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IDENTIFICATION

PRODUCT CODE: AC-F428A-MC
PRODUCT NAME: CXMNEA0 MNCDO MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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1.0 ABSTRACT

THE MNE IS AN IOMOD THAT EXERCISES THE MNCDO DIGITAL OUTPUT. THE MODULE CONSISTS OF A READ-WRITE SECTION OF THE INTERNAL DATA PATH'S OF THE MNCDO LOGIC. UP TO 8 MNCDO'S CAN BE EXERCISED WITH THIS MODULE. THE "MNR" MODULE CAN BE ENABLED TO USE THE MNCDO TO WRAP-AROUND DATA INTO THE MNCDI. IF YOU HAVE SELECTED THAT OPTION, YOU SHOULD DESELECT "MNE" MODULE.

2.0 REQUIREMENTS

HARDWARE: ONE MNCDO (DIGITAL OUT).

STORAGE:: MNE REQUIRES:
DECIMAL WORDS: 407
OCTAL WORDS: 627
OCTAL BYTES: 1456

3.0 PASS DEFINITION

1000 OCTAL PASSES THRU THE LOGIC AND INTERRUPT TESTS.

4.0 EXECUTION TIME

ONE PASS OF THE MNE MODULE RUNNING ALONE TAKES APPROXIMATELY ONE MINUTE.

5.0 CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:

DEVADP: 171260, VECTOR 340, BR1: 4

DEVCNT: 1, SR1: N/A

REQUIRED PARAMETERS:

NONE.

6.0 DEVICE/OUTPUT SET-UP

NONE IF THE "MNR" MODULE IS NOT SELECTED TO RUN WRAP-AROUND MODE.
THIS MODULE MUST BE DESSELECTED IF "MNR" IS IN WRAP-AROUND MODE
AND THE BUS ADDRESS AND VECTOR IS THE DEFAULT VALUE.

7.0 MODULE OPERATION

THE MODULE PERFORMES THE FOLLOWING TESTS:

FLOAT A 1 ACROSS THE DATA OUTPUT REGISTER
FLOAT A 0 ACROSS THE DATA OUTPUT REGISTER
VERIFY BYTE OPERATION OF THE DATA OUTPUT REGISTER
READ-WRITE TEST OF BIT 6 OF THE STATUS REGISTER
READ-WRITE TEST OF BIT 4 OF THE STATUS REGISTER
READ-WRITE TEST OF BIT 3 OF THE STATUS REGISTER
OUTPUT DONE FLAG CAN SET
OUTPUT DONE FLAG CAN BE WRITTEN TO A ZERO
OUTPUT DONE FLAG CLEARS WHEN THE DATA OUTPUT REGISTER IS LOADED
OUTPUT DONE FLAG GENERATES AN INTERRUPT

8.0 OPERATION OPTIONS

LOCATION DVID1 CAN BE MODIFIED TO SELECT ADDITIONAL UNITS.

9.0 NON-STANDARD PRINTOUTS

ALL PRINTOUTS HAVE THE STANDARD FORMATS DESCRIBED IN THE DEC/X11
DOCUMENT.

