287    1288    1292    1293    1294    1299    1296
                        1297    1298    1299    1300    1301    1302    1303    1304    1305    1306    1307    1311    1312
                        1313    1314    1315    1316    1317    1318    1319    132F    1321    1322    1323    1324    1325
                        1326    133F    1331    1332    1333    1334    1335    1336    1337    133F    1339    134F    1341
                        1342    1343    1344    1345    1349    1350    1391    1352    1353    1354    1355    1356    1357
                        1358    1359    136F    1361    1362    1363    1364    1369    1369    137F    1371    1372    1373
                        1374    1379    1376    1377    1378    1379    138F    1381    1382    1383    1387    1388    1389
                        1390    1391    1392    1393    1394    1395    1396    1397    1398    1399    149F    1401    1402
                        1406    1407    1408    1409    141F    1411    1412    1413    1414    1415    1416    1417    1418
                        1419    142F    1421    1425    1426    1427    142F    1429    1437    1431    1432    1433    1434
                        1435    1436    1437    1438    1439    144F    1444    1445    1446    1447    1448    1449    145F
                        1451    1452    1453    1454    1455    1456    1457    1458    1459    507F    5297#
ERRLOP  025760          4408    4416    444F#
ERROR = 004002           920#   1189    1112    1115    1501    1515    1531    1547    1552    1556    156F    1573    1578
                        1593    1598    1609    1615    1623    1637    1642    1649    1663    1667    167F    1679    1686
                        169F    1710    1727    1732    1737    1743    1752    1756    178F    1814    182F    1844    1869
                        1865    1869    1873    1886    1891    1986    1911    1922    1928    1936    195F    1955    1962
                        1976    1980    1983    1992    1999    2083    2023    2049    2045    205F    2056    2065    2069
                        2093    2102    2106    2112    2117    2138    2145    2152    2156    2165    2183    2198    2195
                        2206    2209    2217    2221    2225    2229    2233    2238    2247    2256    2262    2268    2272
                        2276    2289    2289    2302    2305    2309    2316    2322    2326    2351    2355    2363    2367
                        2371    2377    238F    2399    2403    2409    2413    2418    2422    2426    2438    245F    2468
                        2472    2476    248F    2484    2496    2517    2521    2525    2529    2545    2549    2552    2559
                        2586    2591    2598    2685    2612    2618    2622    2626    2638    2634    2638    2642    2646
                        2652    2667    2681    2685    2689    2693    2697    2781    2711    2715    2719    2723    2732
                        2736    2741    2747    2751    2755    2759    276A    2773    2779    2783    2789    2793    2797
                        2882    2813    2817    2821    2825    2837    2845    2849    2853    2879    2883    2887    2892
                        2984    2919    2919    2931    2948    2944    2948    2953    2957    2961    2965    2972    2976
                        2981    2989    2992    2999    3086    3018    3015    3023    3027    3031    3042    3046    3056
                        3062    3866    3873    3877    3881    3886    3893    3897    3181    3188    312F    3127    3131
                        3136    3148    3144    3148    3252    3162    3166    317F    3174    3181    3185    3189    3193
                        3197    3281    3285    3289    3214    3223    322A    3232    3235    3238    3266    3279    3284
                        3291    3299    3386    3312    3316    332F    3324    3328    3332    3336    334F    3346    3361
                        3375    3379    3383    3387    3391    3395    3484    3488    3424    3436    344F    3451    3455
                        3459    3464    3468    3484    3489    3583    3518    3525    3537    3541    3545    3549    3553
                        3558    3568    3589    3595    3599    3682    3686    3619    3614    3621    3625    3629    3633
                        3648    3647    3651    3656    3668    3664    3668    3672    3679    3683    3689    3693    3697
```

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                        3715    3721    3725    3728    3732    3736    3742    3747    3754    3758    3762    3766    3797
                        3801    3805    3853    3857    3928    3983    4004    4042    4081    4183    4194    4232    4237
                        4262    5158    5154    5169
ERYSTN  P26126          1475#   1797#   2569#   3257#   3835#   4315    4368    4487#   4749#   4937#
ES      = P01830         792#    923#    921#    922#    923#    924#    925#    926#    927#    928#    929#    930#
ESEND = P01700           679#
ESMAP   P24250          1584#   1817#   2415#   2485#   2486#   2806#   2831#   3388#   3321#   4145#   4171    4223#
ETMP0   P29430          4356#   4357#   4359
ETMP1   P25560          4383#   4384#   4386
EXR.SM# P00000             2#      19     645     647    4372    4409    4442    4703    4934    4967    6226
EXYR1   P26070          4448    4458#
E.RJ    P26130          4346#   4441    4485#
E.R1    P26132          4347#   4442    4486#
E.R2    P26134          4348#   4443    4487#
E.R3    P26136          4349#   4444    4488#
E.R4    P26140          4350#   4445    4489#
E.R5    P26142          4351#   4446    4490#
FALSE   P24560          2338    4232#   4944
FASTCU# P02000           758#
FASTIS  P23126          2579    3273    3937#
FCYN  = P00006           781#
FIRST'  P27472          4531#   4949#   4946    4948#   4749    4780#   4936#
FISS1   P23230          3948    3951#
FISS2   P23236          3950    3952#
FIVESE# P00001          4708#
FSTART  P35620          4516    6220#
GETHEX  P31202          4598    5243#
GO      = P00001         786#    2668    2665    2669    3354    3359    3362
H       P26202          4588#   4589#
HEADER  P01630          4588    6223#
HERE  = P00000           858#
HEXNUM  P31412          4591    4592    4600    5243#   5272#   5307#
HLDO  = P40000           723#    1578    1571    1576    1579    1782    1883    1884    1889    1892    2632    3326    3948
                        3951    3963
HLTSW = 100000           878#    4487
HOME    P36200          4586    6220#
HTBL    P31422          5285    5318#
IBA2    P1A762          2387#   2388#   2394#   2395#   2397    2407    241A
IBHRST# P34000           674#    2383
ICOUNT  P25100          1474#   1796#   2968#   3256#   3834#   4288    4297#
IDVN    P3E652          5089    5121    5128#
IISW  = P04000           882#
ILLC  = P00405           859#    4849
IMAGBA  P06520          2811#   2812#   2813#   2817#   2821    2824    2854    2859    2188
IMAGOS  P06540          2815#   2816#   2817
INDX    P1A776          2390#   2391#   2392#   2393#   2394
