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.REM _
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IDENTIFICATION

PRODUCT CODE: AC-E839E-MC

PRODUCT NAME: CXCBAE0 CB11 SCAN MODULE

PRODUCT DATE: SEPTEMBER 1978

MAINTAINER: DEC/X11 SUPPORT GROUP

1. ABSTRACT

CBA IS A BKMOD THAT WILL EXERCISE UP TO "N" CB11 SCAN MODULES HAVING CONTIGUOUS UNIBUS ADDRESSES. NON-CONTIGUOUS GROUPS OF SCAN MODULES MAY BE EXERCISED BY CONFIGURING THE CBA MODULE FOR EACH GROUP. THE MODULE SIMPLY TESTS THE ABILITY OF THE MAINTENANCE FLOPS TO ACTIVATE AND DEACTIVATE ALL SCN LINES IN ALL SCAN REGISTERS SELECTED FOR TEST. IF ANY LINE FAILS TO SET OR CLEAR PROPERLY THE ERROR IS REPORTED VIA THE CONSOLE TTY.

2. REQUIREMENTS

HARDWARE: A CB11 INTERFACE WITH AT LEAST ONE SCAN MODULE

STORAGE:: CBA REQUIRES:
1. DECIMAL WORDS: 202
2. OCTAL WORDS: 0312
3. OCTAL BYTES: 624

3. PASS DEFINITION:

ONE PASS OF THE CBA MODULE RESULTS IN 100. ITERATIONS OF THE BASIC TEST SEQUENCE WHICH CLEARS AND SETS ALL SCAN REGISTERS SELECTED FOR TEST.

4. EXECUTION TIME

CBA RUNNING ALONE ON A PDP11/05 SYSTEM WITH ONE SCAN MODULE TAKES LESS THAN 10 SECONDS TO COMPLETE ONE PASS.

5. CONFIGURATION PARAMETERS

DEFAULT PARAMETERS:

DAXA:0,VECTOR:0,BR1:0,BR2:0,DEVCNT:0,SR1:0

REQUIRED PARAMETERS:

FOR EACH COPY OF CBA CONFIGURED THE USER MUST SPECIFY:

DVA= THE FIRST ADDRESS OF THE FIRST SCAN REGISTER IN A CONTIGUOUS GROUP

SR1= THE NO. (OCTAL) OF SCAN MODULES IN THE GROUP.

SEQ 0003

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;THIS SHOULD BE A STRAIGHT OCTAL NUMBER, NOT A
;BIT MAP AS IS USUALLY DONE IN DEVCNT.  DEVCNT
;WAS NOT USED FOR THE DEVICE COUNT BECAUSE IT
;CAN ONLY HOLD 16 AS A MAXIMUM NUMBER OF DEVICES
;AND CBA CAN RUN UP TO 256 DEVICES
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SEQ 0004

6. DEVICE OPTION SETUP

ALL EXTERNAL LINES ENTERING THE SCAN INPUTS FROM THE PLANT MUST BE DISCONNECTED.

7. MODULE OPERATION

TEST SEQUENCE:

A. SET UP THE PASS COUNTER FOR 100. ITERATIONS
B. GET SR1 TO FIND OUT HOW MANY SCAN MODULES TO TEST.
C. CLEAR A SCAN REGISTER
D. COUNT IT
E. TEST FOR ALL BITS CLEARED - REPORT ANY ERROR
F. GENERATE NEXT REGISTER ADDRESS
G. REPEAT C-F UNTIL ALL LINES TESTED
H. SET A SCAN REGISTER
I. TEST FOR ALL BITS SET - REPORT ANY ERROR
J. REPEAT I-J UNTIL ALL LINES TESTED
K. COUNT ONE ITERATION
L. IF NOT 100. REPEAT B-K
M. REPORT END OF PASS RESTART AT A

SUBROUTINES:

STAL: TIMER TO ALLOW SCAN LINES TO SETTLE AFTER SETTING THE MAINTENANCE FLOPS

BRK: TIMER TO PREVENT RESCANNING MORE OFTEN THAN ONCE EVERY 50 USEC

SEQ 0005

8. OPERATION OPTIONS

A. USER CAN MODIFY LOCATIONS "ADDR" AND "SR1" TO SELECT ANY GROUP OF SCAN MODULES

9. NON-STANDARD PRINTOUTS

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

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                ;DEC/X11 CB11 SCAN MODULE EXERCISER