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141 .LIST ME
142 .NLIST MC,CND,MD
143 .TITLE MNEA DEC/X11 SYSTEM EXERCISER MODULE
144 ; DDXCOM VERSION 6 23-MAY-78
145 .LIST BIN
146 ;*****
147 000000° BEGIN:
148 000000° 047115 040505 040 MODNAM: .ASCII /MNEA / ;MODULE NAME.
149 000005° 000 XFLAG: .BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
150 000006° 171260 ADDR: 171260+0 ;1ST DEVICE ADDR.
151 000010° 000340 VECTOR: 340+0 ;1ST DEVICE VECTOR.
152 000012° 200 BR1: .BYTE PRTY4+0 ;1ST BR LEVEL.
153 000013° 000 BR2: .BYTE PRTY0+0 ;2ND BR LEVEL.
154 000014° 000001 DVID1: 0+1 ;DEVICE INDICATOR 1.
155 000016° 000000 SR1: OPEN ;SWITCH REGISTER 1
156 000020° 000000 SR2: OPEN ;SWITCH REGISTER 2
157 000022° 000000 SR3: OPEN ;SWITCH REGISTER 3
158 000024° 000000 SR4: OPEN ;SWITCH REGISTER 4
159 ;*****
160 000026° 140000 STAT: 140000 ;STATUS WORD.
161 000030° 000244° INIT: START ;MODULE START ADDR.
162 000032° 000224° SPOINT: MODSP ;MODULE STACK POINTER.
163 000034° 000000 PASCNT: 0 ;PASS COUNTER.
164 000036° 001000 ICONT: 1000 ;# OF ITERATIONS PER PASS=1000
165 000040° 000000 ICOUNT: 0 ;LOC TO COUNT ITERATIONS
166 000042° 000000 SOFCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
167 000044° 000000 HRDCNT: 0 ;LOC TO SAVE TOTAL HARD ERRORS
168 000046° 000000 SOFPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
169 000050° 000000 HRDPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
170 000052° 000000 SYSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
171 000054° 000000 RANNUM: 0 ;HOLDS RANDOM # WHEN RAND MACPO IS CALLED
172 000056° CONFIG: ;RESERVED FOR MONITOR USE
173 000056° 000000 RES1: 0 ;RESERVED FOR MONITOR USE
174 000060° 000000 RES2: 0 ;RESERVED FOR MONITOR USE
175 000062° 000000 SVR0: OPEN ;LOC TO SAVE R0.
176 000064° 000000 SVR1: OPEN ;LOC TO SAVE R1.
177 000066° 000000 SVR2: OPEN ;LOC TO SAVE R2.
178 000070° 000000 SVR3: OPEN ;LOC TO SAVE R3.
179 000072° 000000 SVR4: OPEN ;LOC TO SAVE R4.
180 000074° 000000 SVR5: OPEN ;LOC TO SAVE R5.
181 000076° 000000 SVR6: OPEN ;LOC TO SAVE R6.
182 000100° 000000 CSRA: OPEN ;ADDR OF CURRENT CSR.
183 000102° SBADR: ;ADDR OF GOOD DATA, OR
184 000102° 000000 ACSR: OPEN ;CONTENTS OF CSR.
185 000104° WASADR: ;ADDR OF BAD DATA, OR
186 000104° 000000 ASTAT: OPEN ;STATUS REG CONTENTS.
