IDENTIFICATION

PRODUCT CODE: AC-E833F-MC

PRODUCT NAME: CXCBCF0 CB11-HA MODULE

PRODUCT DATE: SEPTEMBER 1978

MAINTAINER: DEC/X11 SUPPORT GROUP

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                        1.      ABSTRACT
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                        CBC IS AN IOMOD THAT WILL EXERCISE UP TO "16" (DECIMAL)
                        CB11-HA INTERRUPT MODULES HAVING CONTIGUOUS UNIBUS -
                        ADDRESSES. NON-CONTIGUOUS GROUPS OF INTERRUPT MODULES
                        MAY BE EXERCISED BY CONFIGURING A CBC MODULE
                        FOR EACH GROUP. THE MODULE SIMPLY TESTS THE ABILITY
                        OF THE MAINTENANCE TRANSITION ENABLE BIT #13 OF THE
                        CONTROL AND STATUS REGISTER TO ACTIVATE AND DEACTIVATE
                        ALL THE TRANSITION STATE REGISTERS SELECTED FOR TEST.
                        IF ANY LINES FAIL TO SET OR CLEAR PROPERLY THE ERROR IS
                        REPORTED VIA THE CONSOLE TTY. NOTE RESTRICTIONS (ITEM #6)

                        2.      REQUIREMENTS
                                ------------

                        HARDWARE:       A CB11 INTERFACE WITH AT LEAST ONE INTERRUPT
                                        MODULE.

                        STORAGE:: CBC REQUIRES:
                                        1. DECIMAL WORDS: 433
                                        2. OCTAL WORDS: 0661
                                        3. OCTAL BYTES: 1542

                        3.      PASS DEFINITION:
                                ----------------

                        EACH PASS OF CBC RESULTS IN 20 ITERATIONS
                        OF THE BASIC TEST SEQUENCE WHICH CLEARS AND SETS ALL
                        TRANSITION STATE REGISTERS SELECTED FOR TEST THRU ALL
                        DATA PERMUTATIONS WITHIN THE DATA TABLE.

                        4.      EXECUTION TIME
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                        CBC RUNNING ALONE ON A PDP 11/05 SYSTEM WITH ONE
                        INTERRUPT MODULE TAKES LESS THAN 60 SECONDS TO COMPLETE
                        ONE PASS.

                        NOTE:
                        -----
                                ALL DEVICES SELECTED FOR TEST MUST RESPOND IN
                                REAL TIME. FAILURE TO RESPOND WILL RESULT IN
                                ERROR REPORTS.

                        5.      CONFIGURATION PARAMETERS
                                ------------------------

                        DEFAULT PARAMETERS:
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                        DVADR:  164000
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                        VECTOR: (FUNCTION OF DEVICE RESPONSE)
                        BR1:    7

                        REQUIRED PARAMETERS:
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                        FOR EACH COPY OF CBC CONFIGURED THE USER MUST SPECIFY:

                        DEVADR: THE FIRST ADDRESS OF THE FIRST INTERRUPT MODULE
                                REGISTER IN A CONTIGUOUS GROUP.

                        NOTE:
                        -----

                        "VCTR:" THE DEVICE VECTOR ADDRESS IS SWITCH SELECTABLE
                        AND SUPPLIED BY THE DEVICE(S). A VECTOR ADDRESS IS EXPECTED
                        TO BE IN THE 100 THRU 774 (OCTAL) RANGE.

                        BR1:    THE DEVICE PRIORITY (BUS REQUEST) LEVEL FOR
                                "ALL" DEVICES TO BE TESTED BY THIS MODULE.
                                I.E. MUST BE SET TO HIGHEST BR LEVEL WITHIN
                                THE CURRENT GROUP OF DEVICES SELECTED FOR TEST.


                        DVID1:  A BIT MAP ENTRY OF (CONTIGIOUS) DEVICES SELECTED
                                FOR THE CURRENT TEST SEQUENCE.
                                DEFAULT VALUE = 1 I.E. TEST DEVICE 0
                                TO TEST ADDITIONAL DEVICES:
                                MAP VALUE = 000006
                                BIT 1 = 1 TEST DEVICE 1 (DVADR +10)
                                BIT 2 = 1 TEST DEVICE 2 (DVADR +20)
                                ETC.

                6.      DEVICE OPTION SETUP
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                        RESTRICTION:
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                        ALL EXTERNAL LINES ENTERING THE INTERRUPT MODULE
                        INPUTS FROM THE REAL WORLD (USER INTERFACE) MUST
                        BE DISCONNECTED.

                        ALL DEVICE ADDRESSES SHOULD FALL INTO THE
                        164000 THRU 167770 (OCTAL) RANGE. ALL DEVICE
                        VECTOR ADDRESSES SHOULD FALL INTO THE 100 THRU
                        774 (OCTAL) RANGE.


                7.      MODULE OPERATION
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                        TEST SEQUENCE

                        A.  SET UP THE PASS COUNTER FOR 20 ITERATIONS.
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B. GET DVID1 TO FIND OUT HOW MANY INTERRUPT MODULES TO TEST.