INPDSC# P04000           673#    674
INITB   P01154           965     972#
INITC   P01160           971     973#
INITZ   P01144           968     978#
INTEN = P00100           698#    2342    2341    3263    3264    3925    3926    4513
INTERR  P24616          4247#
INTOK = 100000           863#    4239    4248    4251
INTPAS  P24614          4239#   4242#   4248    4251#
```

```
INTR    *24564          4235#
INTREQ= *3F2P0           772#  2482    2485
IOD   = *3F2P3           793#  2699    2732    2749    2752    3844    3P47    3199    3198    3393    3396    3687    3697
                        3764  3767
IRR     *24640          4249  4252#
IRR2    *24626          4253#
IRS   = *3FP3P1          776#
ISSREJ= *3FP310          682#
KEY.TO= 134PP6           926#  4517    4593    4659    4671    524P    5319
LEGAL.  P27512          4588   4698    4729    4795#   4940-   4947-   5P57    513P
LESS1   *01272          10810   2339    2577    3224    3471    4459    4981-
LEVEL0= *3FP0P0          887#
LEVEL1= *3FP040          888#
LEVEL2= *3FP100          889#
LEVEL3= *3FP14P          898#  1881
LEVEL4= *3FP2P2          891#  1888    4595    4982
LEVEL5= *3FP240          892#
LEVEL6= *3FP300          893#
LEVEL7= *3FP34P          894#   937     948     943     946     949     959     991    3219    4581    4515    5138
LF    = *3FP012         5394  6219#
LOCKD = 10F000           748#  1639    1638    1948    1951    2557    2679    2682    3373    3376
LOGICA  P27256          4724#
LOPSW = P4F000           879#  4447
LPCNTL  P27150          3848  4694#
LPCSU   P27124          4688#
LPC1    P27310          4692  4699    4932#
LPC2    P27274          4782  4738#
LPC3    P27350          4736  4739#
LPC4    P27356          4738  4748#
LPC5    P27266          4722  4729#
MAPERR= 104001           921#  4899    4183    4187    4111    4115    4119    4123    4138    4141    4147    4154
MARK    P3F412          5854#  5861
MAX.DE  P27474          4632-  4698    4735    4781#   4944-   588F    5116
MCCSW = P32000           883#
MCLKEN= P00002           767#  1983    1584    1783    1810    1817    2542    2543    2601    2683    2686    3228    3221
                        3296  3297    3388    3769    4149    4179    4451
MCLKP = P00001           766#  2619    3389    4F38    4839
MCRCB   P12326          2688#  2689-   2618
MCRD    P16676          2593   3226#
MCRDAT  P16772          2595   2596    2688    3191    3245#   3258-
MCREX   P16776          3241   3258#
MCRND   P13454          2776#  2777
MCR1    P12400          2614   2628#
MCWCB   P17386          3382#  3383-   3384
MCWD    P22402          3287   3799#
MCWDAT  P22454          3295   3811#
MCWEX   P22512          3806   3827#
MCWIOD  P21740          3572   3687#
MCWL    P2F120          3410#  3686
MCWNPR  P22464          3288   3289    3294    3817#   3823-   3824-   3825-
MCW1    P17360          3308   3314#
MC1.SM= P00000             2#     9    143     339     647    1894    1139    1791    2089    2176    3921    3947    5248
                        5288  6226
MC2.SM= P00001             2#     9    143     339    1791    2089    2176    2197    2223    2296    2328    2324    3921
```

```
                        3947    5287    5493    6221    6226
MDXX     *26712         4625#   4626*   4627*   4628*
MEM.SM*  *3F8?#          2#      19      365     372     921     994     1152    1467    4385    6226
MI     * *3F816          789#
MIMAP    *24174         1687*   1691*   2?EE*   2?84*   2113*   2114*   2184*   2184*   2219*   2269*   2286*   229F*   2327*
                        2356*   2623*   2794*   2926*   2839*   2557*   2?84*   2916*   2966*   3?87*   3?2?*   3?43*   3?63*
                        3129*   3121*   3149*   3186*   3?17*   3489*   3469*   349F*   3526*   3554*   3673*   368F*   479F*
                        4053*   4128#   4168    4218*
MISC     *31346         1839#   5223
MO     * *3F814          788#
MOMAP    *24152         1534*   1553*   1579*   1599*   1847*   1866*   1872*   1912*   2146*   2171*   2178*   2196*   2317*
                        2352*   2432*   2635*   2865*   2?35*   3?2?*   3F24*   3257*   3374*   312F*   3329*   3429*   3426*
                        3427*   3437*   3485*   3584*   3589*   3586*   3519*   3652*   4121#   4;67    4217*   4372*   4474
MON.FL   *27756         4522    492F    4541    493F#
MON?C    *26144          986    4499#
MON2     *26364         4526    4941#
MON2.F   *26214          989    4282    4511#   4528    4674    5?9?    5251    5322    5475    5682
MON2?    *27034          992    4524    4653    4667#
MON11    *27346          983    4673    4679#
MON12    *27362         4743#
MON13    *27414         4747    4749#
MON14    *27443         4753#
MON2     *3F13?         4952#   4954
MON2.F   *3F153         4957#   4961*
MON2.1   *3F162         4968#   4962
MON2.2   *3F222         4969#   4979
MON2.3   *3F252         4978    4976#
MON3     *264F6         4548    4951#
MON4     *26436         4557    4563#
MON4.1   *26466         4563    4569#
MON5     *26652         4614#   4619    5122
MON5.1   *26742         4633#
MON6     *26554         4572    4587#
MON7     *26564         4589#   4595    4606
MON8     *26746         4647#
MON9     *26762         4658#   4661
MSG1?    *36067         4652    6226#
MSG12    *361F1         4569    6226#
MSG13    *36126         4605    4618    6226#
MSG2     *35634         4551    6226#
MSG26    *36453         4371    6226#
MSG2F    *36473         4568    6226#
MSG3     *35654         4614    6226#
MSG31    *36512         4656    6226#
MSG35    *36524         4366    6226#
MSG36    *36545         4381    6226#
MSG4     *35715         4587    6226#
MSG5     *35676         4529    4942    6226#
MSG6     *36027         4589    6226#
MSG7     *36017         4672    6226#
MSG9     *36036         4649    6226#
U      * *3F076         1155#   1158    1175#   1194#   1213#   1232#   1251#   1277#   1289#   130F#   1327#   1346#   1365#
                        1384#   1403#   1422#   1441#   146F#   1467#   147?    1479#   1792    188F#   2564    2572#   3252
                        3208#   3938    3838#
```


A11

```
ND      = 000022          7918#
NDMAP     024272        1744#  2857#  2239#  2263#  2404#  2469#  2647#  2785#  2822#  2986#  3182#  3187#  3194#
                        3341#  3590#  3712#  3722#  4152#  4179   4221#
NDSTC     004030        1492#  1493   1785#  1787
NIOD      021122        3571   3573#
NIODR     013320        2749#
NOCLR     031042        5144   5167#
NOMI      023764        4851#  4854#  4856#  4125   4934#
NOP     = 000240        9188#  4827   4413
NOPC    = 000403        8578#  2178   4843
NPRT    = 000020        7588#  2424   2427   2523   2526   2721   2724   2734   2738   3612   3615   3619   3622
                        3658   3661   3691   3694   3738   3741   3745   3748
NPRTO   = 000004        7718#  1754   2867
NPRX    = 000340        7578#  1725   1728   1758   1753   2038   2041   2063   2066   2227   223P   2245   2248
                        2375   2428   2423   2436   2439   2474   2477   2494   2497   2519   2522   2713   2716