187 000106° ERRTRYP: ;TYPE OF ERROR
188 000106° 000000 ASB: OPEN ;EXPECTED DATA.
189 000110° 000000 AWAS: OPEN ;ACTUAL DATA.
190 000112° 000244° RSTRT: RESTRT ;RESTART ADDRESS AFTER END OF PASS
191 000114° 000000 WDTO: OPEN ;WORDS TO MEMORY PER ITERATION
192 000116° 000000 WDFR: OPEN ;WORDS FROM MEMORY PER ITERATION
193 000120° 000000 INTR: OPEN ;# OF INTERRUPTS PER ITERATION
194 000122° 000000 IDNUM: 0 ;MODULE IDENTIFICATION NUMBER=0
195 000224° MODSP:
196 ;*****
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197      000224* 000006*      OCSR:  ADDR
198      000226* 000007*      OCSR:  ADDR+1      ;HIGH BYTE ADDRESS
199
200
201      000230* 000010*      DOR:   ADDR+2
202      000232* 000011*      DOR:   ADDR+3      ;HIGH BYTE ADDRESS
203
204      000234* 000010*      DODINV: VECTOR
205      000236* 000012*      DODINS: VECTOR+2
206
207      000240* 000000*      TEMP:  0
208      000242* 000001*      TEMP1: 1
209
210      004000*      HITDAT=BIT12      ;MAINT INPUT INHIBIT
211      004000*      HITEXT=BIT11     ;MAINT INPUT STROBE
212
213      000244*      RESTRT:
214      000244*      START:
215      000244* 012767 000001 177770  CONT:  MOV  #BIT0,TEMP1      ;LOAD UNIT SELECT POINTER
216      000252* 012700 000224*      MOV  #OCSR,R0        ;LOAD ADDRESS POINTER
217      000256* 016701 177524*      MOV  ADDR,R1        ;LOAD INITIAL BUS ADDRESS
218      000262* 010120*      1S:  MOV  R1,(R0)+        ;LOAD DEVICE ADDRESS
219      000264* 005201*      INC  R1              ;UPDATE BUS ADDRESS VALUE
220      000266* 020027 000234*      CMP  R0,#DOR1+2     ;TEST IF DONE WITH BUS ADDRESSES
221      000272* 001373*      BNE  1S             ;RR IF NOT
222      000274* 016701 177510*      MOV  VECTOR,R1      ;LOAD VECTOR POINTER
223      000300* 010120*      3S:  MOV  R1,(R0)+        ;LOAD DEVICE VECTOR ADDRESS
224      000302* 005721*      TST  (R1)+          ;UPDATE BUS VECTOR VALUE
225      000304* 010110*      MOV  R1,(R0)        ;LOAD 2ND ADDR.
226
227      000306* 016767 177712 177564  DOR:  MOV  OCSR,CSPA      ;LOAD BUS ADDRESS IF AN ERROR
228      000314* 005777 177704*      TST  #OCSR          ;TEST OUTPUT STATUS REGISTER
229      000320* 005777 177704*      TST  #DOR           ;TEST OUTPUT DATA REGISTER