C. SET ASSOCIATED TRANSITION ENABLE REGISTER TO CURRENT DATA CONFIGURATION VERIFY RESULTS (ALL TEST DEVICES).

D. SET ASSOCIATED CONTROL AND STATUS REGISTER BIT(S) 14,13
VERIFY RESULTS. (ALL TEST DEVICES).
TOGGLE - (NEG)

E. DELAY LONG ENOUGH FOR INPUT DELAY NETWORK
6.4 MILLISECONDS OR LONGER.

F. CLEAR ASSOCIATED CONTROL AND STATUS REGISTER BIT#13
VERIFY RESULTS. (ALL TEST DEVICES).
TOGGLE + (POS)

G. DELAY LONG ENOUGH FOR INPUT DELAY NETWORK
6.4 MILLISECONDS OR LONGER.

H. VERIFY TRANSITION STATE REGISTER RESULTS

I. CLEAR ASSOCIATED TRANSITION ENABLE REGISTER.
VERIFY RESULTS. (ALL TEST DEVICES).

J. MODIFY DATA INDEX TO NEXT PATTERN.

K. REPEATE ITEMS "C" THRU "J" FOR ALL DATA
ENTRIES IN CONTROL DATA BUFFER.
L. REPEAT ITEMS "D." THRU "K." 20 TIMES.

M. REPORT END OF PASS, RESTART AT "A.".

8. SUBROUTINES

BRK: TIMER TO PREVENT CONTROL AND STATUS
REGISTER BIT#13 MAINTENANCE TRANSITION
TOGGLING DURING TRANSITION DELAY INTERVAL
(6.4 MILLISECONDS OR LONGER).

9. OPERATION OPTIONS

A. THE USER CAN MODIFY THE FOLLOWING LOCATIONS TO
ALTER CONFIGURATION (TEST) REQUIREMENTS:

NOTE:
IT IS THE USERS RESPONSIBILITY TO ENTER
THE CORRECT VALUES ASSOCIATED WITH EACH
DEVICE. CAREFUL SELECTION CANNOT BE OVER
STRESSED, FOR AN ERRONEOUS SELECTION WILL
RESULT IN ERROR REPORTS.

SYMBOLIC
(LOCATION) (SIGNIFICANCE)

DVADR: THE ADDRESS OF THE FIRST INTERRUPT MODULE REGISTER IN A CONTIGUOUS GROUP.

BR1: THE (BUS REQUEST) DEVICE PRIORITY LEVEL FOR "ALL" DEVICES TO BE TESTED BY THIS MODULE.

DVID1: A BIT MAP SELECTION OF DEVICES SELECTED FOR TESTING IN THE CURRENT TEST CYCLE.

