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IDENTIFICATION

PRODUCT CODE: AC-E694F-MC  
PRODUCT NAME: CXCRAFO CR11 MODULE  
PRODUCT DATE: SEPTEMBER 1978  
MAINTAINER: DEC/X11 SUPPORT GROUP

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MAIN DEC CHANGE NOTICE  
MAY BE REQUIRED FOR  
PROGRAM TO OPERATE

1. ABSTRACT

CRA IS AN IOMOD THAT EXERCISES THE CR11 OR CM11 CARD READER. IT READS A PRE-PUNCHED ALPHANUMERIC DECK FORMING A CHECKSUM FOR EACH CARD READ. THE CALCULATED CHECKSUM IS COMPARED AGAINST A KNOWN CKSUM AND ANY ERRORS REPORTED ON THE TTY. THE MODULE TESTS BOTH THE IMAGE AND ENCODED DATA.

2. REQUIREMENTS

HARDWARE: ONE CR11 CARD READER WITH CONTROLLER  
ONE PRE-PUNCHED ALPHANUMERIC DECK (80 CARDS)  
MAINDEC-89-D1B1-C FOR 80 COLUMN READERS  
MAINDEC-89-D2C1-C FOR 40 COLUMN CM11 READERS

STORAGE:: CRA REQUIRES:  
1. DECIMAL WORDS: 300  
2. OCTAL WORDS: 0454  
3. OCTAL BYTES: 1130

3. PASS DEFINITION

ONE PASS OF THE CRA MODULE CONSISTS OF READING 80 80-COLUMN CARDS (6400 CHARACTERS) AT WHICH TIME THE INPUT HOPPER SHOULD BE EMPTY.

4. EXECUTION TIME

ONE PASS OF CRA RUNNING ALONE ON A PDP11/20 PROCESSOR TAKES APPROXIMATELY .4 MINUTES (80 CARD DECK)

5. CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:

DEVADR: 177160, VECTOR: 230, BR1: 6, DEVCNT: 1

REQUIRED PARAMETERS:

NONE

6. DEVICE/OPTION SET-UP

A. POWER UP THE READER  
B. LOAD THE PROPER ALPHA DECK  
C. READY THE READER

7. MODULE OPERATION

TEST SEQUENCE:

- A. SET UP VECTORS AND INITIALIZE MODULE VARIABLES
- B. IF ON-LINE GO TO C ELSE WAIT FOR READY
- C. READ A CARD - ENABLE INTERRUPT
- D. INTERRUPT SERVICE:
  - 1. CHECK FOR NON-DATA ERRORS (TIMING, ETC.)
  - 2. COUNT COLUMN
  - 3. FORM CHECKSUMS (DIRECT AND ENCODED)
  - 4. IF 80 COLUMNS READ: CHECK DATA - REPORT ANY ERRORS
- E. IF HOPPER NOT EMPTY COUNT A CARD AND GO TO B.
- F. AT HOPPER EMPTY (OFF-LINE) AND 80 CARDS READ, REPORT END OF PASS AND START AT A. ELSE REPORT ERROR AND GO TO A.

OTHER ERROR CONDITIONS TESTED FOR AND REPORTED:

- A. READER NOT READY ("CHECK" CONDITIONS)
- B. READING DATA DIDN'T CLEAR COLUMN DONE
- C. TIMING
- D. UNEXPECTED OFF-LINE (EG: TOO FEW TEST CARDS)

IF OFF-LINE CONDITION IS NOT CORRECTED MODULE WILL BE DROPPED.