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230      000324*      D01:
231
232      000324* 012767 000001 177550  MOV  #BIT0,ACSR      ;LOAD EXPECT BIT
233      000332* 016777 177544 177670  1S:  MOV  ACSR,#DOR      ;LOAD MNCDO DATA REGISTER
234      000340* 017767 177664 177536  MOV  #DOP,ASTAT      ;READ MNCDO DATA REGISTER
235      000346* 026767 177530 177530  CMP  ACSR,ASTAT      ;COMPARE
236      000354* 001403*      BEQ  2S             ;RR IF SAME
237
238      000356* 104405 000000* 000000  ;*****
239      000356* 104405 000000* 000000  HDRS,REGIN,NULL      ;MNCDO DATA REGISTER FAILED TO HOLD A FLOATING 1
240
241      000364* 104407 000000*      2S:  BREAKS,REGIN        ;TEMPORARY RETURN TO MONITOR....
242      000370* 104407 000000*      BREAKS,REGIN        ;THEN CONTINUE AT NEXT INSTRUCTION.
243      000374* 006367 177502*      ASL  ACSR           ;CHANGE THE DATA
244      000400* 001354*      ENF  1S            ;RR IF MORE DATA
245
246      000402*      D02:
247      000402* 012767 000001 177630  ;FLOAT A 0 ACROSS THE MNCDO DATA REGISTER
248      000410* 016767 177624 177464  MOV  #BIT0,TEMP      ;LOAD INITIAL BIT
249      000416* 005167 177460*      1S:  MOV  TEMP,ACSR      ;LOAD EXPECTED
250      000422* 016777 177454 177600  COM  ACSR            ;COMPLEMENT
251      000430* 017767 177574 177446  MOV  ACSR,#DOR      ;LOAD MNCDO DATA REGISTER
252      000436* 026767 177440 177440  MOV  #DOP,ASTAT      ;READ MNCDO DATA REGISTER
253      000444* 001403*      CMP  ACSR,ASTAT      ;COMPARE
254      000446* 104405 000000* 000000  BEQ  2S             ;RR IF SAME
255      000446* 104405 000000* 000000  ;*****
256      000446* 104405 000000* 000000  HDRS,REGIN,NULL      ;MNCDO DATA REGISTER FAILED TO HOLD A FLOATING 0
257
258      000454* 104407 000000*      2S:  BREAKS,BEGIN        ;TEMPORARY RETURN TO MONITOR....
259      000460* 104407 000000*      BREAKS,BEGIN        ;THEN CONTINUE AT NEXT INSTRUCTION.
260      000464* 006367 177550*      ASL  TEMP           ;CHANGE THE DATA
261      000470* 001347*      BNE  1S            ;RR IF MORE DATA
262
263      000472*      D03:
264      000472* 012777 177777 177530  ;VERIFY BYTE OPERATION ON THE MNCDO DATA REGISTER
265      000500* 012767 000377 177374  1S:  MOV  #-1,#DOR      ;LOAD MNCDO DATA REGISTER
266      000506* 105077 177520*      MOV  #377,ACSR     ;LOAD EXPECTED
267      000512* 017767 177512 177364  CLRB #DOR1          ;CLEAR HIGH BYTE
268      000520* 026767 177356 177356  MOV  #DOR,ASTAT      ;READ MNCDO DATA REGISTER
269      000526* 001403*      CMP  ACSR,ASTAT      ;COMPARE
270      000530* 104405 000000* 000000  BEQ  2S             ;RR IF SAME
271      000530* 104405 000000* 000000  ;*****
272      000530* 104405 000000* 000000  HDRS,REGIN,NULL      ;CLEARING HIGH BYTE CHANGED LOW BYTE
273
274      000536* 012777 177777 177464  2S:  MOV  #-1,#DOR      ;LOAD MNCDO DATA REGISTER
275      000544* 012767 177460 177330  MOV  #177400,ACSR    ;LOAD EXPECTED
276      000552* 105077 177452*      CLRB #DOR          ;CLEAR LOW BYTE
277      000556* 017767 177446 177320  MOV  #DOP,ASTAT      ;READ MNCDO DATA REGISTER
278      000564* 026767 177312 177312  CMP  ACSR,ASTAT      ;COMPARE
279      000572* 001403*      BEQ  3S             ;RR IF SAME
280      000574* 104405 000000* 000000  ;*****
281      000574* 104405 000000* 000000  HDRS,REGIN,NULL      ;CLEARING LOW BYTE CHANGED HIGH BYTE
282
283      000602* 104407 000000*      3S:  BREAKS,BEGIN        ;TEMPORARY RETURN TO MONITOR....
284      000606* 104407 000000*      BREAKS,BEGIN        ;THEN CONTINUE AT NEXT INSTRUCTION.
285      000612*      D04:

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286 ;TEST THAT BIT6 OF MNCDO STATUS REGISTER IS READ-WRITE
287 MOV #BIT6,ACSR ;LOAD EXPECTED
288 MOV ACSR,ACCSR ;LOAD BIT6 INTO MNCDO STATUS REGISTER
289 MOV @ACSR,ASTAT ;READ MNCDO STATUS REGISTER
290 CMP ACSR,ASTAT ;TEST THAT IT SET
291 BEQ 1$ ;BR IF SAME
292 ;*****
293 HDRFRS,REGIN,NULL ;BIT6 OF MNCDO STATUS REGISTER FAILED TO SET
294 ;*****
295 BIC ACSR,@ACSR ;CLEAR THAT BIT
296 MOV @ACSR,ASTAT ;READ MNCDO STATUS REGISTER AGAIN
297 CMP ACSR,ASTAT ;TEST THE BIT
298 BNE 2$ ;BR IF CLEARED
299 ;*****
300 HDRFRS,REGIN,NULL ;BIT6 OF MNCDO STATUS REGISTER FAILED TO CLEAR
301 ;*****
302 BREAK6,REGIN ;TEMPORARY RETURN TO MONITOR,...
303 BREAK6,REGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
304
305 D05:
306 ;TEST THAT BIT4 OF MNCDO STATUS REGISTER IS READ-WRITE
307 MOV #BIT4,ACSR ;LOAD EXPECTED
308 MOV ACSR,@ACSR ;LOAD BIT4 INTO MNCDO STATUS REGISTER
309 MOV @ACSR,ASTAT ;READ MNCDO STATUS REGISTER
310 CMP ACSR,ASTAT ;TEST THAT IT SET
311 BEQ 1$ ;BR IF SAME
312 ;*****
313 HDRFRS,REGIN,NULL ;BIT4 OF MNCDO STATUS REGISTER FAILED TO SET
314 ;*****
315 BIC ACSR,@ACSR ;CLEAR THAT BIT
316 MOV @ACSR,ASTAT ;READ MNCDO STATUS REGISTER AGAIN
317 CMP ACSR,ASTAT ;TEST THE BIT
318 BNE 2$ ;BR IF CLEARED
319 ;*****
320 HDRFRS,REGIN,NULL ;BIT4 OF MNCDO STATUS REGISTER FAILED TO CLEAR
321 ;*****
322 BREAK4,REGIN ;TEMPORARY RETURN TO MONITOR,...
323 BREAK4,REGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
324
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325 ;TEST THAT BIT3 OF MNCDO STATUS REGISTER IS READ-WRITE
326 MOV #BIT3,ACSR ;LOAD EXPECTED
327 MOV ACSR,@ACSR ;LOAD BIT3 INTO MNCDO STATUS REGISTER
328 MOV @ACSR,ASTAT ;READ MNCDO STATUS REGISTER
329 CMP ACSR,ASTAT ;TEST THAT IT SET
330 BEQ 1$ ;BR IF SAME
331 ;*****
332 HDRFRS,REGIN,NULL ;BIT3 OF MNCDO STATUS REGISTER FAILED TO SET
333 ;*****
334 BIC ACSR,@ACSR ;CLEAR THAT BIT
335 MOV @ACSR,ASTAT ;READ MNCDO STATUS REGISTER AGAIN
336 CMP ACSR,ASTAT ;TEST THE BIT
337 BNE 2$ ;BR IF CLEARED
338 ;*****
339 HDRFRS,REGIN,NULL ;BIT3 OF MNCDO STATUS REGISTER FAILED TO CLEAR
340 ;*****
341 BREAK3,REGIN ;TEMPORARY RETURN TO MONITOR,...
342 BREAK3,REGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
343
344 D06:
345 ;VERIFY THAT MNCDO DONE FLAG SETS
346 CLR @ACSR ;CLEAR CLEARED FLAG
347 MOV #BIT7,ACSR ;LOAD EXPECTED
348 CLR @ACSR ;ENABLE
349 MOVR #BIT0,@ACSR1 ;GENERATE MAINT. REPLY
350 CLR ACSR ;CLEAR EXPECTED
351 MOV @ACSR,ASTAT ;READ OUTPUT STATUS REGISTER
352 CMP ACSR,ASTAT ;COMPARE
353 BEQ D010 ;BR IF SAME
354 ;*****
355 HDRFRS,REGIN,NULL ;OUTPUT DONE FLAG FAILED TO SET
356 ;*****
357 ;VERIFY THAT MNCDO DONE FLAG CLEARS WHEN WRITTEN TO A 0
358 CLR @ACSR ;ENABLE
359 MOVR #BIT0,@ACSR1 ;GENERATE MAINT. REPLY
360 CLR ACSR ;CLEAR EXPECTED
361 MOV @ACSR,ASTAT ;READ STATUS
362 BEQ D011 ;BR IF SAME
363 ;*****
364 HDRFRS,REGIN,NULL ;WRITING OUTPUT FLAG TO A ZERO FAILED TO CLEAR OUTPUT DO
365 ;*****
366 ;VERIFY THAT MNCDO DONE FLAG CLEARS WHEN OUTPUT DATA REGISTER IS WRITTEN
367 CLR @ACSR ;ENABLE
368 MOVR #BIT0,@ACSR1 ;GENERATE MAINT. REPLY
369 CLR ACSR ;CLEAR EXPECTED
370 MOV @ACSR,ASTAT ;WRITE THE OUTPUT DATA REGISTER
371 BEQ D012 ;BR IF CLEARED
372 ;*****
373 HDRFRS,REGIN,NULL ;OUTPUT DONE FLAG FAILED TO CLEAR