10. NON-STANDARD PRINTOUTS

NONE: ALL PRINTOUTS HAVE THE STANDARD DEC/X11 FORMATS.

```
                        000062                  SPSIZ = 50.
                                                ;       CR11-HA EXERCISER MODULE
                                                        IOMOD   <CBCF >,164000,774,7,,,100.,,35
                                                        MODULE  140000,CBCF ,164000,774,7,,,100.,,35
                                                        .TITLE  CBCF DEC/X11 SYSTEM EXERCISER MODULE
                                                ;       DDXCOM  VERSION  6      23-MAY-78
                                                        .LIST   MIN
                                                ;*****************************************************************************
000000'                                         BEGIN:
000000' 041103  043103      040                 MODNAM: .ASCII  /CBCF / ;MODULE NAME.
000005'     000                                 XFLAG:  .BYTE   0PEN            ;USED TO KEEP TRACK OF WBUFF USAGE
000006' 164000                                  ADDR:   164000+0                ;1ST DEVICE ADDR.
000010' 000774                                  VECTOR: 774+0                   ;1ST DEVICE VECTOR.
000012'     340                                 BR1:    .BYTE   PRTY7+0         ;1ST BR LEVEL.
000013'     000                                 BR2:    .BYTE   PRTY+0          ;2ND BR LEVEL.
000014' 000001                                  DVID1:  +1                      ;DEVICE INDICATOR 1.
000016' 000000                                  SR1:    OPEN                    ;SWITCH REGISTER 1
000020' 000000                                  SR2:    OPEN                    ;SWITCH REGISTER 2
000022' 000000                                  SR3:    OPEN                    ;SWITCH REGISTER 3
000024' 000000                                  SR4:    OPEN                    ;SWITCH REGISTER 4
                                                ;*****************************************************************************
000026' 140000                                  STAT:   140000                  ;STATUS WORD.
000030' 000270'                                 INIT:   START                   ;MODULE START ADDR.
000032' 000270'                                 SPOINT: MODSP                   ;MODULE STACK POINTER.
000034' 000000                                  PASCNT: 0                       ;PASS COUNTER.
000036' 000144                                  ICONT:  100.                    ;# OF ITERATIONS PER PASS=100.
000040' 000000                                  ICOUNT: 0                       ;LOC TO COUNT ITERATIONS
000042' 000000                                  SOFCNT: 0                       ;LOC TO SAVE TOTAL SOFT ERRORS
000044' 000000                                  HRDCNT: 0                       ;LOC TO SAVE TOTAL HARD ERRORS
000046' 000000                                  SOFPAS: 0                       ;LOC TO SAVE SOFT ERRORS PER PASS
000050' 000000                                  HRDPAS: 0                       ;LOC TO SAVE HARD ERRORS PER PASS
000052' 000000                                  SYSCNT: 0                       ;# OF SYS ERRORS ACCUMULATED
000054' 000000                                  RANNUM: 0                       ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
000056'                                         CONFIG:                         ;RESERVED FOR MONITOR USE
000056' 000000                                  RES1:   0                       ;RESERVED FOR MONITOR USE
000060' 000000                                  RES2:   0                       ;RESERVED FOR MONITOR USE
000062' 000000                                  SVR0:   OPEN                    ;LOC TO SAVE R0.
000064' 000000                                  SVR1:   OPEN                    ;LOC TO SAVE R1.
000066' 000000                                  SVR2:   OPEN                    ;LOC TO SAVE R2.
000070' 000000                                  SVR3:   OPEN                    ;LOC TO SAVE R3.
000072' 000000                                  SVR4:   OPEN                    ;LOC TO SAVE R4.
000074' 000000                                  SVR5:   OPEN                    ;LOC TO SAVE R5.
000076' 000000                                  SVR6:   OPEN                    ;LOC TO SAVE R6.
000100' 000000                                  CSRA:   OPEN                    ;ADDR OF CURRENT CSR.
000102'                                         SBADR:                          ;ADDR OF GOOD DATA, OR
000102' 000000                                  ACSR:   OPEN                    ;CONTENTS OF CSR.
000104'                                         WASADR:                         ;ADDR OF BAD DATA, OR
000104' 000000                                  ASTAT:  OPEN                    ;STATUS REG CONTENTS.
000106'                                         ERRTYP:                         ;TYPE OF ERROR
000106' 000000                                  ASBS:   OPEN                    ;EXPECTED DATA.
000110' 000000                                  AWAS:   OPEN                    ;ACTUAL DATA.
000112' 000354'                                 RSTRT:  RESTRT                  ;RESTART ADDRESS AFTER END OF PASS
000114' 000000                                  WDTO:   OPEN                    ;WORDS TO MEMORY PER ITERATION
000116' 000000                                  WDFR:   OPEN                    ;WORDS FROM MEMORY PER ITERATION
000120' 000000                                  INTR:   OPEN                    ;# OF INTERRUPTS PER ITERATION
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000122' 000035                                  IDNUM:  35                      ;MODULE IDENTIFICATION NUMBER=35
        000062                                          .REPT   SPSIZ           ;MODULE STACK STARTS HERE.
                                                        .NLIST
                                                        .WORD   0
                                                        .LIST
                                                        .ENDR
000270'                                         MODSP:
                                                ;*****************************************************************************
                                                ;*****************************************************************
                                                ;       ********* MODULE INITIALIZATION *********
                                                ;*****************************************************************
000270' 012767  000002  177622                  START:  MOV     #2,INTR         ;AT LEAST 2 INTERRUPTS/ITERATION
000276' 012767  000001  177610                          MOV     #1,WDTO         ;AT LEAST 2 WORDS TO MEM/ITERATION
000304' 012767  000001  177604                          MOV     #1,WDFR         ;AT LEAST 2 WORDS FROM MEM/ITERATION
000312' 016700  177476                                  MOV     DVID1,R0        ;SET DVC TO R0
000316' 001002                                          BNE     1S              ;IF SET UP OK - BRANCH
000320' 104410  000000'                                 ENDS,BEGIN              ;
000324' 006200                                  1S:     ASR     R0              ;ANY LEFT ?