8. OPERATION OPTIONS

NONE

9. NON-STANDARD PRINTOUTS

NONE: ALL PRINTOUTS HAVE THE STANDARD FORMAT.

```
144 .LIST SEQ,BIN
145 000000- <CRAF >,177160,230,6,,80,,15
146 000000- MODULE 140000,CRAF 177160,230,6,,80,,15
147 .TITLE CRAF DEC/X11 SYSTEM EXERCISER MODULE
148 ; DDICOM VERSION 6 23-MAY-78
149 ; LIST BIN
150 ;*****
151 000000- REGIN:
152 000000- 051103 043101 040 MODNAM: .ASCII /CRAF / ;MODULE NAME-
153 000005- 177160 XPLAG: .BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
154 000006- 177160 ADDR: 177160+0 ;1ST DEVICE ADDR
155 000010- 000230 VECTOR: 230+0 ;1ST DEVICE VECTOR.
156 000012- 300 BR1: .BYTE PRTV6+0 ;1ST RR LEVEL.
157 000013- 300 BR2: .BYTE PRTV+0 ;2ND RR LEVEL.
158 000013- 000001 DVID1: +1 ;DEVICE INDICATOR 1.
159 000016- 000000 SR1: OPEN ;SWITCH REGISTER 1
160 000020- 000000 SR2: OPEN ;SWITCH REGISTER 2
161 000022- 000000 SR3: OPEN ;SWITCH REGISTER 3
162 000024- 000000 SR4: OPEN ;SWITCH REGISTER 4
163 ;*****
164 000026- 140000 STAT: 140000 ;STATUS WORD
165 000032- 000224- IHW: START ;MODULE START ADDR.
166 000032- 000224- SPAIN: MODSP ;MODULE STACK POINTER.
167 000034- 000000 PASCNT: 0 ;PASS COUNTER.
168 000036- 000120 ICNT: 80. ;# OF ITERATIONS PER PASS=80.
169 000040- 000000 ICHM: 0 ;LOC TO COUNT ITERATIONS
170 000042- 000000 SOFCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
171 000044- 000000 HRDCNT: 0 ;LOC TO SAVE TOTAL HARD ERRORS
172 000046- 000000 SOFPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
173 000050- 000000 HROPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
174 000052- 000000 SVSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
175 000054- 000000 RANNUM: 0 ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
176 000056- 000000 CONPIC: 0 ;RESERVED FOR MONITOR USE
177 000056- 000000 RES1: 0 ;RESERVED FOR MONITOR USE
178 000056- 000000 RES2: 0 ;RESERVED FOR MONITOR USE
179 000062- 000000 SVR0: OPEN ;LOC TO SAVE R0.
180 000064- 000000 SVR1: OPEN ;LOC TO SAVE R1.
181 000066- 000000 SVR2: OPEN ;LOC TO SAVE R2.
182 000068- 000000 SVR3: OPEN ;LOC TO SAVE R3.
183 000072- 000000 SVR4: OPEN ;LOC TO SAVE R4.
184 000074- 000000 SVR5: OPEN ;LOC TO SAVE R5.
185 000076- 000000 SVR6: OPEN ;LOC TO SAVE R6.
186 000100- 000000 CSRA: OPEN ;ADDR OF CURRENT CSR.
187 000102- 000000 SBADR: ;ADDR OF GOOD DATA, OR
188 000102- 000000 ACSR: OPEN ;CONTENTS OF CSR.
189 000104- 000000 WASADR: ;ADDR OF BAD DATA, OR
190 000104- 000000 ASSTAT: OPEN ;STATUS REG CONTENTS.
191 000106- 000000 ERRTYP: ;TYPE OF ERROR
192 000106- 000000 ASB: OPEN ;EXPECTED DATA.
193 000110- 000000 AWAS: OPEN ;ACTUAL DATA.
194 000112- 000240- RSTRT: RSTRT ;RESTART ADDRESS AFTER END OF PASS
195 000114- 000000 WDT0: OPEN ;WORDS TO MEMORY PER ITERATION
196 000116- 000000 WDFR: OPEN ;WORDS FROM MEMORY PER ITERATION
197 000120- 000000 INTR: OPEN ;# OF INTERRUPTS PER ITERATION
```