000000'                 BKMOD   <CBAE >,<,,,100.,33
000000'                 MODULE  40020,CBAE ,<,,,100.,,33
                        .TITLE  CBAE DEC/X11 SYSTEM EXERCISER MODULE
                ;       IDDXCON VERSION  6      23-MAY-78
                                .LIST   BIN
                        ;*****************************************************************************
000000'                 BEGIN:
000000' 041103  042501      040 MODNAM: .ASCII  /CBAE / ;MODULE NAME.
000005'     000         XFLAG:  .BYTE   OPEN        ;USED TO KEEP TRACK OF WBUFF USAGE
000006' 000000          ADDR:   +0                  ;1ST DEVICE ADDR.
000010' 000000          VECTOR: +0                  ;1ST DEVICE VECTOR.
000012'     000         BR1:    .BYTE   PRTY+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' 040020          STAT:   40020               ;STATUS WORD.
000030' 000224'         INIT:   START               ;MODULE START ADDR.
000032' 000224'         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          ASB:    OPEN                ;EXPECTED DATA.
000110' 000000          AWAS:   OPEN                ;ACTUAL DATA.
000112' 000266'         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' 000033          IDNUM:  33                  ;MODULE IDENTIFICATION NUMBER=33
        000040                  .REPT   SPSIZ       ;MODULE STACK STARTS HERE.
                                .NLIST
                                .WORD   0
                                .LIST
                                .ENDR
000224'                 MODSP:
                        ;*****************************************************************************
  234
  235 000224' 012767  000002  177664 START:  MOV     #2,WDFR ;2 WORDS FR MEM/ITERATION
  236 000232' 012767  000025  177646         MOV     #25,ERRTYP          ;BIT STUCK IN REG ONLY ERROR
  237 000240' 016702  177552         1$:     MOV     SR1,R2      ;SAVE SR1
  238 000244' 001410                         BEQ     RESTRT      ;IT'S ZERO - SO BEAT IT
  239 000246' 062767  000002  177640         ADD     #2,WDTO     ;INCREASE WDTO COUNT
  240 000254' 062767  000002  177634         ADD     #2,WDFR     ;INCREASE WDFR COUNT
  241 000262' 005302                         DEC     R2
  242 000264' 001370                         BNE     1$          ;NOT DONE BRANCH
  243 000266' 016700  177514 RESTRT: MOV     ADDR,R0     ;R0 POINTS TO 1ST SCAN REGISTER
  244 000272' 016702  177520         MOV     SR1,R2      ;GET THE SCAN MODULE COUNT
  245 000276' 012701  177774         1$:     MOV     #-4,R1      ;COUNT 4 REGISTERS PER MODULE
  246 000302' 005200                         INC     R0          ;POINT R0 TO MAINT. REGISTER
  247 000304' 152710  000017                 BISB    #17,(R0)    ;SET BITS <11:08> IN THE MAINT REG.
  248 000310' 122710  000017                 CMPB    #17,(R0)    ;DID ALL FOUR BITS SET ??
  249 000314' 001402                         BEQ     2$          ;BR IF YES
  250 000316' 004767  000130                 JSR     PC,ERR1     ;GO REPORT IT
  251 000322' 004767  000252         2$:     JSR     PC,STAL     ;GO WAIT FOR SCAN LINES TO SETTLE
  252 000326' 005300                         DEC     R0          ;POINT R0 BACK AT 1ST REG.
  253 000330' 105710                 4$:     TSTB    (R0)        ;ALL BITS CLEARED ?
  254 000332' 001402                         BEQ     3$          ;BR IF YES
  255 000334' 004767  000132                 JSR     PC,ERR2     ;GO REPORT IT
  256 000340' 005720                 3$:     TST     (R0)+       ;GENERATE THE NXT ADDRESS
  257 000342' 005201                         INC     R1          ;COUNT ONE OF 4
  258 000344' 001371                         BNE     4$          ;BR IF NOT 4
  259 000346' 005302                         DEC     R2          ;COUNT ONE SCAN MODULE
  260 000350' 001353                         BNE     1$          ;BR IF ANY MODULES LEFT
  261 000352' 004767  000174                 JSR     PC,BRK      ;GO TAKE A BREAK
  262 000356' 016702  177434 T2:     MOV     SR1,R2      ;GET THE SCAN MODULE COUNT
  263 000362' 016700  177420         MOV     ADDR,R0     ;GET THE ADDRESS OF 1ST REGISTER
  264 000366' 012701  177774         1$:     MOV     #-4,R1      ;COUNT 4 REGS PER MODULE
  265 000372' 005200                         INC     R0          ;POINT R0 TO MAINT. REG.
  266 000374' 105010                         CLRB    (R0)        ;CLEAR BITS <11:08> IN THE MAINT. REG.
  267 000376' 105710                         TSTB    (R0)        ;DID ALL FOUR CLEAR ??
  268 000400' 001402                         BEQ     2$          ;BR IF YES
  269 000402' 004767  000104                 JSR     PC,ERR3     ;GO REPORT IT
  270 000406' 004767  000166         2$:     JSR     PC,STAL     ;GO WAIT FOR SCAN LINES TO SETTLE
  271 000412' 005300                         DEC     R0          ;POINT R0 BACK TO 1ST REG.
  272 000414' 022710  177777         4$:     CMP     #177777,(R0)    ;ALL BITS SET?
  273 000420' 001402                         BEQ     3$          ;BR IF YES
  274 000422' 004767  000104                 JSR     PC,ERR4     ;GO REPORT IT
  275 000426' 005720                 3$:     TST     (R0)+       ;GENERATE THE NXT ADDRESS
  276 000430' 005201                         INC     R1          ;COUNT 1 OF 4
  277 000432' 001370                         BNE     4$          ;BR IN NOT 4
  278 000434' 005302                         DEC     R2          ;COUNT ONE SCAN MODULE
  279 000436' 001353                         BNE     1$          ;BR IF ANY MODULES LEFT
  280 000440' 004767  000106'                JSR     PC,BRK      ;GO TAKE A BREAK
  281 000444' 104413  000000'                ENDITS,BEGIN        ;SIGNAL END OF ITERATION.
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                                        ;MONITOR SHALL TEST END OF PASS
000450' 000706                  BR      RESTRT          ;BR IF NOT 100. TIMES