000326' 001412                                          BEQ     RESTRT          ;NO - BRANCH OUT
000330' 062767  000002  177562                          ADD     #2,INTR         ;2 MORE INTERRUPTS/ITERATION
000336' 062767  000001  177550                          ADD     #1,WDTO         ;1 MORE WORD TO MEM
000344' 062767  000001  177544                          ADD     #1,WDFR         ;1 MORE WORD FROM MEM
000352' 000764                                          BR      1S              ;GO CHECK FOR MORE
000354' 016706  177452                  RESTRT: MOV     SPOINT,R6               ;SET UP STACK
                                                ;                               ;NONE    DROP MODULE EXECUTION
000360' 012767  000016  001024          1S:     MOV     #16,SCNT                ;SCAN COUNT=16.
000366' 016767  177422  001004                  MOV     DVID1,BLOCK             ;RECORD SELECTED ACTIVITY
000374' 016702  177406                          MOV     ADDR,R2                 ;DEVICE ADDRESS
000400' 016705  177410                          MOV     DVID1,R5                ;DEVICE ACTIVITY
000404' 012746  177777                          MOV     #-1,-(SP)               ;DELIMIT
000410' 005046                                  CLR     -(SP)                   ;DELIMIT CONTROL SCAN
000412' 005046                                  CLR     -(SP)
000414' 005067  000754                          CLR     DECNT                   ;INIT DEVICE COUNT
000420' 005016                          L00:    CLR     (SP)                    ;INIT CURRENT CONTROL SCAN DELIMIT
000422' 006005                                  ROR     R5                      ;ACTIVITY TO "C" AND TEST
000424' 103041                                  BCC     L04                     ;(NONE) BRANCHES
000426' 010216                                  MOV     R2,(SP)                 ;CONTROL ENTRY
000430' 010667  000750                          MOV     SP,CNTLX                ;SCAN ADDRESS
000434' 005012                                  CLR     (R2)                    ;CLR CSR REG
000436' 005062  000006                          CLR     6(R2)                   ;CLR TER REG
000442' 005762  000004                          TST     4(R2)                   ;CLR TSR REG

                                                ;       DEVICE VECTOR ASSIGNMENT CODE

000446' 011203                                  MOV     (R2),R3                 ;FETCH VECTOR RESPONSE
000450' 032703  177003                          BIT     #177003,R3              ;CHECK LEGAL FIELDS
000454' 001411                                  BEQ     L02                     ;(OK) BRANCHES
000456' 004767  000644                  L01:    JSR     PC,ERR                  ;SETUP ERROR ACSR CCSR

000462' 012767  000015  177416          L11:    MOV     #15,ERRTYP              ;WRONG VECTOR ADDRESS
                                                ;*****************************************************************
000470' 104405  000000' 000000                  ERRORS,BEGIN,NULL               ;ILLEGAL VECTOR RESPONSE
                                                ;*****************************************************************

000476' 000414                                  BR      L04                     ;DO NXT DEV
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                                ;       CSR BITS 08 THRU 00 SHOULD BE 100 THRU 774 (OCTAL)
                                ;
000500' 020327  000076          L02:    CMP     R3,#76          ;CHECK LEGAL RANGE
000504' 101764                          BLOS    L01             ;(NO) BRANCHES
                                ;
000506' 005716                          TST     (SP)            ;TEST ACTIVITY
000510' 001407                          BEQ     L04             ;(NO) BRANCHES
                                ;       LINK DEVICE VECTOR TO INTERRUPT SERVICE
                                ;       SET DEVICE PRIORITY LEVEL
000512' 012723  001152'         L03:    MOV     #MISR,(R3)+     ;LINK ISR
000516' 016713  177270                  MOV     BPL,(R3)        ;SET BR (LEVEL)
000522' 005746                          TST     -(SP)           ;ADVANCE SCAN CONTROL
000524' 005267  000644                  INC     DPCNT           ;ADVANCE ACTIVITY COUNT
000530' 062702  000010          L04:    ADD     #10,R2          ;NEXT ADDRESS > R2
000534' 005367  000652                  DEC     SCNT            ;MORE ACTIVITY
000540' 001327                          BNE     L00             ;CONTINUES
000542' 005716                          TST     (SP)            ;CHECK DYNAMIC SCAN TABLE
000544' 001401                          BEQ     1$              ;DELIMITED BRANCHES
000546' 005046                          CLR     -(SP)           ;(NO) DELIMIT
                                                                ;ACTIVITY COUNT > R0
000550' 016700  000620          1$:     MOV     DPCNT,R0
000554' 005046          L05:    CLR     -(SP)           ;INITIALIZE FLOATING
000556' 005300                  DEC     R0              ;DATA TABLE ENTRIES
000560' 003375                  BGT     L05
                                ;
000562' 010667  000614                  MOV     SP,CNTLD        ;SET FLOATING DATA SCAN BASE
000566' 012746  177777                  MOV     #177777,-(SP)   ;SET MODULE STACK ID
000572' 012767  001414' 000572          MOV     #DTABLE,WORK    ;SET BASE DATA BUFFER SCAN ADDRESS
                                ;               INITIALIZE DEVICE TER REGISTER (S)
                                ;               I.E. SET TO CURRENT DATA CONFIGURATION
                                ;
000600' 016767  000570  000346  CONT:   MOV     DECNT,IHNGCT    ;SET INTERRUPT ANTIHANG CONTROL
000606' 016767  000562  000574          MOV     DECNT,CNTX16
000614' 006367  000570                  ASL     CNTX16
000620' 006367  000564                  ASL     CNTX16
000624' 006367  000560                  ASL     CNTX16
000630' 016701  000550                  MOV     CNTLX,R1        ;SET CONTROL SCAN BASE ADDRESSS
000634' 011102                  P10:    MOV     (R1),R2         ;FETCH ENTRY (CURRENT DEVICE ADDRESS)
000636' 001423                          BEQ     SERVC           ;BRANCH SCAN COMPLETE
000640' 016704  000526                  MOV     WORK,R4         ;CURRENT DATA BUFFER ADDRESS
000644' 011404                          MOV     (R4),R4         ;CURRENT DATA BUFFER CONTENTS
                                ;       SERVICE CURRENT DEVICE TER REGISTER
000646' 010462  000006                  MOV     R4,6(R2)        ;DATA > TER
000652' 016203  000006                  MOV     6(R2),R3        ;FETCH RESULTS
000656' 020304                          CMP     R3,R4           ;VERIFY
000660' 001410                          BEQ     P12             ;(OK) BRANCHES
000662' 004767  000440                  JSR     PC,ERR          ;SETUP ERROR ACSR
000666' 012767  000025  177212  P11:    MOV     #25,ERRTYP      ;BIT STUCK
                                ;*******************************************************************
000674' 104405  000000' 000000          HRDERS,BEGIN,NULL       ;TER REGISTER RESPONSE
                                ;*******************************************************************
                                ;
000702' 005721          P12:    TST     (R1)+           ;ADVANCE TO NEXT ENTRY
000704' 000753                  BR      P10             ;CONTINUE
```