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198 000122- 000015 IDNUM: 15 ;MODULE IDENTIFICATION NUMBER=15
199 000040- 000040 .REPT SPSIZ ;MODULE STACK STARTS HERE.
200 .NLST
201 .WORD 0
202 .LIST
203 .ENDR
204 000224- MODSP:
205 ;*****
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206 000224 012767 000120 177662 START: MOV #R0,WDTO ;80 WORDS TO MEM FROM READER
207 000232 012767 000121 177660 MOV #R1,INTR ;81 INTERRUPTS PER ITERATION
208
209 000240 016700 177542 RESTR: MOV ADDR,R0 ; GET DEVICE ADDRESS
210 000249 010067 000652 MOV #R0,CRS ; LOAD DEVICE ADDRESS
211 TST #R0 ;
212 000252 010067 000646 MOV #R0,CRB1 ; LOAD DATA 1 ADDRESS
213 000256 005720 (R0)+ ;
214 000264 010067 000642 MOV #R0,CRB2 ; LOAD DATA 2 ADDRESS
215 000264 016700 177520 MOV VECTOR,R0 ; GET DEVICE VECTOR
216 000270 012720 000454 MOV #INTR,(R0)+ ; POINT TO SERVICE ROUTINE
217 000274 116710 177512 MOV# BR1,(R0) ; GET PRIORITY
218
219
220 000300 005067 000604 CLR CRDCNT ; ZERO CARD COUNTER
221 000304 032777 000400 000610 BIT #R10,ACRS ; READER ON-LINE ?
222 000312 001416 BEQ NUCAR1 ; YES, BEGIN THE TEST
223 000314 005767 177514 TST #R0 ; FIRST PASS ?
224 000320 001013 BNE NUCAR1 ; NO, DON'T LOG ERROR YET
225 000322 004767 000540 JSR R7,ERSUB ; YES, LOAD ERROR INFORMATION
226 000326 012767 000006 MOV #R7,ERRTYP ; OFF LINE CODE
227
228
229 000334 104405 000000 000000 HRDERS,REGIN,NULL ;READER OFF-LINE... WAITING
230 000342 000402 BR NUCAR1
231
232
233 000344 104413 000000 000000 NUCARD: ENDDITS,BEGIN ; SIGNAL END OF ITERATION.
234 000350 005067 000536 NUCAR1: CLR COLUMN ; ZERO COLUMN COUNTER
235 000354 005067 000536 SUM1 ; ZERO TRACE RUNNING SUM
236 000360 005067 000536 CLR SUM2 ; ZERO ENCODED RUNNING SUM
237 000364 012767 177777 000522 MOV #177777,CLK ; SET CLOCK COUNTER
238
239
240 000372 104407 000000 000000 1S: BREAKS,REGIN ; TEMPORARY RETURN TO MONITOR...
241 000376 104407 000000 000000 BREAKS,BEGIN ; THEN CONTINUE AT NEXT INSTRUCTION.
242 000378 032777 000400 000512 BIT #R10,@CRS ; READY ?
243 000380 001412 BFC GO ; YES, CONTINUE
244 000382 005367 DEC CLK ; NO, WAIT SOME MORE ?
245 000384 001365 BNE IS ; GO WAIT
246 000386 004767 JSR R7,ERSUB ; NO, LOAD ERROR INFORMATION
247
248
249 000424 104405 000000 000000 HRDERS,REGIN,NULL ;READER STILL NOT READY... BNE
250 000432 104410 000000 000000 SNDS,REGIN ;
251
252
253 000436 005267 000446 GOI: INC CRDCNT ; DROP THE MODULE
254 000442 012777 000101 000452 MOV #101,ACRS ; COUNT A CARD
255 000450 104400 000000 000000 EXITS,BEGIN ; ENABLE INTERRUPT AND READ
256 ; ; EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
257
258
259
260 000454 105777 000442 ; INTERRUPT SERVICE
261 000460 100011 INTSR: TST @CRS ; COLUMN READY TO BE READ ?
262 000462 067767 IS ; NO, FIND OUT WHY
263 000464 000436 ADD @CRB1,SUM1 ; ADD IMAGE TO RUNNING SUM
264 000466 005367 ADD @CRB2,SUM2 ; ADD ENCODED TO RUNNING SUM
265 000468 005267 INC COLUMN ; COUNT COLUMN
266 000502 000002 RTI ; GO ON TO OTHER THINGS