374 ;*****
375 ;WHEN OUTPUT DATA REGISTER WAS WRITTEN
376
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DO7	001120R	347*														
DVID1	000014R	154*	405													
ENDITS	104413	197*	407													
ENDS	104410	197*														
ERRIYP	000106R	187*														
EXIT\$	104400	197*	391													
FINISH	001376R	402*														
GETPAS	104415	197*														
GWBUF\$	104414	197*														
HPDCNT	000044R	167*														
HPDERS	104405	197*	238	255	271	280	293	300	313	320	333	340	355	365		
		376														
HRDPAS	000050R	169*														
ICONT	000036R	164*														
ICOUNT	000040P	165*														
IDNUM	000122R	194*														
INIT	000030P	161*														
INTR	000120R	193*														
MAP22\$	104416	197*														
MODNAM	000000R	148*														
MODSP	000224R	162	195*													
MSGNS	104403	197*														
MSG\$	104402	197*														
MSG\$	104401	197*														
NULL	000000	197*	238	255	271	280	293	300	313	320	333	340	355	365		
		376														
OCSR	000224R	198*	214	227	228	288*	289	295*	296	308*	309	315*	316	328*		
		329	335*	336	347*	351	361*	362	373	387*	393*	399*	410			
OCSR1	000226R	199*	350*	359*	370*	386*										
OPEN	000000	149	155	156	157	158	175	176	177	178	179	180	181	182		
		184	186	188	189	191	192	193	197*							
OTOA\$	104420	197*														
PASCNT	000034R	163*														
PIRQ\$	000004	197*	395													
POPSP	005726	197*														
POPSP2	022626	197*														
PRTY	000000	197*														
PRTY0	000000	153	197*													
PRTY1	000040	197*														
PRTY2	000100	197*														
PRTY3	000140	197*														
PRTY4	000200	152	197*													
PRTY5	000240	197*														
PRTY6	000300	197*														
PRTY7	000340	197*														
PS	177776	197*														
PSW	177776	197*														
PUSH	005746	197*														
PUSH2	024646	197*														
RAND\$	104417	197*														
RANNUM	000054P	171*														
RESTRT	000244R	190	211*													
RES1	000056P	173*														
RES2	000060P	174*														
RSTRT	000112R	190*														
SBADP	000102P	183*														

SOFCNT	000042P	166*														
SOFER\$	104406	197*														
SOPPAS	000046P	168*														
SPOINT	000032R	162*														
SPSIZ	000040	1*	195													
SR1	000016P	155*														
SR2	000020P	156*														
SR3	000022R	157*														
SR4	000024R	158*														
START	000244R	161	212*													
STAT	000026P	160*														
SVR0	000062R	175*														
SVR1	000064R	176*														
SVR2	000066P	177*														
SVR3	000070R	178*														
SVR4	000072P	179*														
SVR5	000074R	180*														
SVR6	000076R	181*														
SYSCNT	000052P	170*														
TEMP	000240R	207*	247*	248	260*	412										
TEMP1	000242R	208*	213*	402*	403	405										
TRDFED	000022	197*														
VECTOP	000010P	151*	204	205	220											
WASADP	000104R	185*														
WDFR	000116P	192*														
WDTO	000114R	191*														
XFLAG	000005P	149*														

* ABS, 000000 000
 001456 001

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

XMNEAP,XMNEAP/SOL/CPF:SYM=PDXC04,XMNEAP
 RUN-TIME: 1 1 .2 SECONDS
 RUN-TIME RATIO: 64/3=16.3
 CORE USED: 7K (13 PAGES)