                        2738   2733   2753   2756   2815   2818   2843   2846   2974   2977   299P   2993   3079
                        3082   3172   3175   3287   3510   3547   355P   3608   3611   3623   3626   3734   3737
                        3752   3759
NXM     = 040000          6788#
OCTNUM    027478        4531   4947   4549   4556   4558   4562   4564   4569#  4566   4571   4573#  4574#  4575#
                        4576#  4577#  4578   4579#  4588#  4581   4616   4621   4632   4652   4654   4655   4658
                        4779#  5319#  5342#
ODAT      030312        4685   5389#
OEP       025356        4388   4339   4345#
OFFSET    027466        4778#  4964   4965
OLE.SM=   000000          2#     19   4681   5192   6226
ONESWD    027444         982#  4298#  4458#  4668#  4761#  4935#
ONLINA=   001000         695#
ONLINB=   000004         768#
OPLI    = 100000         735#  1187   1684   1687   1997   2088   262P   2623   3314   3317
OPLO    = 100000         722#  1782   2632   3326   4217
OS      = 000006         785#
OSMAP     024114        2183#  2264#  2784#  2949#  3894#  3145#  3468#  4189#  4164   4212#  4213#
O.ADR1    032546        4828#  4414#  4971#  5768   5765   5769   5778#  5785#  5948   5962#  5979   6813   6814#
                        6847#  6218#
O.ASMB=   033628        6198#  6218
O.BACK    033624        5673   5749#
O.BD      035628        5955   5956   6151#
O.BKP   = 000016        4969   5532#  5765   5769   5778   5783   5876   5914   5926   5947   5961   6812   6858#
                        6211   6213   6215
O.BKPT    033646        5677   5753#
O.BK1     034534        5558   5927#
O.BK2     034566        5932   5935#
O.BK3     034604        5934   5941#
O.BRK     034516         937   5573   5924#
O.BW      033548        5615   5638#  5693#  5696#  5781   572P   5727   5738   5731#  5734#  5745   5748   5793
                        5811#  5813#  5827#  5977#  6259   6114   6129#
O.BYT     033482        5666   5696#
O.BYT1    033488        5695#  5789
O.B1      034634        5948#  5952
O.B2      034728        5949   5963   5964#
O.B3      035028        5968   5988#
O.B4      034786        5944   5961#
O.CAD     035542        5681#  5617   5788#  5783   5786   5788   5725#  5727#  5728   5732   5748#  5799   6117#
```

```
                        6119*  6132#
0.CADV  #35276          5789   5733   5803   5812   5846   585?   598?   6?59#
0.CLGL  #33264          5644   5648   5654#
0.CLGT* #0?323          5658   6178#
0.CLSE  #35462          5614   5714   5722   5747   6112#
0.CLS1  #35512          6113   6116   6118   612?#
0.CLS2  #35586          6115   6119#
0.CR    #35562          6122   6124   6125   6153#
0.CRET  #33464          5667   5714#
0.CRLF  #35514          5729   5844   5954   6530   6122#
0.CRLS  #35522          5637   6124#
0.CRS   #35526          6123   6129#
0.CSR1  #35554          6822*  6837   6146#
0.CSR2  #35555          6823*  6838   6147#
0.CT    #32578          4973*  5779*  5787*  5911*  5965*  5967*  6212#
0.C1    #34456          5914#  5966
0.DCD   #33284          5627   5629   5636#  5715   5981
0.DCDA  #33478          5715#  5772   5788   5784
0.DCDB  #33758          5788#  5832
0.DCD1  #33228          5648#  5689
0.DCD2  #33214          5638#  5718   5814
0.DDT   #35544          5699*  5725   5728*  6133#
0.EFF   #34128          5676   5822#
0.EFF1  #34244          5835   5854#
0.ENTR  #32646          5553#
0.ERR   #33174          5628   5634#  5659   5721   5816
0.ERR1  #34114          5758   5768   5778   5777   5794   5798   5816#  5826   5875   5878   5986   5988
0.ERR2  #33582          5721#  5746
0.FTYP  #35378          5635   5738   5796   5848   5978   5974   5976   6872   6888#  6893   6186
0.GET   #35484          5588   5642   6887#  6894   6?96
0.GET1  #35444          6892   6897#
0.GO    #34318          5669   5874#
0.GO1   #34374          5888#
0.GO2   #34488          5886   5889#  5921
0.LG  * #0?806          5584   6184#
0.LGCH  #35565          5655   6157#  6176
0.LGDR  #33314          5662   5664#  5683
0.LGL * #0?846          5683#
0.LGL1  #33286          5655#  5668
0.LGL2  #33386          5656   5661#
0.MSK   #32548          5828   5829   5831   6283#
0.ODT   #32634          5558#  5559   6191
0.OFST  #34818          5674   5793#
0.OF1   #34118          5886   5888   5818   5814#
0.OF2   #34834          5799#
0.OLD   #33472          5672   5719#
0.OP1   #33476          5678   5728#
0.OP2   #33536          5728#  5749
0.OP2A  #33544          5682   5729#
0.OP3   #33616          5736   5748#
0.OP4   #33618          5738#  5741
0.OP5   #33524          5724   5726#
0.ORAB  #33872          5683#  5679
0.ORPC  #33858          5597#  5671
```

```
0.BRRB  P33102          5686#   5988
0.P     P35553          5556*   5571*   5876*   5984    5914    5926*   5964*   5971    5978    6143#
0.PCS   P33062          5601#   5685    5613
0.PRI   P32536          5565    5931    5935    6202#
0.PROC  P34428          5678    5784#
0.PR1   P34444          5918    5912#
0.RALL  P33752          5574    5779    5781#
0.RCSR* 177562          5540#   6822    6824*   6833    6835    6837*   6F87
0.RDB * 177562          5539#   6889
0.REGT  P33000          5588#   5668
0.REM   P35244          5564    5938    6844#
0.REMB  P33726          5756    5774#
0.RM1   P33768          5783#   5789
0.RS8   P35128          5888    6812#
0.RSE1  P35226          6834    6837#
0.RSP   P33018          5582#   5585
0.RSR   P35066          5889    5999#
0.RST   P32728          5552    5563#
0.RSTT  P35176          5882    5913    6838#
0.RST1  P32746          5562    5578#
0.RS1   P35124          6813#   6817
0.R1    P35254          6847#   6851
0.R2    P35274          6845    6852#
0.S     P35551          5557*   5578*   5626*   5628*   5885    5916    5943    6844    6137#
0.SCAN  P33224          5591    5642#   5653
0.SEM1  P33362          5664    5687#
0.SEQ   P35556          5719*   5723    5726*   6148#
0.SET   P33676          5703#   5768
0.SET1  P33714          5762    5764    5769#
0.SI1   P33164          5625    5628#
0.SNGL  P33152          5624#   5681
0.SP    P33042          5583    5592#
0.SPC   P35326          6800    6864#
0.SP1   P33038          5588#   5593
0.STM * P00340          5534#   5572    5881    5912    5918
0.STRT  P32706          5551    5560#
0.SVR   P35030          5563    5927    5985#
0.SVTT  P35150          5953    5968    6822#
0.T     P35552          5883*   5919*   5928    6142#
0.TBIT  P34346          5883#   5919    5917    5929
0.TBT * P00020          5535#   5884    5887    5920
0.TCLS  P33124          5597    5603    5606    5614#
0.TCL1  P33146          5616    5619#
0.TCSR* 177564          5542#   6823    6825*   6831    6838*   6880
0.TDB * 177566          5541#   6882*
0.TL    P35618          5581    5584    5592    6178#   6184
0.TMP * P32514          5529#   5538
0.TRTC  P35616          4968    5753    5782    6814    6188#
0.TVEC* P00014          5533#   5554    5572*   5573*
0.TYPE  P35446          5557    6183#   6187    6126
0.TYP1  P35442          6883#   6184