                                ;ROUTINE TO REPORT FAILURE TO CLEAR BITS <11:8> IN MAINT. REGISTER

000452' 010067  177422          ERR1:   MOV     R0,CSRA         ;CSRA = MAINT. REG ADDRESS
000456' 111067  177420          MOVB    (R0),ACSR       ;ACSR=BITS <11:8> OF MAINT. REG.
                                ;*****************************************************************
000462' 104405  000000' 000000  HRDERS,BEGIN,NULL       ;CAN'T CLEAR (11:8) IN MAINT REG
                                ;*****************************************************************
000470' 000207                  RTS     PC              ;CONTINUE WITH EXERCISE

                                ;ROUTINE TO REPORT FAILURE TO CLEAR ALL BITS IN SCAN REG.

000472' 010067  177402          ERR2:   MOV     R0,CSRA         ;CSRA=ADDRESS OF SCAN REG.
000476' 011067  177400          MOV     (R0),ACSR       ;ACSR=CONTENTS OF SCAN REG.
                                ;*****************************************************************
000502' 104405  000000' 000000  HRDERS,BEGIN,NULL       ;REG. SHOULD BE ALL ZEROS
                                ;*****************************************************************
000510' 000207                  RTS     PC              ;CONTINUE WITH EXERCISE

                                ;ROUTINE TO REPORT FAILURE TO SET ALL BITS <11:8> IN MAINT REG

000512' 110067  177362          ERR3:   MOVB    R0,CSRA         ;CSRA=ADDRESS OF MAINT. REG.
000516' 011067  177360          MOV     (R0),ACSR       ;ACSR=CONTENTS OF MAINT. REG.
                                ;*****************************************************************
000522' 104405  000000' 000000  HRDERS,BEGIN,NULL       ;BITS (11:8) SOULD BE ALL ONES
                                ;*****************************************************************
000530' 000207                  RTS     PC              ;CONTINUE WITH EXERCISE

                                ;ROUTINE TO REPORT FAILURE TO CLEAR ALL BITS IN SCAN REG.

000532' 010067  177342          ERR4:   MOV     R0,CSRA         ;CSRA=ADDRESS OF SCAN REG.
000536' 011067  177340          MOV     (R0),ACSR       ;ACSR=CONTENTS OF SCAN REG.
                                ;*****************************************************************
000542' 104405  000000' 000000  HRDERS,BEGIN,NULL       ;REG. SHOULD BE ALL ONES
                                ;*****************************************************************
000550' 000207                  RTS     PC              ;CONTINUE WITH EXERCISE


                                ;ROUTINE TO INSURE SCAN LINES ARE NOT SAMPLED MORE OFTEN
                                ;THAN ONCE EVERY 50 USEC.

000552' 012767  000031  000042  BRK:    MOV     #25.,STALL      ;SET STALL COUNT TO 25.
000560'                         1$:
000560' 104407  000000'         BREAK$,BEGIN            ;TEMPORARY RETURN TO MONITOR....
000564' 104407  000000'         BREAK$,BEGIN            ;THEN CONTINUE AT NEXT INSTRUCTION.
000570' 005367  000026          DEC     STALL           ;TICK-TOCK
000574' 001371                  BNE     1$              ;BR IF STALL NOT 0
000576' 000207                  RTS     PC              ;RETURN TO CALLER