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                                ;*******************************************************************
                                ;
                                ;       ******** MODULE DEVICE SERVICE ********
                                ;
                                ;       SERVC:
                                ;               SET DEVICE CSR REGISTER BITS 14,13 INT/ENB, MAINT/TRANS
                                ;               DELAY 6.4 MILLISECONDS MINIMUM (BREAK FOR SERVICE) -TRANSITIONS
                                ;               CLR DEVICE CSR REGISTER BIT 13 MAINT/TRANS
                                ;               DELAY 6.4 MILLISECONDS MINIMUM (BREAK FOR SERVICE) +TRANSITIONS
000706' 016701  000472          SERVC:  MOV     CNTLX,R1        ;SET SCAN BASE
000712' 011102          S10:    MOV     (R1),R2         ;DEVICE ADDRESS
000714' 001424                  BEQ     SBK1            ;TOGGLE NEXT (+)
000716' 005012                  CLR     (R2)            ;ARM INT/ENB
000720' 012704  060000          MOV     #60000,R4       ;INT/ENB, MAINT/TRANS SET
000724' 050412                  BIS     R4,(R2)         ;DEVICE SET
000726' 032712  040000          BIT     #40000,(R2)     ;VERIFY INT/ENB SET
000732' 001405                  BEQ     S11             ;(ERROR) BRANCHES
000734' 032712  020000          BIT     #20000,(R2)     ;VERIFY MAINT/TRANS SET
000740' 001010                  BNE     S12             ;(OK) BRANCHES
000742' 004767  000360          JSR     PC,ERR          ;SET UP ERROR ACSR
000746' 012767  000025  177132  S11:    MOV     #25,ERRTYP      ;BIT STUCK
                                ;*******************************************************************
000754' 104405  000000' 000000          HRDERS,BEGIN,NULL       ;CSR REGISTER RESPONSE
                                ;*******************************************************************
                                ;       INT/ENB=BIT14 OR MAINT/TRANS BIT13
000762' 005721          S12:    TST     (R1)+           ;NEXT ENTRY
000764' 000752                  BR      S10             ;CONTINUE
000766' 004767  000306  SBK1:   JSR     PC,BRK          ;STALL 6.4 MILLISECONDS MINUMUM
000772' 016701  000406          MOV     CNTLX,R1        ;NEXT SCAN
000776' 011102          S13:    MOV     (R1),R2         ;DEVICE ADDRESS
001000' 001417                  BEQ     S16             ;COMPLETED VERIFY
001002' 042712  020000          BIC     #20000,(R2)     ;DEVICE CLR
001006' 032712  020000          BIT     #20000,(R2)     ;VERIFY RESULTS
001012' 001410                  BEQ     S15             ;(OK) BRANCHES
001014' 004767  000306          JSR     PC,ERR          ;SET UP ERROR ACSR
001020' 012767  000025  177060  S14:    MOV     #25,ERRTYP      ;BIT STUCK
                                ;*******************************************************************
001026' 104405  000000' 000000          HRDERS,BEGIN,NULL       ;CSR REGISTER RESPONSE
                                ;*******************************************************************
                                ;       MAINT/TRANS BIT 13 FAILURE TO CLEAR
001034' 005721          S15:    TST     (R1)+           ;NEXT ENTRY
001036' 000757                  BR      S13             ;CONTINUE
001040' 004767  000234  S16:    JSR     PC,BRK          ;STALL 6.4 MILLISECONDS MINIMUM
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                                ;*****************************************************************************
                                ;
                                ;       ******** MODULE DEVICE DATA VERIFICATION ********
                                ;
                                ;       ENTERED UPON COMPLETION OF SERVICE
                                ;
                                ;       VERFY:
                                ;               VERIFY DEVICE TSR REGISTER RESPONSE
                                ;               CORRECT FOR DATA CONFIGURATION UNDER TEST