0.UIN   P32612          4827*   4413*   4972*   5786*   6813*   6847    6214#
0.UPC   P32532          5555*   5888*   5891    5924*   5942    5946*   5959*   6288#
0.URC   P32514          5560    5589    6193#
```

```
0.USP   #32532  5501#  5988#  5987   6006   6199#
0.UST   #32534  5553#  5884#  5887#  5A9F   5928#  5925#  5933   6201#
0.VZ    #35332  6005#  6074
0.V1    #35336  6007#  6078
0.WB1   #33410  5694   5697#
0.WLFG  #35552  6135#
0.WDS   #34176  5823   5829#
0.WDS2  #34152  5831#  5853
0.WDS3  #34202  5842#  5859   5861   5878
0.WDS4  #34240  5842   5852#
0.WRD   #33370  5665   5693#
0.WRD1  #33424  5698   5701#  5939
0.WRD2  #33452  5702   5708#
0.WRD3  #33456  5707   5709#
0.WSCH  #34124  5675   5824#
0.XXX   #35546  5985#  5993   6008#  6007   6134#
PARA    #27072  4608#
PARER = 100003   669#
PARI  = 700400   744#  1688   1691   2001   2304   2287   2298   4218
PARITY= 134007   927#  2838   2924   3035   3213   4591   4694   4932   4748
PARO  = 700400   731#  3428   3585   4048   5043   5045
PARSTP= 130000   689#  2588   2589   2592   3281   3282   3286
PC    =X700007   987#  1129#  1126#  1491#  1795#  1497#  1585#  1516#  1522#  1523#  1535#  1536#  1539#
                1548#  1562#  1565#  1566#  1588#  1583#  1616#  1624#  1638#  1658#  1656#  1697#  1781#
                1713#  1721#  1746#  1758#  1768#  1765#  1767#  1777#  1788#  1818#  1818#  1829#  1835#
                1836#  1848#  1849#  1852#  1853#  1875#  1878#  1879#  1893#  1896#  1929#  1937#  1943#
                1963#  1969#  2018#  2014#  2428#  2034#  2059#  2071#  2073#  2078#  2088#  2083#  2187#
                2122#  2129#  2129#  2131#  2141#  2158#  2161#  2169#  2174#  2185#  2288#  2282#  2213#
                2248#  2243#  2249#  2252#  2258#  2265#  2278#  2281#  2291#  2294#  2312#  2329#  2333#
                2334#  2343#  2357#  2373#  2383#  2386#  2389#  2428#  2434#  2443#  2445#  2458#  2464#
                2487#  2492#  2498#  2503#  2509#  2513#  2531#  2536#  2538#  2541#  2554#  2562#  2573#
                2575#  2579#  2607#  2648#  2654#  2657#  2659#  2663#  2678#  2675#  2703#  2707#  2725#
                2728#  2742#  2761#  2764#  2779#  2885#  28A8#  2828#  2832#  2841#  2855#  2859#  2863#
                2866#  2878#  2872#  2875#  2994#  2897#  2986#  2989#  2922#  2926#  2933#  2936#  2967#
                2987#  3081#  3017#  3033#  3037#  3048#  3052#  3088#  3103#  3111#  3115#  3154#  3157#
                3176#  3218#  3262#  3269#  3273#  3293#  3301#  3342#  3348#  3351#  3353#  3357#  3363#
                3369#  3397#  3488#  3413#  3414#  3428#  3432#  3442#  3446#  3478#  3476#  3478#  3486#
                3493#  3589#  3518#  3514#  3533#  3573#  3577#  3579#  3583#  3598#  3616#  3648#  3674#
                3685#  3699#  3782#  3784#  3788#  3716#  3742#  3768#  3826#  3876#  3878   3886#  3889
                3981#  3988#  3911#  3931#  3954#  3972#  3976#  3978#  3988#  3991#  3997#  4882#  4885#
                4014#  4823#  4843#  4855#  4878#  4886#  4896   4188   4184   4188   4112   4116   4128
                4127   4131#  4138   4142#  4144   4151   4159#  4185#  4186#  4188#  4189#  4198#  4197#
                4224#  4252#  4277#  4321#  4326#  4331#  4355#  4368#  4375#  4382#  4387#  4488#  4483#
                4454#  4582#  4528#  4541#  4598#  4688#  4621#  4624#  4633#  4679#  4681#  4682#  4683#
                4684#  4685#  4686#  4716#  4729#  4743#  4956#  4976#  4999#  5888#  5828#  5838#  5832#
                5888#  5891#  5897#  5183#  5189#  5123#  5127#  5148#  5144#  5146#  5157#  5158#  5159#
                5167#  5192#  5227#  5276#  5354#  5362#  5388#  5469#  5476#  5527#  5614#  5714#  5722#
                5747#  6128#
PCH1  = 104010   928#
PCH2  = 104011   929#
PCH3  = 104012   930#
PERRPC  225704   4353   4363   4388   4407#
PFAIL   #01444   943    1102#  1123
PFLC    #01613   1138   1148#
```


E 11

MCL<2.P11   CROSS REFERENCE TABLE

```
PG2      #3#343          5035#   5042
PG3      #3#352          5036    5039#
PG4      #3#376          5042    5045#
PG5      #3#4#4          5044    5047#
PHASE0=  #0#0#3           796#     813     814
PHASE1=  #1#0#3           797#     815     816
PHASE2=  #2#0#3           798#     817     818
PHASE3=  #3#0#3           799#     819     820
PHASE4=  #4#0##           800#     821     822
PHASE5=  #5#0#0           801#     823     824
PHASE6=  #6#0#0           802#     825     826
PHASE7=  #7#0#3           803#     827     828    2612    3324
PHS    = #74#3#           749#
PHST     #23434          1523    1548    1566    1616    1638    1656    1721    1768    1765    1779    1836    1853    1879
                         1929    1943    1969    2034    2073    2078    2083    2125    2129    2141    2161    2213    2243
                         2252    2281    2312    2334    2357    2383    2434    2443    2464    2492    2503    2513    2536
                         2657    2663    2675    2707    2728    2764    2008    2841    2863    2979    2075    2097    2089
                         2936    3052    3157    3351    3357    3369    3409    3414    3432    3446    3476    3514    3533
                         3577    3583    3702    3708    3908#
PHSTE    #23522          3995    4005#
PHSTER   #23524          3996    4006#
PHS.1  = #04#3#           813#    1524    1541    1567    1617    1837    1854    1889    1938
PHS12  = #0#0#3           814#    1631    1944
PHS11  = #14#0#           815#    1657    1761    1978    2274
PHS12  = #1#2#3           816#    1722    1966    2035    2079
PHS21  = #24#0#           817#    1771    2084    2138    2142
PHS22  = #2#0#0           818#    2120    2162    2214    2244
PHS31  = #34#00           819#    2253    2313    2335
PHS32  = #3#0#0           820#    2282
PHS41  = #44#00           821#    2358    2435
PHS42  = #4#0#3           822#    2384    2444
PHS51  = #54#00           823#    3372    3415    3447    3477    3534    3584    3709
PHS52  = #50000           824#    3401    3433    3515    3578    3703
PHS61  = #64#00           825#    2670    2729    2765    2942    2864    2876    2898    2918    2937
PHS62  = #6#3#0           826#    2708    2889    2871    3053    3158
PHS71  = #74#00           827#    2469    2534    2537    2758    3352    4137
PHS72  = #70000           828#    2493    2514    2664    3458
PNPSH  = #2#0#0           800#
PREI     #3#713          4454    4743    5137#
PREITO   #31#44          5137    5169#
PREI.1   #3#734          5144#
PRINTF   #32144          5443    5449#
PRINTL   #32132          5444#   5458
PRINTR   #32#66          4802    4823    4321    4326    4331    4368    4375    4387    4408    4403    4716    5434#
PRINTS   #32#76          4316    4369    5436#
PRINT2   #32#54          5438#   5441    5459    5463
PRINT3   #32#64          5432#   5434.   5436.   5437.   5453.   5454    5457.
PRTE     #32222          5439    5469#
PRTY     #3#336          5033#   5037.   5041
PS     = 177776           911#    959.    991.    1137.   2577.   3219.   3224.   3271.   4292.   4455.   4501.   4515.