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262 000504 004767 000356 1S: JSR R7,ERSUB ; SAVE ADDR AND CONTENTS OF CONTROL RFGS.
263 000510 042777 000100 000404 BIT #R0,ACRS ; DISABLE INTERRUPT
264
265 000516 000004 000000 000524 PTRQS,BEGIN,WHY ; QUEUE UP TO CONTINUE AT WHY AND RTI
266
267
268 000524 005767 177352 WHY: TST ACSR ; ERROR ?
269 000530 100435 BHI 2S ; YES, GO CHECK IT OUT
270 000532 032767 040000 177342 BIT #R14,ACSR ; CARD DONE ?
271 000540 001011 BNE 1S ; YES, GO CHECK CHECKSUMS
272 000542 032767 002000 177332 BIT #R10,ACSR ; TRANSITION TO ON-LINE ?
273 000550 001775 BNE NUCARD ; YES, GO GET A CARD
274 000552 032767 000400 177322 BIT #R10,ACSR ; READER READY ?
275 000560 001671 BEQ NUCARD ; YES, GO GET ANOTHER CARD
276 000562 000447 BR 4S ; NO, GO REPORT ERROR
277
278
279 000564 022767 000120 000320 1S: CMP #R0,COLUMN ; 80 COLUMNS CHECKED ?
280 000574 001457 BEQ CHECK ; YES, GO CHECK CHECKSUMS
281 000578 022767 000050 000310 CMP #R0,COLUMN ; 40 COLUMN CARD ?
282 000602 001717 BFC GOI ; YES, GET SECOND CARD
283 000604 012767 000011 177274 MOV #11,ERRTYP ; DONE OCCURED BUT SHOULD NOT HAVE
284
285 000612 104405 000000 000000 HRDERS,REGIN,NULL ;CARD DONE SET BUT NOT 40 OR 80 COLUMNS READ
286
287
288 000620 000167 177520 2S: JMP NUCARD ; GO TRY ANOTHER CARD
289 000624 032767 004000 177250 BIT #R11,ACSR ; TIMING ERROR ?
290 000632 001410 BFC 3S ; NO, LOOK FOR OTHERS
291 000634 012767 000002 177244 MOV #2,ERRTYP ; TIMING ERROR CODE
292
293
294 000642 104400 000000 000000 3S: SOFERS,REGIN,NULL ; TIMING ERROR
295
296
297 000650 000167 177470 JMP NUCARD ; GO TRY ANOTHER CARD
298 000654 032767 000400 177220 BIT #R10,ACSR ; ON-LINE ?
299 000662 001007 BNE 4S ; NO, GO REPORT ERROR
300 000664 005067 CLR #R7,ERRTYP ; UNKNOWN ERROR
301
302
303 000670 104405 000000 000000 HRDERS,REGIN,NULL ;ERROR BIT WAS SET - OTHERS WEREN'T
304
305
306 000676 000167 177442 JMP NUCARD ; GO TRY ANOTHER CARD
307 000702 022767 000120 000200 4S: CMP #R0,CRDCNT ; REQUIRED NUMBER OF CARDS READ ?
308 000710 001410 BFC CHECK ; YES, GO CHECK DATA
309 000712 012767 000006 177166 MOV #C,ERRTYP ; OFF LINE CODE
310
311
312 000720 104405 000000 000000 HRDERS,REGIN,NULL ;OFF-LINE --- EXAMINE READER FOR "CHECK" CONDITIONS
313
314
315 000726 000167 177412 ; JMP NUCARD IF HOPPER EMPTY, PROBABLY TOO FEW TEST CARDS (80 REQUIRED)
316 ; GO SET UP FOR NEXT CARD

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ICOUNT	000040R	169#																			
IDNUM	000122R	198#																			
INIT	000030R	165#																			
INTR	000454R	216#	255#																		
INTR	000120R	197#	207#																		
MAP22S	104416	206#																			
MODNAM	000000R	152#																			
MODSP	000224R	166#	204#																		
MSGNS	104403	206#																			
MSGNS	104402	206#																			
MSGNS	104401	206#																			
NUCARD	000344R	230#	272	274	285#	292	299	307	333												
NUCARD	000350R	222	229	233#																	
NUCAR1	000000	227	246	283	290	297	304														
NULL	000000	153	159	160	162	179	180	181	182	183	184	185	186								
OPEW	000000	188	190	192	193	195	196	197	206#												
OPOAS	104420	206#																			
PASCNT	000034R	167#	222																		
PTRGS	000004	206#	265																		
POPSP	005726	206#																			
POPSP2	022626	206#																			
PRTV	000000	157	206#																		
PRTV0	000000	206#																			
PRTV1	000040	206#																			
PRTV2	000100	206#																			
PRTV3	000140	206#																			
PRTV4	000200	206#																			
PRTV5	000240	206#																			
PRTV6	000300	156	206#																		
PRTV7	000340	156																			
PS	177346	206#																			
PSW	177776	206#																			
PUSH	005746	206#																			
PUSH2	024646	206#																			
RANDS	104417	146#																			
RANNUM	000054R	145#																			
RESNT	000240R	194	209#																		
RES1	000056R	170																			
RES2	000056R	178#																			
RSTRT	000112R	194#																			
SRADR	000102R	187#	311*	321*																	
SOPCNT	000042R	170#																			
SOPRNS	104405	206#	290																		
SOPPAS	000046R	172#																			
SPOINT	000032R	166#																			
SPSIZ	000040	199																			
SR1	000016R	159#																			
SR2	000020R	160#																			
SR3	000022R	161#																			
SR4	000024R	162#																			
START	00024R	165	206#																		
STAT	000026R	164#																			
SUM1	001116R	234*	257*	309	313	314	344#														
SUM2	001120R	235*	258*	319	323	324	345#														
SVRO	000062R	179#																			
SVR1	000064R	180#																			