001044' 016700  000332          VERFY:  MOV     CNTLD,R0        ;FLOATING DATA BUFFER ADDRESS >R0
001050' 016701  000330                  MOV     CNTLX,R1        ;SCAN BASE BUFFER ADDRESS > R1
001054' 011102                  V10:    MOV     (R1),R2         ;DEVICE ADDRESS>R2
001056' 001415                          BEQ     OUT             ;COMPLETED EXITS

001060' 016704  000306                  MOV     WORK,R4         ;ADDRESS DATA (N)>R4
001064' 011404                          MOV     (R4),R4         ;DATA (N)>R4 "OUTPUT"
001066' 011003                          MOV     (R0),R3         ;DATA (N)>R3 "INPUT"
001070' 020304                          CMP     R3,R4           ;VERIFY RESULTS
001072' 001404                          BEQ     V12             ;(OK) BRANCHES
001074' 004767  000240                  JSR     PC,DERR         ;SET UP VERIFICATION ERROR REPORT
001100'                         V11:
                                        ;*************************************************************
001100' 104404  000000'                 DATER$,BEGIN            ;DATA ERROR!!!
                                        ;*************************************************************
                                        ;       <DATA VERIFICATION ERROR>

001104' 005020                  V12:    CLR     (R0)+           ;CLEAR TABLE FOR NEXT ENTRY
001106' 005721                          TST     (R1)+           ;NEXT ENTRY
001110' 000761                          BR      V10             ;CONTINUE

001112' 062767  000002  000252  OUT:    ADD     #2,WORK         ;ADVANCE DATA ENTRIES
001120' 016704  000246                  MOV     WORK,R4         ;FETCH VARIABLE DATA TABLE
001124' 011404                          MOV     (R4),R4         ;ENTRY, TEST ACTIVITY
001126' 001402                          BEQ     2$              ;(NO) BRANCHES
001130' 000167  177444          1$:     JMP     CONT            ;(ACTIVITY) CONTINUES
001134' 012767  001414' 000230  2$:     MOV     #DTABLE,WORK    ;SET UP NEXT DATA SCAN
001142' 104413  000000'                 ENDIT$,BEGIN            ;SIGNAL END OF ITERATION.
                                                                ;MONITOR SHALL TEST END OF PASS
001146' 000167  177426                  JMP     CONT
                                                                ;NOT REQUIRED
                                ;                               ;SIGNAL END OF PASS, RESUME AT RESTRT
```



```
                                ;*****************************************************************************
                                ;
                                ;       ******** MODULE DEVICE INTERRUPT SERVICE ********
                                ;
                                ;       MISR:
                                ;               DEVICE INTERRUPT SERVICE MONITOR SCHEDULE ROUTINE
                                ;               INTERRUPT DISMISSES DEVICE REQUEST
                                ;               DEFER SERVICE UNTIL MONITOR TIME AVAILABLE

001152' 005327                  MISR:   DEC     (PC)+           ;TEST DEVICE ACTIVITY
001154' 000000                  INHGCT: 0                       ;INTERRUPT ANTIHANG CONTROL
001156' 001003                          BNE     PIRQX           ;(ACTIVE) CONTINUE
001160' 012767  000017  000210          MOV     #15.,BKCNT      ;(INACTIVE) SET TERMINATION
                                                                ;SCHEDULE FINAL MONITOR CALL
001166'                         PIRQX:
                                        ;-------------------------------------------------------------
001166' 000004  000000' 001174'         PIRQ$,BEGIN,ISR         ; QUEUE UP TO CONTINUE AT ISR AND RTI
                                        ;-------------------------------------------------------------
                                                                ;105 MICRO SECOND (MIN) MONITOR CALL
                                ;
                                ;*****************************************************************************
                                ;
                                ;       ******** MODULE MONITOR PIRQ SERVICE ********
                                ;
                                ;       ISR:
                                ;               SERVICE THE DEVICE(S) WHEN THE MONITOR HAS TIME
                                ;
                                ;               HERE WE GO!

001174' 016700  000202          ISR:    MOV     CNTLD,R0        ;SET DATA TABLE BASE> R0 (FLOATING)
001200' 016701  000200                  MOV     CNTLX,R1        ;SET SCAN TABLE BASE> R1 (FLOATING)
001204' 011102                  ISR00:  MOV     (R1),R2         ;FETCH CURRENT SCAN ENTRY
001206' 001432                          BEQ     IOUT            ;SERVICE SCAN COMPLETED EXIT
001210' 016767  000174  000170          MOV     CNTX16,HANGCT   ;SET ANTI HANG COUNTER
001216' 006367  000164                  ASL     HANGCT          ;TWO SCANS PER DEVICE (MAX)
001222' 056210  000004          1$:     BIS     4(R2),(R0)      ;MAKE CURRENT DATA ENTRY (TSR)>(R0)
001226' 056203  000004                  BIS     4(R2),R3        ;AGAIN FOR PULSE WIDTH (TSR)>R3
001232' 001415                          BEQ     ISR10           ;CLEARED BRANCHES
001234' 050310                          BIS     R3,(R0)         ;RECORD MUTIPLE INPUT R3>(R0)
001236' 005003                          CLR     R3              ;INIT ANTI HANG CONTROL
001240' 005367  000142                  DEC     HANGCT          ;ADVANCE HANG COUNT
001244' 001366                          BNE     1$              ;CONTINUE
001246' 004767  000054          BADTSR: JSR     PC,ERR          ;<TSR> FAILING TO CLR WHEN ACCESSED

001252' 012767  000025  176626  ERRISR: MOV     #25.,ERRTYP     ;BIT STUCK
                                        ;*************************************************************
001260' 104405  000000' 000000          ERDER$,BEGIN,NULL       ;TSR RESPONSE FAILURE
                                        ;*************************************************************

001266' 005720                  ISR10:  TST     (R0)+           ;ADVANCE DATA TABLE ADDRESS
001270' 005721                          TST     (R1)+           ;ADVANCE SCAN TABLE ADDRESS
001272' 000744                          BR      ISR00           ;CONTINUE