PSTMP    #23474          3998#   3999.   4001
PWRUP    #01530          1104    1120#
P2BA     #07566          2203#   2204    2207
P2ND     #07562          2201#   2204
```

```
PSND    P1F1F6          2259#   2268
RDW     P36144          4389    6226#
RDWP2   P25624          4393#   4406
RDWP1   P25642          4393-   4397#
RDWP2   P25674          4395    4404#
RDXX    P26708          4622#   4623-   4626
READC - P00DF2           856#   2974    4842
REGTT   P01476          1067#
REG,SE  P31076          4686    5288#
REGP    P01356          1049#
REG1    P01362          1050#
REG2    P01362          1051#
REG3    P01364          1052#
REG4    P01366          1053#
REG5    P01370          1054#
REG6    P01372          1055#
REG7    P01374          1056#
RELOD   P26338          4589    4534#
REQI  - P2F0D8           737#
RESMAP  P24462          4186    4209#
RESRES  P31050          1125    5140    5146    5186#
RETURN  P25104          1138    1470-   1998-   2570-   3258-   3836-   4293    4294-   4299#   4456    4751-   4752-   4939-
RSVPC   P32050          5414-   5424    5426#
RSVPSW  P32052          5415-   5423    5427#
RSVRC - 1040F4           924#   1122
RS',1   P31176          5283#   5286
RTX     P34416           964-    970-    973    5896#
RUBOJH  P31310          5253    5259    5270#   5284
RUBOJY  P31532          5324    5330    5332    5340#
R0    =X70F0D8           898#   4346    4441-   4518    4522    4525    4527    4594    4668    4672    4721-   4725    4746-
                        4750-   4751    4753    4949-   4252    4953    4958-   4968    4968-   4971    5006    5007-   5057-
                        5060    5069    5072-   5273    5075    5076    5100-   5111    5124    5125    5201-   5203    5204-
                        5230-   5232    5233    5246    5449    5252    5254    5256    5258    5260    5262-   5267    5273-
                        5279    5289-   5317    5320    5323    5325    5327    5329    5331    5333-   5337    5343-   5352-
                        5355-   5520#   5582    5586-   5587    5634-   5643    5645    5647-   5651    5655    5706-   5708-
                        5732-   5737-   5740-   5753-   5763    5778    5782-   5785    5795-   5802-   5804-   5805-   5807
                        5809    5833-   5836    5838-   5840    5845-   5847-   5849-   5854    5856    5862-   5863-   5865-
                        5866-   5867-   5868-   5869    5904-   5905    5911-   5950-   5969-   5971-   5972-   5973-   5975-
                        5979-   5995-   6008-   6063-   6064    6066-   6068-   6071-   6075-   6082    6084-   6089-   6091
                        6095    6105-
R1    =X70D0D1           899#   1494-   2235-   2236    2283    2080-   2709    2739    2771    2799-   2808    2810-   2811
                        2819    2940    2958-   2951    2955    2978-   2979    2983    3133-   3134    3159-   3160    3164
                        3295-   3419    3422    3425    3527    3497    3498    3501    3504    3506    3864    3865-   3866
                        3872    3879    3876    3885-   3886    3896-   3897    3899-   3905    3908    3918-   4061    4063-
                        4065-   4869-   4875    4877-   4879    4085-   4333    4347    4398-   4393    4405    4442-   4958-
                        4952-   4959-   4959-   4968-   4999-   4996-   4997    5058-   5068-   5061-   5063-   5064-   5068-
                        5078-   5073    5078-   5082-   5089    5096-   5100-   5202-   5203-   5205    5231-   5232-   5233-
                        5234-   5249    5247-   5263-   5264-   5265-   5266-   5267-   5272    5274-   5316    5318-   5334-
                        5335-   5336-   5337-   5342    5344-   5921#   5687-   5688-   5689-   5618-   5611-   5612    5654-
                        5655    5657-   5658    5661-   5662    5822-   5824-   5834    5992    6081-
R2    =X70D0D2           900#   1493-   3294-   3597    3631    3637    3638    3653    3654    3723    3768    4062    4064-
                        4066-   4068-   4076    4078-   4082-   4084-   4348    4391-   4394    4399    4484    4443-   5071-
                        5082    5099-   5100    5244    5475-   5278-   5279    5281-   5282    5285    5522#   5598-   5598-
                        5599-   5608-   5601    5604-   5907    5612-   5617-   5624    5641-   5652-   5687    5697    5761
```

```
                    5774    5928#   5831    5833    5849    5949    5952    5857    5868    5987    5991    6082#   6112
R3      =%3P0P3      9818    4349    4392#   4394    4402    4424    4444#   4588#   4592#   4687#   4648#   4655#   4662#
                    5523#   5638#   5687#   5755    5797    5825    5837#   5839#   5848#   5841#   5856#   5857#   5858#
                    5859#   5968    5874    5989    5X58#   5992    6P33#   6P57#   6061#   6P73#   6103    6122#   6124#
R4      =%3P3P4      9828    4358    4445#   4647#   465P#   4967#   4969    4971#   4972#   4973#   4974    5524#   5565#
                    5566#   5567#   5568#   5569    5581#   5582    5584    5587#   5588#   5589#   5992#   564P#   564R#
                    5649#   5958#   5651#   5688    5695#   5699    57P2    5783#   5784#   5754#   576P#   5763    5765
                    5767    5769    5771#   5776    5778#   5779#   5781#   5783    5785#   5786#   5787#   5788    5829#
                    5838#   5841    5843    5851#   5947#   5948    5952#   5951#   5955#   5961#   5962#   5964    5965#
                    5967#   5978#   5979    5989    6084#   6012#   6P13#   6014#   6015#   6P16#   6046#   6047#   6048#
                    6049#   6058    6058#   6062#   6365#   6869#   6103    6105    6117    6119    6125#
R5      =%3P0P5      983#    1911#   192P#   1532#   1537#   1548#   1563#   1574#   1581#   1594#   1628#   1654#   1719#
                    1747#   1763#   1768#   1824#   1833#   1845#   185P#   1861#   1876#   1887#   1894#   1987#   1941#
                    1967#   2032#   2068#   2076#   2081#   2123#   2127#   2139#   2159#   2168#   2172#   2179#   2191#
                    2211#   2241#   2258#   2279#   2292#   231P#   2338#   2347#   2381#   2432#   2441#   2462#   2498#
                    2581#   2911#   2934#   2939#   2959#   2961#   2973#   2985#   2726#   2743#   2762#   2886#   2839#
                    2856#   2861#   2867#   2873#   2895#   29P8#   29P7#   2911#   2934#   29P8#   2988#   2995#   3082#
                    3019#   3058#   3058#   3069#   3089#   3104#   3123#   3155#   3177#   3349#   3355#   3367#   3398#
                    3411#   3428#   3438#   3444#   3474#   348P#   3491#   3499#   3587#   3912#   3931#   3575#   3581#
                    3617#   3635#   3643#   3675#   37B8#   37B6#   3743#   3976    3984#   4014    4022    4033#   4351
                    4446#   5208#   5238    5231    5935    5237    5238#   5525#   5618#   5639#   5688#   5757#   5759#
                    5771    5799#   5888#   5881#   5882    5884    5837    5838    5854    5868    5869    5877#   5879#
                    5888    5911    5933#   5935#   5937#   5938#   5939#   5948#   5941    5942#   5945    5946    5948
                    5958    5962    5988    6085#   60P8#   6026#   6P39#   6052#   6072#   6083#   6097#   6127#
R6      =%3P3P6      985#    1183    1121#   4257#   4458#   4259#   4268    4263#   4264#   4265#   4266#   4267
S       = %0P001    1467#
SAVDFV  P27584      4788#
SAVRG = 184003       923#    1102
SAVP6   P016P6      1183#   1121    1139#
SBYTE   P31156      5208    5229#   5236
SCALD:  P27554      4815#   5858    5872
SCB     P23484      3979#   3988#   3981
SCB1    P23446      3992#   3993#   3994
SCB8    P12022      2555#   2558#   2557
SCHAR   %32233      5478#   5471#   5472    5477
SCOPE = 184400       832#   1473    1995    2567    3255    3833
SCOPEA  P25872      4286    4299#
SCOPEB  P25846      4284    4293#
SCOPEC  P24754       949    4279#
SCOPEF  P25182      4287#   4288    4295#   4298#
SCOPEG  P25866      4289    4294#
SCOPEH  P25812      4276    4281    4283#
SCP1    P04824      1476    1477#
SCP2    P05476      1798    1799#
SCP3    P12072      2578    2571#
SCP4    P17038      3258    3259#
SCP5    P22543      3836    3837#
SDAPG   P3P324      5029#   5038    5043#   5245#
SDXCR   P24286      4132#   4137#   4138
SDXES   P24242      4143#   4144
SELI  = %0P3P0      736#
SELO  = %2P0P0       724#   1185    1598    1591    1596    1599    1782    1983    1984    1989    1912    2032    3326
                    3948    3951    3963
SELRST= %2P000       671#    674
```


H11

```
SEL.DO  022544          3858#  3938
SEL.IS  023254          3958#
SEL.X   023022          3858   3919#
SENRV1  022642          3877#  3878   3881
SENRV2  022782          3888#  3889   3892
SENSEC= 000004           858#  4944
SESW  = 001003           881#
SM    = 000103           872#  3928
SMIP    037100          2188#  2189*  2118   2114
SND     021203          3591#  3592*  3593
SND2    022104          3717#  3718*  3719
SOSIEN= 000004           768#
SP    =%000006           986#   958*   967*   968*   972*   998*  1137  3241*  3886*  3858*  3864*  3918   3988
                        3998*  3997   4008*  4003   4021*  4024  4061*  4062*  4068   4069   4075*  4076*  4084
                        4085   4258*  4291   4292   4494   4314*  4317  4319*  4322   4324*  4327   4329*  4337
                        4355   4358*  4361   4367*  4378   4373*  4376  4382   4385*  4388   4449*  4508*  4514*
                        4714*  4717   5006*  5007   5028   5047*  5058  5122*  5244*  5245*  5246*  5273   5274
                        5275   5318*  5317*  5343   5344   5526#  556F*  5561   5619   573F*  5734   5735   5836*
                        5839   5843*  5851   589F*  5891*  5924   5925  5985   5986   5987*  5988*  5989*  599F*
                        5991*  5992*  5993*  5994   5199   6008   6001  6002   6003   6004   6005   6006*  6007*
                        6064*  6067*  6076
SPACE   036255          4025   4401   6226#
SPAC4   036246          439A   6226#
SPWS    023376          3977#  3981
SPWST   023434          3989#  3994
SPW     001436          1084#  1124   1494   4212   4964*  5064  5F77   5147   5148
SPW.SE  030414          1788   2562   4682   5056#
SP',0   030424          5060#  5060
SP',1   030462          1495   5072#  5086
SP',2   030466          5073#  5077
SP',3   030510          5074   5088#
SP',4   030514          5081#  5083*
SP',5   030516          5082#  5084
SP',6   030526          5079   5085#
SP',7   030552          5087   5091#
SR    = 177572           913#   987   4283   4285   4352   4362  4407  4409   4447   5366   5438
SRCCNT  027500          4786#
SRVI  = 002000           742#  2791   2994   2847   2858   2881  2884  2963   2966   3284   3887   3825   3828
                        3868   3863   3146   3149   3183   3186  3406  3409   3466   3469   3487   349F   3523
                        3526   3551   3554   3678   3673   3677  368?
