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IDENTIFICATION

PRODUCT CODE: AC-E839E-MC  
PRODUCT NAME: CXCAEO CR11 SCAN MODULE  
PRODUCT DATE: SEPTEMBER 1978  
MAINTAINER: DEC/X11 SUPPORT GROUP

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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 SCAN 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 POP11/05 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,DEV CNT: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.

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

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 SRI 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

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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FDEC/X11 CB11 SCAN MODULE EXERCISER
000000* 8KNOD <CBAE > 100.33
000000* MODULE 40020 CBAE 100.33
; .TITLE CBAE DEC/X11 SYSTEM EXERCISER MODULE
; .DDXCON VERSION 6 23-MAY-78
*****LIST*****
000000* BEGIN:
000000* 041103 042501 040 MODNAM: - ASCII /CBAE / ;MODULE NAME
000000* 000000 XFLAG: -BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
000000* 000000 ADDR: +0 ;1ST DEVICE ADDR.
000000* 000000 VECTOR: +0 ;1ST DEVICE VECTOR.
000000* 000013 000 BR1: -BYTE PRTV+0 ;1ST BR LEVEL.
000000* 000013 000 BR2: -BYTE PRTV+0 ;2ND BR LEVEL.
000000* 000014 000001 DVID1: + ;DEVICE INDICATOR 1.
000000* 000016 000000 SR1: OPEN ;SWITCH REGISTER 1
000000* 000020 000000 SR2: OPEN ;SWITCH REGISTER 2
000000* 000022 000000 SR3: OPEN ;SWITCH REGISTER 3
000000* 000024 000000 SR4: OPEN ;SWITCH REGISTER 4
*****LIST*****
000026* 040020 STAT: 40020 ;STATUS WORD.
000030* 000024 INTR: START ;MODULE START ADDR.
000032* 000024 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 SOPPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
000048* 000000 HRDPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
000052* 000000 SYSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
000054* 000000 RANUM: 0 ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
000056* 000000 RCONF1: 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* 000000 SBADR: OPEN ;ADDR OF GOOD DATA, OR
000104* 000000 ACSR: OPEN ;CONTENTS OF CSR.
000106* 000000 MBSADR: OPEN ;ADDR OF BAD DATA, OR
000108* 000000 ASTAT: OPEN ;STATUS REG CONTENTS.
000106* 000000 ERRTP: OPEN ;TYPE OF ERROR
000108* 000000 ASB: OPEN ;EXPECTED DATA.
000110* 000000 AWAS: OPEN ;ACTUAL DATA.
000112* 000266 RSTRT: RSTRT ;RESTART ADDRESS AFTER END OF PASS
000114* 000000 WDIO: 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:
*****LIST*****
234 000224* 012767 000002 177664 START: MOV #2,WDFR ;2 WORDS FR MEM/ITERATION
235 000232* 012767 000025 177646 MOV #25,ERRTP ;BIT STUCK IN REG ONLY ERROR
236 000240* 016702 177552 MOV SR1,R2 ;SAVE SR1
237 000244* 014100 177552 BEQ SR2,R2 ;ZERO - SO BEAT IT
238 000246* 062767 000002 177640 1S: ADD #2,WDFR ;INCREASE WDIO COUNT
239 000254* 062767 000002 177634 ADD #2,WDFR ;INCREASE WDFR COUNT
240 000262* 005302 DEC R2
241 000264* 001370 BNE 1S
242 000266* 016700 177514 RESTRT: MOV ADDR,R0 ;RO POINTS TO 1ST SCAN REGISTER
243 000272* 016702 177520 MOV SR1,R2 ;GET THE SCAN MODULE COUNT
244 000276* 012701 177774 1S: MOV #4,R1 ;COUNT 4 REGISTERS PER MODULE
245 000302* 002000 177774 INC R0 ;POINT RO TO MAINT. REGISTER
246 000304* 152710 000017 BTR #1,(R0) ;SET BITS <11:08> IN MAINT REG.
247 000310* 122710 000017 CMPB #1,(R0) ;DID ALL FOUR BITS SET ??
248 000314* 001402 BEQ 2S ;BR IF YES
249 000316* 004767 000130 JSR PC,ERR1 ;GO REPORT IT
250 000322* 004767 000252 2S: JSR PC,STAL ;GO WAIT FOR SCAN LINES TO SETTLE
251 000326* 005300 DEC RO ;POINT RO BACK AT 1ST REG.
252 000330* 005710 4S: TST (R0) ;ALL BITS CLEARED ?
253 000332* 001402 BEQ 3S ;BR IF YES
254 000334* 004767 000132 JSR PC,ERR2 ;GO REPORT IT
255 000340* 005720 3S: TST (R0)+ ;GENERATE THE NXT ADDRESS
256 000342* 005201 INC R1 ;COUNT ONE OF 4
257 000344* 001371 BNE 4S ;BR IF NOT 4
258 000346* 005302 BEQ 1S ;COUNT ONE SCAN MODULE
259 000350* 001352 BNE 1S ;BR IF ANY MODULES LEFT
260 000352* 004767 000174 JSR PC,BRK ;GO TAKE A BREAK
261 000356* 016702 177434 72: MOV ADDR,R0 ;GET THE SCAN MODULE COUNT
262 000360* 016700 177420 MOV #4,R1 ;GET THE ADDRESS OF 1ST REGISTER
263 000366* 012701 177774 1S: MOV (R0) ;COUNT 4 REGS PER MODULE
264 000372* 005200 INC RO ;POINT RO TO MAINT. REG.
265 000374* 105010 CLR (R0) ;CLEAR BITS <11:08> IN THE MAINT. REG.
266 000376* 105710 TSB (R0) ;DID ALL FOUR CLEAR ??
267 000400* 001402 BEQ 2S ;BR IF YES
268 000402* 004767 000104 JSR PC,ERR3 ;GO REPORT IT
269 000406* 004767 000166 2S: JSR PC,STAL ;GO WAIT FOR SCAN LINES TO SETTLE
270 000410* 005300 DEC RO ;POINT RO BACK TO 1ST REG.
271 000414* 022710 177777 4S: CMP #177777,(R0) ;ALL BITS SET?
272 000420* 001402 BEQ 3S ;BR IF YES
273 000422* 004767 000104 3S: JSR PC,ERR4 ;GO REPORT IT
274 000426* 005720 INC R1 ;GENERATE THE NXT ADDRESS
275 000430* 005201 INC R1 ;COUNT 1 OF 4
276 000432* 001370 BNE 4S ;BR IN NOT 4
277 000434* 005302 DEC 1S ;COUNT ONE SCAN MODULE
278 000436* 005353 BNE 1S ;BR IF ANY MODULES LEFT
279 000440* 004767 000106 JSR PC,BRK ;GO TAKE A BREAK
280 000442* 104413 000000* ENDITS,BEGIN ;SIGNAL END OF ITERATION.

