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IDENTIFICATION

PRODUCT CODE: AC-E854D-MC
PRODUCT NAME: CXDRADO DR11-A MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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1. ABSTRACT

DRA IS AN IOMOD THAT EXERCISES ONE DR11-A. THE MODULE USES THE MAINTENANCE MODE TO CHECK DATA TRANSFERS TO AND FROM THE DR11-A. IT TRANSMITS AND RECEIVES A SERIES OF WORST-CASE BUS PATTERNS AND ALSO TESTS THE ABILITY OF THE DR11A TO GENERATE BOTH TRANSMIT AND RECEIVE INTERRUPTS.

2. REQUIREMENTS

HARDWARE: ONE DR11-A WITH A MAINTENANCE CABLE

STORAGE:: DRA REQUIRES:

1. DECIMAL WORDS: 196
2. OCTAL WORDS: 0304
3. OCTAL BYTES: 610

3. PASS DEFINITION

ONE PASS OF THE DRA MODULE CONSISTS OF TRANSMITTING AND RECEIVING 64 WORDS AND GENERATING ONE TRANSMIT AND ONE RECEIVER INTERRUPT.

4. EXECUTION TIME

ONE PASS OF DRA RUNNING ALONE ON A PDP11/05 PROCESSOR TAKES APPROXIMATELY MINUTES

5. CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:

DEVADR: 167770, VECTOR: 410, BR1: 5, DEVCNT: 1

REQUIRED PARAMETERS:

AT CONFIGURATION TIME MODIFY "VECTOR" IF SYSTEM SPECIFIES OTHER THAN 410

6. DEVICE/OPTION SET-UP

CONNECT THE MAINTENANCE CABLE TO TIE OUTPUT BACK TO INPUT

7. MODULE OPERATION

TEST SEQUENCE:

- A. SET UP VECTORS AND ADDRESS POINTER
- B. OUTPUT TEST DATA TO OUTPUT BUFFER
- C. COMPARE OUTPUT BUFFER WITH TEST DATA-REPORT ANY DATA ERROR
- D. COMPARE INPUT BUFFER WITH TEST DATA-REPORT ANY DATA ERROR
- E. IF NOT 64 TRANSFERS, NEXT TEST DATUM--REPEAT B-D
- F. IF FINISHED GENERATE AND TEST INPUT/OUTPUT INTERRUPTS.
- G. IF NO INTERRUPT - DO NOT REPORT END PASS
- H. IF INTERRUPT - REPORT END PASS RESTART AT A

IF DEVICE FAILS TO GENERATE INTERRUPT DRA LOOPS AT:

- A. DRA 452 FOR RECEIVE
- B. DRA 460 FOR TRANSMIT

IN EITHER CASE NO END PASS PRINTOUT OCCURS.