SRVO  = 001000           738#  2308   2344   2349   2352   2429  2432  2862   2865   2899   2982   2985   2994
                        2997   3888   3818   3821   3824   3849  3854  3857   3868   3871   3874   3122   3125
                        3128   3429   3434   3437   3479   3485  3511  3516   3519   3642   3649   3652   3952
                        3953   3978   3971
SSTAT   027476          4785#
ST    = 177776          5528#  5553   5554*  5569*  5881*  5912*  5918*  5941*
STAI  = 000400           741#  1118   2266   2269   2924   2327   2357   2358
STALL   036261          6226#
STAMOD= 000103           711#
START   000200           954#
STKSTA= 000042           699#
STKSTB= 000002           684#
STT1    011306          2446#  2447*  2448   2451
SUPO  = 001000           729#
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SVRPC   P32?P6          5430#   5409    5411#
SVRPSW  P32010          5431#   5408    5412#
SWR     = 177573         912#   4018    4679
SYNC    = P010P0         791#   1542    1643    1661    1664    1732    1753    1953    1956    1974    1977    2043    2046
                        2115    2118    2231    2234    2254    2257    2378    2411    2414    2474    2477    2515    2518
                        2624    2627    2695    2698    2717    2728    2764    2769    2851    2854    2938    2941    2959
                        2962    2978    2973    3152    3153    3165    3171    3199    3202    3322    3325    3389    3392
                        3566    3569    3628    3603    3666    3669    3681    3684    3726    3729
SYSRST# P1F0P8           872#    874
S1      = P22540        1478#   1988#   2572#   3260#   3838#
TD      = P35622        6221#   6226
TDAT    P3F332          5831#   5839#   5839#
TDXBA   P01416          1872#
TDXCA   P01418          1869#
TDXCB   P01424          1875#
TDXCS   P01412          1878#
TDXDS   P01406          1868#
TDXES   P01432          1877#
TDXES1  P01432          1876#
TDXM1   P01422          1874#
TDXMD   P01428          1873#
TDXWD   P01426          1876#
TDXDS   P01414          1871#
TERPC   P25220          2578#   3272#   4329#   4328
TESTAB# P25120          1467#   1478#   1888#   2572#   3260#   3838#
TEVAC   P26710          2859#
TEJ     P11704          2533#
TIMDIS# P2P010           789#   4187    4223    5151    5152    5557
TIMS1   P23666          4837#
TIOC    = P02400         854#   4848
TI'.J   P23040          3921#
TKB     P01400          1861#   4277    4512    5352    5353    5469
TKS     P01376          1860#   4279    4513#   5350
TMP     P27450          4783#
TPB     P01404          1863#   5353#   5388#   5477#
TPS     P01402          1862#   5360    5378
TRACER# 104002           922#   3878    3874    3883    3894    3987
TRAINT  P23024          2575    3269    3919#
TRC     P36626          4318    6228#
TRC1    P36574          4313    6228#
TRC1    P36726          4323    6228#
TRC2    P36750          4328    6228#
TRF     = P00003        4972    5536#   5786    6186
TSSF    = P04000         887#   1589    1513    1822    1826    2556    2613    2616    3387    3318    4837    4848
TSSFT   P27506          4789#
TSTABL  P25106          1467    4388#   4751    4753
TST1    P04000          1473#   1478    3897    4299    4979
TST2    P05452          1795#   1888
TST3    P12046          2567#   2572
TST4    P17004          3255#   3268
TST5    P22514          3833#   3938
TS1     = P04000         808#    813     815     817     819     821     823     825     827
TS2     = P08000         809#    814     816     818     820     822     824     826     828
TT      P01440          1888#   2369    2445    3866    3899    3984    4063    4077    4191    4933    4965#   4966#   4995
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                    5085    5193
TTCA     #37017     4337    6226#
TTDS     #36772     4335    6226#
TTNDX    #01358     184F#   2389    2415    2628    2631    3318    3321    3981    4192
TTRACE   #23818     3865    3989#   4191*   4933*   5198*
TTS-CU   #23828     3882*   3993*   3913#   433F
TTY-DX   #01434     1F79#
TTWAS    #23816     3881*   3892*   3912#   4325
TTY    *XF00F5       984#   4388    4881*   4F83*   4321    4822*   4F24*   4314    4315*   4317*   4319    4328*   4322*
                    4324    4329*   4327*   4329    4338*   4332*   4358    4359*   4361*   4367    4368*   4378*   4373
                    4374*   4376*   4385    4386*   4388*   4399*   4482*   4714    4715*   4717*   5368    5369*   537#
                    5372    5374    5376    5388    5382*   5383    5384*   5386*   5389*   5449*   5447*   5449*
TTYFLG   #31684     5354    5359#   5388    5476
TTYI     #32224     4584    5469#
TTYIP    #32268     5473    5478#
TTYERO   #24816     4874#   4193    5158
TTYI     #24832     4879#   4883
TTY-CLR  #38274     4683    4994#
TTY-TRA  #22682     3862#
TTY-T0   #22712     3891#
TTY-T1   #22752     3898    3988#
TTY-T2   #22762     3988*   3982#   3983*   3984*   3985
TYPE   * #00004       989#   1138    3996    482F    4F29    4313    4318    4323    4328    4335    4337    4354    4366
                    4371    4381    4389    4396    4398    4481    4411    4586    4588    4516    4529    4542    4551
                    4568    4569    4587    4589    4685    4614    4618    4649    4658    4656    467F    4694    4712
                    4713    5889    5121    527F    534F    5463    5474
T-ACCE   #31438      925    5314#
T-ERRO   #25352      92F    4343#
T-KEY-   #31552      926    5349#
T-MAPE   #25286      921    4386#
T-PARI   #38328      927    5827#
T-PCH1   #32428      928    5385#
T-PCH2   #32444      929    5388#
T-PCH3   #32478      938    5511#
T-RSTR   #32812      924    5414#
T-SAVR   #31758      923    5488#
T-TRAC   #25222      922    4311#
UC     * #00002      878#   4969    487F    4871    4872    4873    4874    4879    4876    4877    4878    4879    5298
                    5299    5388    5381    5382    5383    5384    5385    5493    5494    5495    5496    5497    5498
                    5499    5988    5581    5582
UCHECK* 000002       716#
UCHKS  * #02003      675#
UEXCEP* 00F0F1       717#
UNREAD   #06216     1919    1926#
VLUMEX   #26628     4681#   4682*   4683    4624
WRITEC* 03F0F1       859#   3268    4841
XBA    * #00038      788#
X1S      #26674     4617    4621#
YESRTI   #34414      973*   5899#
ZEROTT   #23766     4868#   4189    5157
ZNPRC    #22474     3293    3823#
ZTT1     #24002     4865#   4867
.      * 037044      667#    928#    921#    922#    923#    924#    925#    926#    927#    928#    929#    938#    936#
                     939#    942#    945#    948#    I52#    956#    118F    1I1I    1114    112F*   1129    1143#    115#
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1685   1689   1729   1726   1731   1736   1742   1751   1755   1779   1889#  1813   1827
1843   1859   1864   1868   1872   1885   1892   1909   1918   1921   1927   1935   1949
1954   1961   1975   1979   1982   1991   1998   2202   2322   2339   2844   2849   2855
2864   2869   2892   2101   2105   2111   2116   2137   2144   2151   2155   2164   2182
2189   2194   2205   2205   2216   222F   2224   2228   2232   2237   2246   2259   2261
2267   2271   2275   2284   2488   2301   2304   2308   2315   2321   2329   235F   2354
2362   2366   2378   2376   2379   2398   2402   2408   2412   2417   2421   2425   2437
2449   2467   2471   2475   2479   2483   2495   2516   2528   2524   2528   2544   254A