001274'                         IOUT:
001274' 104400  000000'                 EXIT$,BEGIN                     ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
```

```
                                        ;*********************************************************************
                                        ;*********************************************************************
                                        ;
                                        ;       ******** MODULE UTILITIES ********
                                        ;BRK:
                                        ;       DEVICE SERVICE DELAY BREAK FOR APPOXIMATELY 100 MICRO SECONDS MIN
                                        ;       64 BREAKS EQUALS 6.4 MILLISECONDS MINIMUM, NOTE THAT THIS TIME (MIN)
                                        ;       IS REDUCED TO 1 MILLISECOND (MIN) ON FINAL INTERRUPT
                                        ;       SERVICE DURING "MISR" SERVICE EXECUTION
001300' 016767  000064  000070  BRK:    MOV     TIME,BKCNT      ;DING/DONG
001306'                         STALL:
001306' 104407  000000'                 BREAK$,BEGIN            ;TEMPORARY RETURN TO MONITOR....
001312' 104407  000000'                 BREAK$,BEGIN            ;THEN CONTINUE AT NEXT INSTRUCTION.
001316' 005367  000054                  DEC     BKCNT
001322' 001371                          BNE     STALL           ;AGAIN
001324' 000207                          RTS     PC              ;EXIT
001326' 010267  176546          ERR:    MOV     R2,CSRA
001332' 010367  176544                  MOV     R3,ACSR
001336' 000207                          RTS     PC
001340' 010267  176534          DERR:   MOV     R2,CSRA
001344' 016767  000022  176530          MOV     WORK,ACSR
001352' 010067  176526                  MOV     R0,WASADR
001356' 010467  176524                  MOV     R4,ASB
001362' 010367  176522                  MOV     R3,AWAS
001366' 000207                          RTS     PC
                                        ;*********************************************************************
                                        ;
                                        ;       ******** MODULE CONTROL CONSTANTS ********
001370' 000100                  TIME:   64.             ; 6.4 MILLISECOND (MIN) BREAK COUNT
                                        ;
                                        ;       ******** MODULE DYNAMIC CONTROL ENTRIES ********
001372' 000000                  WORK:   0               ; FLOATING DATA TABLE CURRENT ADDRESS
001374' 000000                  DRCNT:  0               ;NUMBER OF DEV RUNNING
001376' 000000                  BKCNT:  0               ; DYNAMIC 6.4 MILLISECOND COUNTER
001400' 000000                  BLOCK:  0               ; ORIGINAL DEVICE SELECTION MAP
001402' 000000                  CNTLD:  0               ; FLOATING DATA TABLE BASE ADDRESS
001404' 000000                  CNTLX:  0               ; FLOATING SCAN TABLE BASE ADDRESS
001406' 000000                  HANGCT: 0               ; INTERRUPT SERVICE ANTIHANG CONTROL COUNTER
001410' 000000                  CNTX16: 0               ; MULTIPLE SCAN COUNTER
001412' 000000                  SCNT:   0               ; SUB SCAN CONTROL COUNTER
```



```
                                        ;*********************************************************************
                                        ;
                                        ;       ******** MODULE DATA CONFIGURATION TABLE ********
001414' 177776                  DTABLE: 177776
001416' 177775                          177775
001420' 177773                          177773
001422' 177767                          177767
001424' 177757                          177757
001426' 177737                          177737
001430' 177677                          177677
001432' 177577                          177577
001434' 177377                          177377
001436' 176777                          176777
001440' 175777                          175777
001442' 173777                          173777
001444' 167777                          167777
001446' 157777                          157777
001450' 137777                          137777
001452' 077777                          077777
001454' 125252                          125252
001456' 052525                          052525
001460' 100000                          100000
001462' 040000                          40000
001464' 020000                          20000
001466' 010000                          10000
001470' 004000                          4000
001472' 002000                          2000
001474' 001000                          1000
001476' 000400                          400
001500' 000200                          200
001502' 000100                          100
001504' 000040                          40
001506' 000020                          20
001510' 000010                          10
001512' 000001                          1
001514' 000004                          4
001516' 177777                          177777
001520' 011111                          011111
001522' 123456                          123456
001524' 065432                          065432
001526' 122222                          122222
001530' 176543                          176543
001532' 000000                          0
001534' 000000                          0
000001                          .END
```