8. OPERATION OPTIONS

NONE

9. NON-STANDARD PRINTOUTS

NONE: ALL PRINTOUTS HAVE THE STANDARD FORMATS DESCRIBED IN THE DEC/X11 DOCUMENT

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DR11-A DEC/X11 EXERCISER MODULE
000000- IDMOD <DRAD> 167770 410 5 500,55
000000- MODULE 140000 DRAD 167770 410 5 500,55
; TITLE DRAD DEC/X11 SYSTEM EXERCISER MODULE
; DDXCOM VERSION 6 23-MAY-78
;*****LIST BIN*****
000000- 051104 042101 040 BEGIN:
000005- 000 ASCII /DRAD / ;MODULE NAME.
000010- 167770 ADDR: 167770+0 ;USED TO KEEP TRACK OF WBUF USAGE
000015- 000410 VECTOR: 410+0 ;1ST DEVICE ADDR.
000020- 240 BR1: .BYTE PRTY5+0 ;1ST BR LEVEL.
000025- 000 BR2: .BYTE PRTY+0 ;2ND BR LEVEL.
000030- 000001 DIVI1: +1 ;DEVICE INDICATOR 1.
000035- 000000 SR1: OPEN ;SWITCH REGISTER 1
000040- 000000 SR2: OPEN ;SWITCH REGISTER 2
000045- 000000 SR3: OPEN ;SWITCH REGISTER 3
000050- 000000 SR4: OPEN ;SWITCH REGISTER 4
;*****LIST BIN*****
000026- 140000 STAT: 140000 ;STATUS WORD.
000030- 000232- INIT: START ;MODULE START ADDR.
000035- 000000 SPOINT: MODSP ;MODULE STACK POINTER.
000040- 000000 PASCNT: 0 ;PASS COUNTER.
000045- 000500 ICOUNT: 500 ;# OF ITERATIONS PER PASS=500
000050- 000000 LCCNT: 0 ;LOC TO COUNT ITERATIONS
000055- 000000 SOFCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
000060- 000000 HRDCNT: 0 ;LOC TO SAVE TOTAL HARD ERRORS
000065- 000000 SOFPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
000070- 000000 HRDPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
000075- 000000 SYSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
000080- 000000 RANUM: 0 ;HOLDS RANDOP # WHEN RAND MACRO IS CALLED
000085- 000000 CONFIG: ;RESERVED FOR MONITOR USE
000090- 000000 RES1: 0 ;RESERVED FOR MONITOR USE
000095- 000000 RES2: 0 ;RESERVED FOR MONITOR USE
000100- 000000 SADR: OPEN ;LOC TO SAVE R0.
000105- 000000 SVR1: OPEN ;LOC TO SAVE R1.
000110- 000000 SVR2: OPEN ;LOC TO SAVE R2.
000115- 000000 SVR3: OPEN ;LOC TO SAVE R3.
000120- 000000 SVR4: OPEN ;LOC TO SAVE R4.
000125- 000000 SVR5: OPEN ;LOC TO SAVE R5.
000130- 000000 SVR6: OPEN ;LOC TO SAVE R6.
000135- 000000 CSRA: OPEN ;ADDR OF CURRENT CSR.
000140- 000000 ACSR: OPEN ;ADDR OF GOOD DATA, OR
000145- 000000 WASADR: OPEN ;ADDR OF BAD DATA, OR
000150- 000000 ASTAT: OPEN ;STATUS REG CONTENTS.
000155- 000000 ERRPT: 0 ;TYPE OF ERROR
000160- 000000 ASB: OPEN ;EXPECTED DATA.
000165- 000000 AWAS: OPEN ;ACTUAL DATA.
000170- 000254- RSTART: RESTRT ;RESTART ADDRESS AFTER END OF PASS
000175- 000000 WDR: OPEN ;WORDS TO MEMOR PER ITERATION
000180- 000000 WDFR: OPEN ;WORDS FROM MEMORY PER ITERATION
000185- 000000 INTR: OPEN ;# OF INTERRUPTS PER ITERATION
000190- 000055 IDNUM: 55 ;MODULE IDENTIFICATION NUMBER=5

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000040 .REPT SPSIZ ;MODULE STACK STARTS HERE.
;*****LIST BIN*****
000224- .LIST
000224- .ENDR
MODSP:
;*****LIST BIN*****
; LOCAL VARIABLES
; ALLOFF: -1
; ALLOFF: 0
; BUBBLE: 177776
; THIS MODULE TESTS THE DR11-A AND DR11-C GENERAL DEVICE INTERFACE
; MAINTENANCE CABLE MUST BE INSTALLED FOR THIS TEST
;*****LIST BIN*****
; INITIALIZATION FOR GENERAL DEVICE INTERFACE
211 000232- 012767 000002 177660 START: MOV #2,INTR ;2 INTERRUPTS PER ITERATION
212 000240- 012767 000100 177646 MOV #64,WDT0 ;64. WDS TO MEM PER ITERATION
213 000246- 012767 000100 177642 MOV #64,WDFR ;64. WDS FROM MEM PER ITERATION
214
215 000254- 016705 177526 RESTRT: MOV ADDR,R5 ;GET DEVICE ADDRESS
216 000260- 010567 177614 MOV R5,CSRA ;SAVE CSR ADDRESS IN CSRA
217 000264- 016700 177520 MOV VECTOR,R0 ;LOAD DEVICE VECTOR
218 000270- 016720 000600- MOV DRACT0,(0)+ ;SET OUTPUT VECTOR TO SERVICE ROUTINE
219 000274- 016720 177512 MOV BR,(0)+ ;SET OUTPUT PRIORITY
220 000300- 012720 000576- MOV DRACT1,(0)+ ;SET INPUT VECTOR TO SERVICE ROUTINE
221 000304- 016720 177502 MOV BR1,(0)+ ;SET INPUT PRIORITY
222 000310- 005077 177564 CLR CCSR ;CLEAR CONTROL REGISTER
223 000314- 016701 177704 MOV ALON,R1 ;SET UP INITIAL TEST PATTERNS; 177777
224 000320- 016702 177704 MOV BUBBLE,R2 ;AND 177776 (0 WILL BUBBLE TO LEFT)
225 000324- 010103 MOV R1,R3 ;R3 REMEMBERS ALON/ALOFF WHEN BUBBLE IS IN USE
226 000326- 010104 MOV R1,R4 ;C-BIT SET WORD FOR BUBBLE RCL
227
228
229
230
231 ;CHECK DATA TRANSFER ON DR11-A AND DR11-C
232 ; TRANSMIT, RECEIVE AND CHECK (VIA MAINTENANCE CABLE) A SERIES OF
233 ; 64 WORD PATTERNS FORCING WORST-CASE TRANSITIONS. THIS
234 ; CONSISTS OF 177777 FOLLOWED BY 177776, 177777, 177775, 177777,
235 ; 177773, 177771, 177769, ETC. ALL ONES ALTERNATING WITH A
236 ; 0 BUBBLING LEFT THROUGH A WORD OF ONES), THEN ALL ZEROS ALTERN-
237 ; ATING WITH THE SAME BUBBLE PATTERN.
238
239 000330- 010165 000002 DRACT1: MOV R1,2(R5) ;MOVE DATA TO OUTPUT BUFFER
240 000334- 020165 000002 CMP R1,2(R5) ;CHECK DATA
241 000340- 001422 BEQ IS ;BRANCH IF DATA GOOD