2551   2558   2572#  2578   2585   259F   2597   2604   2611   2617   2621   2625   2629
2633   2637   2641   2645   2651   2666   268F   2684   2688   2692   2696   27BE   271F
2714   2718   2722   2731   2735   2742   2746   2752   2754   2758   2767   2772   2778
2782   2788   2792   2796   2881   2812   2816   2828   2824   2836   2844   2848   2852
2878   2882   2886   2891   2983   2914   2918   2938   2939   2943   2947   2952   2956
2968   2964   2971   2975   2:8F   2984   2991   2998   3185   3889   3814   3822   3826
3838   3841   3845   3855   3861   3865   3872   3876   3888   3885   3892   3896   3188
3187   3119   3126   3138   3135   3139   3143   3147   3151   3161   3165   3169   3173
3188   3184   3188   3192   3196   3288   3284   3288   3213   3222   3227   3231   3234
3237   3268#  3265   3272   3278   3283   3292   3298   3385   3311   3315   3319   3323
3327   3331   3335   3339   3345   336F   3374   3378   3382   3386   339F   3394   3483
3487   3423   3435   3439   3458   3454   3458   3463   3467   3483   3488   3582   3517
3524   3536   3548   3544   3548   3552   3557   3567   3588   3594   3598   3681   3685
3689   3613   3628   3624   3628   3632   3639   3646   3658   3655   3659   3663   3667
3671   3678   3682   3688   3692   3696   3714   3728   3724   3727   3731   3735   3739
3746   3753   3757   3761   3765   3796   38BF   3884   3838#  3852   3856   3869   3873
3986   3927   3982   4211#  4041   4883   4F9A   4182   4186   411F   4114   4118   4122
4129   4148   4146   4153   4182   4193   4236   4272#  4381#  5149   5153   5293#  5351
5379   5394#  5435   5452   5459   546F   5481#  5483#  5485   5583#  5586#  5589#  5512#
5529   5538.  5548#  5683   6332   6836   6F81   6888   6158#  6176   6184   619F   6191#
6211#  6213#  6215#  6216#  6321   6222#  6226#

.CAR    231734   5384   5394#
.CRLF   231676   5377   5382#
.IOT    231614    948   5366#
.IOTE   231724   5367   5398#
.MORE   231634   5378#  5381   5385   5387
.QUES   236243   5278   5348   6226#
.REST   231718   5375   5386#
.SAV    231732   5368•  5389   5393#
.TERM   231714   5371   5373   5388#
.TYPE   231746   5397#
.1ST    213752   2827•  2829#  2838   2831•  2835
.1ST1   213778   2833#  2834•  2835
.2ST    214508   2921•  2923#  2924   2925•  2929
.2ST1   214516   2927#  2928•  2929
.3ST    215348   3832•  3834#  3839   3836•  3348
.3ST1   215356   3838#  3839•  3848
.4ST    216816   3118•  3112#  3113   3114•  3118
.4ST1   216834   3116#  3117•  3118
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ACPTOM    2#  5313
ASCICM    2#  5347
CHECK   667#  1523  1548  1566  1616  1632  1650  1721  1767  1765  1773  1836  1853  1879  1929
        1943  1969  2034  2273  2878  2283  2129  2129  2141  2161  2213  2243  2252  2281  2312
        2334  2357  2383  2434  2443  2464  2492  2583  2513  2536  2657  2663  2675  2787  2728
        2764  2888  2841  2563  287F  2875  2897  2929  2936  3F52  3157  3351  3357  3369  348F
        3414  3432  3446  3476  3514  3533  3577  3583  3762  3788
CHECKF  667#
CINITM    2#  1467
CKREGM    2#  4887
CLEAR   667#
CLKCHK  667#
CLOCK   667#  1511  1528  1532  1537  1548  1563  1574  1581  1594  1628  1654  1719  1747  1763
        1768  1824  1833  1949  185F  1861  1876  1887  1894  1987  1941  1967  2032  2F6F  2F76
        2F81  2123  2127  2139  2159  2168  2172  2179  2191  2211  2241  225F  2279  2292  2318
        233F  2347  2381  2432  2441  2462  2498  2581  2511  2533  2539  2659  2661  2673  2784
        2726  2743  2762  2886  2839  2856  2861  2867  2873  2899  2988  2987  2911  2934  2968
        298R  2995  3002  3319  3358  3F58  3369  3389  3184  3123  3155  3177  3349  3359  3367
        3398  3413  3428  3438  3444  3474  3488  3491  3499  3587  3512  3531  3575  3581  3617
        3635  3643  3675  3788  3786  3743
CLRSJB  667#
COPYRI    2#  619
DEPINE  567#  928  921  922  923  924  929  926  927  928  929  938
DSYB      2#  1468
DSYM      2#  5483
DUMP    667#  488F  4821  4319  4324  4329  4358  4373  4389  4714
DXBITS    2#  667
DXDOC     2#
DXREG     2#  994
EDCOD     2#  4253
EDEF      2#  915
EOYS      2#  3828
ERCALL  667#  1188  1111  1114  1588  1514  153F  1546  1591  1555  1559  1572  1577  1592  1597
        168R  1614  1622  1636  1641  1648  1962  1666  1669  1678  1685  1689  1789  1726  1731
        1736  1742  1751  1759  1779  1813  1827  1843  1859  1864  1868  1872  1885  1898  1985
        1918  1921  1927  1935  1949  1954  1961  1975  1979  1982  1991  1998  2882  2822  2839
        2844  2849  2855  2864  2868  2892  2181  2185  2111  2116  2137  2144  2151  2155  2164
        2182  2189  2194  2285  2288  2216  2228  2224  2228  2232  2237  2246  2255  2261  2267
        2271  2275  2284  2288  2381  2384  2388  2315  2321  2325  2358  2354  2362  2366  237F
        2376  2379  2398  2482  2488  2412  2417  2421  2425  2437  2449  2467  2471  2475  2479
        2483  2495  2516  2528  2524  2528  2544  2548  2551  2558  2585  259F  2597  2684  2611
        2617  2621  2625  2629  2633  2637  2641  2645  2651  2666  2688  2684  2688  2692  2696
        2788  2718  2714  2718  2722  2731  2735  2748  2746  2758  2754  2758  2767  2772  2778
        2782  2788  2792  2796  2881  2812  2816  282F  2824  2836  2844  2848  2852  2878  2882
        2886  2891  2983  2914  2918  293F  2939  2943  2947  2952  2956  296F  2964  2971  2975
        298F  2984  2991  2998  3885  3889  3414  3822  3826  383R  3841  3845  3855  3861  3865
        3F72  3876  3888  3885  3892  3896  3188  3187  3119  3126  3138  3135  3139  3143  3147
        3151  3161  3165  3169  3173  3188  3184  3188  3192  3196  3288  3284  3288  3213  3222
        3227  3231  3234  3237  3265  3278  3983  329F  3298  3385  3311  3315  3319  3323  3327
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M11

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ERPSW         2#    4383
ERSTOR      667#    4447
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FABISS        2#    3934
INPSW         2#    4227
LDNLW       667#
LOAD        667#    1523    1818
LODSSM        2#
MACDEF        2#     667
MCISS         2#    1797
MCLKIC        2#
MCRT          2#    2563
MCSUB         2#    4012
MCWT          2#    3251
MISCDE        2#     838
MMAC1         2#    0217
MONMAC        2#    4491
NCISS         2#
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ODM           2#    5428
ODTMAC        2#    5513
PAM           2#    5524
PFM           2#    1895
PMSSJB        2#    3973
PRTVM         2#    5089
REMOV       667#
RESTOR      667#    3917    4068    4084    5027
RRM           2#    4176
RSRW          2#    5398
SAVE        667#    3864    4062    4074    5035
SCOPEL      667#    4273
SCOPEM      667#    1469    1791    2563    3251    3329
SDUMP       667#    4314    4367
SHORT       667#
SNAPSH      667#
SPWN        667#    1156    1175    1194    1213    1232    1251    1270    1289    1308    1327    1346    1365    1384    1403
            1422    1441
SPWNM       667#    1156    1175    1194    1213    1232    1251    1270    1289    1308    1327    1346    1365    1384    1403
            1422    1441
SS          667#    2574    3208
STEPTS      667#
STRTW         2#     931
S.D           2#    3849
TABLES        2#    1148
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TTYE          2#    3859
TYPW          2#    5363
VPSWCP        2#
ZEROW         2#    4057