```
ACSR    000102R          275#    559*    563*
ADDR    000006R          241#    313
ADDR22= 001000           293#
ASB     000106R          279#    565*
ASTAT   000104R          277#
AWAS    000110R          280#    566*
BADTSR  001246R          523#
BRGIN   000000R          238#    302     337     389     418     433     462     476     497     527     535     552     553
BIT0  = 000001           293#
BIT1  = 000002           293#
BIT10 = 002000           293#
BIT11 = 004000           293#
BIT12 = 010000           293#
BIT13 = 020000           293#
BIT14 = 040000           293#
BIT15 = 100000           293#
BIT2  = 000004           293#
BIT3  = 000010           293#
BIT4  = 000020           293#
BIT5  = 000040           293#
BIT6  = 000100           293#
BIT7  = 000200           293#
BIT8  = 000400           293#
BIT9  = 001000           293#
BKCNT   001376R          493*    550*    554*    580#
BLOCK   001400R          312*    581#
BREAKS= 104407           293#    552     553
BRK     001300R          423     438     550#
BR1     000012R          243#    351
BR2     000013R          244#
BTODS = 104421           293#
CDATAS= 104412           293#
CNTLD   001402R          365*    449     510     582#
CNTLX   001404R          323*    376     405     424     450     511     583#
CNTX16  001410R          372*    373*    374*    375*    514     585#
CONFIG  000056R          263#
CONT    000600R          371#    474     478
CSRA    000100R          273#    558*    562*
DATCK$= 104411           293#
DATERS= 104404           293#    462
DECNT   001374R          318#    353*    360     371     372     579#
DERR    001340R          459     562#
DTABLE  001414R          367     475     591#
DVID1   000014R          245#    300     312     314
ENDITS= 104413           293#    476
ENDS  = 104410           293#    302
ERR     001326R          333     386     415     430     523     558#
ERRISR  001252R          525#
ERRTYP  000106R          278#    335*    387*    416*    431*    525*
EXITS = 104400           293#    535
GETPAS= 104415           293#
GWBUFS= 104414           293#
HANGCT  001406R          514*    515*    521*    584#
HRDCNT  000044R          256#
HRDERS= 104405           293#    337     389     418     433     527
HRDPAS  000050R          260#
```



```
ICONT   000036R          255#
ICOUNT  000040R          256#
IONUM   000122R          285#
INNGCT  001154R          371*    491#
INTF    000030R          252#
INTR    000120R          284#    297*    305*
IOUT    001274R          513     534#
ISR     001174R          497     510#
ISR00   001204R          512#    532
ISR10   001266R          518     530#
L00     000420R          319#    356
L01     000456R          333#    344
L02     000500R          332     343#
L03     000512R          350#
L04     000530R          321     340     347     354#
L05     000554R          361#    363
L11     000462R          335#
MAP22S= 104416           293#
MISR    001152R          350     490#
MODNAM  000000R          239#
MODSP   000270R          253     291#
MSGN$ = 104403           293#
MSGS$ = 104402           293#
MSGS  = 104401           293#
NULL  = 000000           293#    337     389     418     433     527
OPEN  = 000000           240     246     247     248     249     266     267     268     269     270     271     272     273
                         275     277     279     280     282     283     284     293#
OTDAS = 104420           293#
OUT     001112R          452     470#
PASCNT  000034R          254#
PIRQX   001166R          492     495#
PIRQS = 000004           293#    497
POPSP = 005726           293#
POPSP2= 022626           293#
PRTY  = 000000           244     293#
PRTY0 = 000000           293#
PRTY1 = 000040           293#
PRTY2 = 000100           293#
PRTY3 = 000140           293#
PRTY4 = 000200           293#
PRTY5 = 000240           293#
PRTY6 = 000300           293#
PRTY7 = 000340           243     293#
PS    = 177776           293#
PS#   = 177776           293#
PUSH  = 005746           293#
PUSH2 = 024646           293#
P10     000634R          377#    393
P11     000666R          387#
P12     000702R          385     392#
RANDS = 104417           293#
RANNUM  000054R          252#
RESTRT  000354R          281     304     309#
RES1    000056R          264#
RES7    000060R          265#
RSTRT   000112R          281#
```

```
SRADR   000102R          274#
SRK1    000766R          407     423#
SCNT    001412R          311*    355*    586#
SERVC   000706R          376     405#
SOFCNT  000042R          257#
SOFERS= 104406           293#
SOFPAS  000046R          259#
SPOINT  000032R          253#    309
SPSIZ = 000062             1#    229#    286
SR1     000016R          246#
SR2     000020R          247#
SR3     000022R          248#
SR4     000024R          249#
STALL   001306R          551#    555
START   000270R          252     297#
STAT    000026R          251#
SVR0    000062R          266#
SVR1    000064R          267#
SVR2    000066R          268#
SVR3    000070R          269#
SVR4    000072R          270#
SVR5    000074R          271#
SVR6    000076R          272#
SYSCNT  000052R          261#
S10     000712R          406#    422
S11     000746R          412     416#
S12     000762R          414     421#
S13     000776R          425#    437
S14     001020R          431#
S15     001034R          429     436#
S16     001040R          426     438#
TIME    001370R          550     574#
TRPDFD= 000022           293#
VECTOR  000010R          242#
VERPY   001044R          449#
V10     001054R          451#    468
V11     001100R          460#
V12     001104R          458     466#
WASADR  000104R          276#    564*
WDFR    000116R          284#    299*    307*
WDTO    000114R          282#    298*    306*
WORK    001372R          367*    379     454     470*    471     475*    563     578#
XFLAG   000005R          240#

. ABS.  000000      000
        001542      001

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 XCBCF0,XCBCF0/SOL/CRF:SYM=DDXCOM,XCBCF0
 RUN-TIME:  1  2  .3 SECONDS
 RUN-TIME RATIO: 13/4=3.4
 CORE USED:  7K  (13 PAGES)
```