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282  
283 000450 000706 BR RSTRRT ;MONITOR SHALL TEST END OF PASS  
284 ;BR IF NOT 100. TIMES  
285  
286  
287 ;ROUTINE TO REPORT FAILURE TO CLEAR BITS <11:8> IN MAINT. REGISTER  
288  
289 000452 010067 177422 ERR1: MOV RO,CSRA ;CSRA = MAINT. REG ADDRESS  
290 000456 111067 177420 MOVB (RO),ACSR ;ACSR=BITS <11:8> OF MAINT. REG.  
291 ;*****  
292 000462 104405 000000 000000 HRDRS,BEGIN, NULL ;CAN'T CLEAR (11:8) IN MAINT REG  
293 ;*****  
294 000470 000207 RTS PC ;CONTINUE WITH EXERCISE  
295  
296 ;ROUTINE TO REPORT FAILURE TO CLEAR ALL BITS IN SCAN REG.  
297  
298 000472 010067 177402 ERR2: MOV RO,CSRA ;CSRA=ADDRESS OF SCAN REG.  
299 000476 011067 177400 MOV (RO),ACSR ;ACSR=CONTENTS OF SCAN REG.  
300 ;*****  
301 000502 104405 000000 000000 HRDRS,BEGIN, NULL ;REG. SHOULD BE ALL ZEROS  
302 ;*****  
303 000510 000207 RTS PC ;CONTINUE WITH EXERCISE  
304  
305 ;ROUTINE TO REPORT FAILURE TO SET ALL BITS <11:8> IN MAINT REG  
306  
307 000512 110067 177362 ERR3: MOVB RO,CSRA ;CSRA=ADDRESS OF MAINT. REG.  
308 000516 011067 177360 MOV (RO),ACSR ;ACSR=CONTENTS OF MAINT. REG.  
309 ;*****  
310 000522 104405 000000 000000 HRDRS,BEGIN, NULL ;BITS (11:8) SHOULD BE ALL ONES  
311 ;*****  
312 000530 000207 RTS PC ;CONTINUE WITH EXERCISE  
313  
314 ;ROUTINE TO REPORT FAILURE TO CLEAR ALL BITS IN SCAN REG.  
315  
316 000532 010067 177342 ERR4: MOV RO,CSRA ;CSRA=ADDRESS OF SCAN REG.  
317 000536 011067 177340 MOV (RO),ACSR ;ACSR=CONTENTS OF SCAN REG.  
318 ;*****  
319 000542 104405 000000 000000 HRDRS,BEGIN, NULL ;REG. SHOULD BE ALL ONES  
320 ;*****  
321 000550 000207 RTS PC ;CONTINUE WITH EXERCISE  
322  
323 ;ROUTINE TO INSURE SCAN LINES ARE NOT SAMPLED MORE OFTEN  
324 ;THAN ONCE EVERY 50 USEC.  
325  
326  
327 000552 012767 000031 000042 BRK: MOV #25.,STALL ;SET STALL COUNT TO 25.  
328 IS: ;  
329 000560 104407 000000 0 BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR...  
330 000564 104407 000000 0 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.  
331 000570 005367 000026 DEC STALL ;TICK-TOCK  
332 000574 001371 BNE IS ;BR IF STALL NOT 0  
333 000576 000207 RTS PC ;RETURN TO CALLER  
334  
335 ;SUBROUTINE TO INTRODUCE ADEQUATE DELAY TO ALLOW SCAN LINES TO  
336 ;SETTLE DOWN AFTER SETTING THE MAINTENANCE PLOPS  
337
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338  
339 000600 012703 000010 STAL: MOV #10,R3 ;SET UP A COUNT OF 10  
340 000604 000000 0 IS: ;  
341 000604 104407 000000 0 BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR...  
342 000610 104407 000000 0 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.  
343 000614 005303 DEC R3 ;TICK-TOCK GOES THE CLOCK  
344 000616 001372 BNE IS ;BR IF R3 NOT ZERO  
345 000620 000207 RTS PC ;NOW GO BACK AND START TESTING  
346  
347 000622 000000 STALL: OPEN ;STALL COUNTER  
348  
349 000001 .END
```





WDTO 000114R 223# 239\*  
XFLAG 000005R 181#

. ABS. 000000 000  
000624 001

ERRORS DETECTED: 0  
DEFAULT GLOBALS GENERATED: 0

XCBABO, XCBABO/SOL/CRF: SYM=DDXCON, XCBABO  
RUN-TIME: 1 1.2 SECONDS  
RUN-TIME RATIO: 9/2=3.3  
CORE USED: 7K (13 PAGES)