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ASL     1699  2812  2392  3983  4573  4574  4575  4576  4577  475F  5263  5263  5264  5265  5266
        5334  9335  5336  5588  5689  5448  5649  565F  5661  5754  5759  5865  5879
ASL@    1785  9835  5839
ASR     5784  9757  5885  5977  5973
BCS     1786  9785  5758  5586  5878
BEQ      98F   988  1136  1114  153F  1530  1540  1572  1592  1606  1638  1614  1622  1648  1662
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        1935  1961  1975  1979  1982  2822  2849  2355  2864  2869  2892  2181  2185  2111  2116
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B1?      987    1105    1107    1118    1529    1513    1545    155F    1594    1598    1571    1576    1591    1596    1613
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BLO     5646    6184
BLOS    4261
BL?     5286    5259    533F    5818    5986
BM1     5842    5944
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BPT     4F26    4829    4412    4419
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BVC     5F36
CCC     5864    5936
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C12

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COM             5837    5838
COMB            4627
DEC             984     1128    2391    4331    4866    4882    4579    4623    4961    5883    5181    588F    5881    5811    595F
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EMT             92F     921     922     923     924     925     926     927     92A     929     938
HALT            667     1116    3793    4437    5156
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INCB            5453    5457    5719    5919
IOT             949
JMP             954     983     986     989     992     1138    1787    3972    3686    3848    4267    4282    4293    4388    4456
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MOV             958     959     964     965     966     968     97F     973     974     998     991     118F    1184    1121    1123
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TD12-

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NOP             1128    3827    4726    4727    4728    5191
RESET           4511    4723
ROL             4263    5445    5447    5449    5695    6867    6368
ROLB            5446    5448    5458
RORB            5566    5567    5568    5937    5938    5939    594F
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                5895    5896
RTS             3826    3911    3931    3954    3972    3984    4889    4833    4843    4855    4878    4886    4159    4197    4224
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RTT             969
SUB             3999    4258    4357    4384    4739    5592    5748    5799    6861
SWAB            3592    3718    6863
TRAP            832
TST             979     2527    2557    3238    3497    3578    3868    3872    3875    4816    4879    4291    4379    4512    4547
                4556    4562    4571    4618    4652    4974    5141    5875    5F88    5124    5237    5619    5624    5697    572F
                5745    5755    5761    5767    5774    5788    5797    5825    5834    5852    5874    5987    5989    5945    5994
                5999    6874    6112
TSTB            2365    3482    3637    3649    3653    3947    3949    4192    4275    5359    5368    5372    5378    5451    5454
```

```
            5723    5885    5905    5916    5928    5931    5943    6031    6P3?    6244    6088    6P87
WAIT        3225    3792
.ABS           2
.ASCII      5308    5394    6226
.ASCIZ      114?    4?86    4534    5128    5482    6226
.BLKW       1464    4272    5506    5589    5512
.BYTE       3245    3246    3247    3248    4864    4865    4866    4867    4?6?    4869    4873    4871    4872    4873    4874
            4875    4876    4877    4878    4879    4988    4989    4913    4911    4912    4913    4914    4915    4916    4917
            4918    4919    492?    4921    4922    4923    5298    5299    53??    5381    5382    5383    5384    5385    531?
            5432    5487    5488    5489    549?    5491    5493    5494    549?    5496    5497    5498    5499    55??    5581
            5502    6135    6137    6142    6143    6146    6147    6148    6153    6154    6155    6157    6158    6159    616?
            6161    6162    6163    6164    6165    6166    6167    6168    6169    617?    6171    6172    6173    6174    6175
            617?    6179    618?    6181    6182    6183
.ENABL         2
.END        6227
.ENDC          9      15     143     339     372     647     923     994    1?94    1144    1152    1467    1791    1889    2?89
            2?95    2176    2177    2211    2296    2324    3921    3947    4343    4372    4427    4438    4442    4681    4783
            4935    4976    5087    5192    524?    5306    5493    5583    6223    6226
.EVEN       1143    4011    4538    5133    5396    5481    5583    615?    6185
.IF            9      15     143     339     365     372     645     647     921     994    1894    1139    1152    1467    1791
            2?89    2176    2197    2223    2296    2323    2324    3921    3947    4385    4372    4489    444?    4681    4783
            4934    4967    5087    5192    524?    5288    5493    6221    6226
.IFF        6226
.IFT        6226
.IRP        3864    3913    4861    4868    4875    4884    4346    4441    5?86    5887
.LIST          2      34     616     867     928     921     922     923     924     925     926     927     928     929     93?
            1175    1194    1213    1232    1251    1272    1289    1388    1327    1346    1365    1384    1483    1422    1441
            1462    1467    1478    1678    1792    188?    2?64    2572    3252    3262    3832    3838    6226
.MACRO       667
.MCALL         2
.NLIST         2      34     667     928     921     922     923     924     925     926     927     928     929     93?    1175
            1194    1213    1232    1251    1272    1289    1388    1327    1346    1365    1384    1483    1422    1441    146?
            1467    1472    1478    1792    188?    2564    2572    3252    326?    3832    3838    6226
.PAGE          2      34     666    147?    1992    2564    3252    383?    3849
.REM           2       9      15      34     143     339     365     372     62?    148?    1881    3848    4288    4638
.REPT        667    1156    1159    1178    1197    1216    1235    1254    1273    1292    1311    133?    1349    1368    1387
            1486    1425    1444    4797    4817    4846    4887    4988    52?8    5493
.SBTTL       632     667     83?     932     995    1895    1149    1461    147?    1792    2564    3252    3838    4492    4756
            4989    5363    5398    5428    5514    6218
.TITLE         2
.WORD       3811    3812    3813    3814    3817    3818    3819    382?    4797    4798    4799    488?    4881    4882    4883
            4884    4885    4886    4887    4888    4889    4818    4811    4812    4813    4817    4818    4819    4828    4821
            4822    4823    4824    4825    4826    4827    4828    4829    483?    4831    4832    4833    4887    4888    4889
            489?    4891    4892    4893    4894    4895    4896    4897    489?    4899    4988    4981    4982    5389    543?
            6134    6151
```

ERRORS DETECTED: 0

*MCLK2,MCLK2/SOL/CRF*MCLK2,P11
RUN-TIME: 173 47 10 SECONDS
CORE USED: 5PK