SVR2	000066R	181#																			
SVR1	000070R	182#																			
SVR4	000072R	183#																			
SVR5	000074R	184#																			
SVR6	000076R	185#																			
SVSCNT	000052R	174#																			
TRDPFD	000022	206#																			
VECTUR	000010R	155#	215																		
WASADR	000104R	189#	313*	323*																	
WDFR	000116R	186#																			
WDTN	000114R	195#	206*																		
WHY	000524R	265	267#	332																	
XFLAG	000005R	153#																			

. ARS. 000000 000  
 001130 001

ERRORS DETECTED: 0  
 DEFAULT GLOBALS GENERATED: 0

XCRAFO, XCRAFO/SOL/CRP:SYM=DDXCON, XCRAFO  
 RUN-TIME: 11.2 SECONDS  
 RUN-TIME RATIO: 10/3=3.3  
 CORE USED: 7K (13 PAGES)

digital

DECO  DEPO  SUBMISSION

FOR RELEASE ENG. USE  
 NEW  CHANGE  DELETE

PRODUCT IDENTIFICATION													
MD	LIBRARY	PRODUCT NUMBER	REV	PATCH	ECO TALLY	PRODUCT DATE			STATUS	DISTRIBUTION		1ST COPY - RIGHT YEAR	LAST COPY - RIGHT YEAR
	XX	CXCRA	F	1	0	DD	MMM	YY	OBSOLETE	X	G	R	1973

TITLE: CXCRA1 CR11 MODULE

AUTHOR: D. BUTENHOF      MAINTAINING GROUP: DEC/X11 SUPT GRP      MAINTAINER: D. BUTENHOF      SUBMITTING ENGINEER: D. BUTENHOF

PRODUCT COMPONENTS						
CK	DESCRIPTION	PRODUCT NO.	REV	CK	DESCRIPTION	PRODUCT NO.
	DOCUMENT				INDEX	
	LISTING				SOURCE MEDIA	
	OBJECT MEDIA				TEST MEDIA	
X		AF-E694F-M1				

PRODUCTS OBSOLETE (other than previous version)								
LIBRARY	PRODUCT NUMBER	REV	LIBRARY	PRODUCT NUMBER	REV	LIBRARY	PRODUCT NUMBER	REV
MD			MD			MD		

PRODUCT CHARACTERISTICS																			
PROCESSORS PRODUCT OPERATES WITH (Enter all applicable 2-digit codes representing the Processor the product operates with. See separate instructions.)																			
03	04	05	10	20	21	34	35	40	45	50	55	60	70						
OPERATIONAL CODES (Enter all applicable 2-digit codes that describe the product. See separate instructions.)																			
02	03	04	06	50															
ACT/APT/XXDP		EXT	ACT SEQ NUMBER		ACT/XXDP COMPATIBLE?		APT COMPATIBLE?		1ST PASS RUN TIME		SUBSEQUENT PASS RUN TIME								
INFORMATION FIELD					Y N		Y N		SECONDS		SECONDS								

DECO/DEPO INFORMATION							
PROBLEM REPORTS CLOSED:							
DEVICE AFFECTED: DEC/X11				MULTIMEDIA AFFECTED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
KIT NUMBERS	ZJ129-RZ, FR	ZJ239-RB, RY	ZJ240-RB, RE	ZJ240-FR	ZJ215-RY, RZ	ZJ239-RZ, PB	ZJ240-RZ, PB

PROBLEM: MODULE DOES NOT WORK PROPERLY UNDER "NEW" DEC/X11 MONITOR. WILL GET HARD ERRORS (WRONG # OF CARDS) AFTER RELOCATION, DUE TO MONITOR ALLOWING PARTIAL PASS PRIOR TO RELOCATION.

SOLUTION: INSTALL THE FOLLOWING PATCH

DEPO PATCH AREA					
CHANGE LOC	FROM	TO	CHANGE LOC	FROM	TO
36	120	1			
550	1275	1277			
560	1671	1673			
622	177520	177524			
652	177470	177474			
700	177442	177446			
730	177412	177416			
1050	1404	1726			

SUBMITTING ENGINEER: <i>D. Butenhof</i>	MANUFACTURING ENGINEER: <i>J. Casella</i>	SUPPORT ENGINEER:	CHARGE DECO/DEPO TO DISCRETE PROJECT NUMBER:
DATE: 26 MAR 78	DATE: 25-APR-79	DATE:	
MAINTAINER: <i>D. Butenhof</i>	FIELD SERVICE:	WAIVERING MANAGER:	COORDINATION NO. 3076
DATE:	DATE:	DATE:	