                                ;SUBROUTINE TO INTRODUCE ADEQUATE DELAY TO ALLOW SCAN LINES TO
                                ;SETTLE DOWN AFTER SETTING THE MAINTENANCE FLOPS
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000600' 012703  000010          STAL:   MOV     #10,R3          ;SET UP A COUNT OF 10
000604'                         1$:
000604' 104407  000000'         BREAK$,BEGIN            ;TEMPORARY RETURN TO MONITOR....
000610' 104407  000000'         BREAK$,BEGIN            ;THEN CONTINUE AT NEXT INSTRUCTION.
000614' 005303                  DEC     R3              ;TICK-TOCK GOES THE CLOCK
000616' 001372                  BNE     1$              ;BR IF R3 NOT ZERO
000620' 000207                  RTS     PC              ;NOW GO BACK AND START TESTING

000622' 000000          STALL:  OPEN                    ;STALL COUNTER

        000001                  .END
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ACSR    000102R          216#    290*    299*    308*    317*
ADDR    000006R          182#    243     263
ADDR22= 001000           234#
ASB     000106R          220#
ASTAT   000104R          218#
AWAS    000110R          221#
BEGIN   000000R          179#    281     292     301     310     319     329     330     341     342
BIT0    000001           234#
BIT1    000002           234#
BIT10   002000           234#
BIT11   004000           234#
BIT12   010000           234#
BIT13   020000           234#
BIT14   040000           234#
BIT15   100000           234#
BIT2    000004           234#
BIT3    000010           234#
BIT4    000020           234#
BIT5    000040           234#
BIT6    000100           234#
BIT7    000200           234#
BIT8    000400           234#
BIT9    001000           234#
BREAK$= 104407           234#    329     330     341     342
BRK     000552R          261     280     327#
BR1     000012R          184#
BR2     000013R          185#
BTOD$ = 104421           234#
CDATA$= 104412           234#
CONFIG  000056R          204#
CSRA    000100R          214#    289*    298*    307*    316*
DATCK$= 104411           234#
DATER$= 104404           234#
DVID1   000014R          186#
END1T$= 104413           234#    281
END$  = 104410           234#
ERRTYP  000106R          219#    236*
ERR1    000452R          250     289#
ERR2    000472R          255     298#
ERR3    000512R          269     307#
ERR4    000532R          274     316#
EXIT$ = 104400           234#
GETPA$= 104415           234#
GWBUF$= 104414           234#
HRDCNT  000044R          199#
HRDER$= 104405           234#    292     301     310     319
HRDPAS  000050R          201#
ICONT   000036R          196#
ICOUNT  000040R          197#
IDNUM   000122R          226#
INIT    000030R          193#
INTR    000120R          225#
MAP22$= 104416           234#
MODNAM  000000R          180#
MODSP   000224R          194     232#
MSGN$ = 104403           234#
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```
MSGS$ = 104402           234#
MSG$  = 104401           234#
NULL  = 000000           234#    292     301     310     319
OPEN  = 000000           181     187     188     189     190     207     208     209     210     211     212     213     214
                         216     218     220     221     223     224     225     234#    347
OTOA$ = 104420           234#
PASCNT  000034R          195#
PIRQ$ = 000004           234#
POPSP = 005726           234#
POPSP2= 022626           234#
PRTY  = 000000           184     185     234#
PRTY0 = 000000           234#
PRTY1 = 000040           234#
PRTY2 = 000100           234#
PRTY3 = 000140           234#
PRTY4 = 000200           234#
PRTY5 = 000240           234#
PRTY6 = 000300           234#
PRTY7 = 000340           234#
PS    = 177776           234#
PSW   = 177776           234#
PUSH  = 005746           234#
PUSH2 = 024646           234#
RAND$ = 104417           234#
RANNUM  000054R          203#
RESTRT  000266R          222     238     243#    283
RES1    000056R          205#
RES2    000060R          206#
RSTRT   000112R          222#
SBADR   000102R          215#
SOFCNT  000042R          198#
SOFER$= 104406           234#
SOPPAS  000046R          200#
SPOINT  000032R          194#
SPSIZ = 000040           1#      227
SR1     000016R          187#    237     244     262
SR2     000020R          188#
SR3     000022R          189#
SR4     000024R          190#
STAL    000600R          251     270     319#
STALL   000622R          327*    331*    347#
START   000224R          193     235#
STAT    000026R          192#
SVR0    000062R          207#
SVR1    000064R          208#
SVR2    000066R          209#
SVR3    000070R          210#
SVR4    000072R          211#
SVR5    000074R          212#
SVR6    000076R          213#
SYSCNT  000052R          202#
TRPDFD= 000022           234#
T2      000356R          262#
VECTOR  000010R          183#
WASADR  000104R          217#
WDFR    000116R          224#    235*    240*
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```
WDTO    000114R           223#     239*
XFLAG   000005R           181#

. ABS.  000000      000
        000624      001

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 XCBAE0,XCBAE0/SOL/CRF:SYM=DDXCOM,XCBAE0
 RUN-TIME:  1  1  .2 SECONDS
 RUN-TIME RATIO: 9/2=3.3
 CORE USED:  7K  (13 PAGES)
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