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242 000342 012767 177701 177532 MOV #177701,SBADR ;GOOD DATA ADDRESS
243 000350 062705 000000 ADD #2,R5 ;ADD 2 TO GET DATA REG. ADDRESS
244 000354 010567 177524 MOV #2,R5 ;BAD DATA ADDRESS
245 000360 162705 000000 SUB #2,R5 ;RESTORE R5
246 000364 010167 177516 MOV #4,ASB ;MOVE "SHOULD BE"
247 000370 016567 000000 MOV #2(R5),AWAS ;MOVE "WAS"
248 *****
249 000376 104404 000000 DATERS,BEGIN ;DATA ERROR!!!
250 *****
251 *****
252 *****
253 000402 000167 000046 JMP 25 ;NEXT DATA
254 000406 020165 000004 CMP R1,4(R5) ;CHECK RECEIVED DATA
255 000414 001420 BEQ 25 ;BRANCH IF DATA GOOD
256 000422 062705 177701 177460 MOV #177701,SBADR ;GOOD DATA ADDRESS
257 000426 010567 000004 ADD #2,R5 ;GET INPUT DATA ADDRESS
258 000432 162705 177452 MOV #2,R5 ;BAD DATA ADDRESS
259 000436 016205 000004 SUB #2,R5 ;RESTORE R5
260 000442 010167 177444 MOV #4,ASB ;MOVE "SHOULD BE"
261 000442 016567 000004 177440 MOV #2(R5),AWAS ;MOVE "WAS"
262 *****
263 000450 104404 000000 DATERS,BEGIN ;DATA ERROR!!!
264 *****
265 *****
266 *****
267 ;CHECK CURRENT DATA PATTERN AND LOAD NEXT ACCORDINGLY
268 2S: CMP R1,ALLOFF ;IF JUST TESTED WITH
269 000460 001405 BEQ 3S ; ALL ON/OFF PATTERN,
270 000462 020167 177540 CMP R1,ALLOFF ; LOAD THE CURRENT BUBBLE
271 000466 001402 BEQ 3S ; FOR NEXT TEST CYCLE
272 000470 010301 MOV #1,R1 ;NOT BUBBLE? LOAD CURRENT ALL ON/OFF
273 000474 001405 DRACT1 ;TEST WITH IT
274 000476 010201 3S: MOV R2,R1 ;SET UP BUBBLE FOR THIS CYCLE
275 000476 006304 ASL R4 ;PRE-LOAD C-BIT FOR ROL
276 000500 006107 ROL R2 ;BUBBLE 0 TO LEFT ONE BIT
277 000506 020269 CMB R2 ;HAS IT CIRCLED ALL THE WAY?
278 000510 001401 BEQ 4S ;YES: SWITCH ALLOFF-ALLOFF OR END
279 000514 000707 BR DRACT1 ;TEST WITH THE BUBBLE
280 000514 005703 4S: TST R3 ;ALLOFF OR ALLOFF?
281 000516 010304 BEQ INTST ;IF ALLOFF FINISHED: TEST INTERRUPTS
282 000520 016703 MOV R5,R4 ;RESET C-BIT PRE-LOAD
283 000524 010301 MOV ALLOFF,R3 ;SWITCH TO ALLOFF
284 000526 000700 BR DRACT1 ;SET UP FOR TEST
285 *****
286 *****
287 *****
288 *****
289 *****
290 *****
291 000530 005065 000002 INTST: CLR 2(R5) ;CLEAR OUTPUT BUFFER
292 000534 005015 CLR (R5) ;CLEAR CONTROL REGISTER
293 000536 012715 000003 MOV #3(R5) ;SET MAINTENANCE BITS
294 000542 012765 100200 000002 MOV #100200,2(R5) ;SET MAINTENANCE BIT FOR DR-11A
295 000550 052715 000140 BIS #140,(R5) ;SET INTERRUPT ENABLER
296 000554 104400 000000 INPUT: EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
297 *****
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298 000560 104400 000000 OUTPUT: EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
299 000560 042715 000140 EMPS: BIC #140,(R5) ;CLEAR INTERRUPT ENABLER
300 000564 104413 000000 ENDS$,BEGIN ;SIGNAL END OF ITERATION.
301 000570 000000 BR RESTR ;MONITOR SHALL TEST END OF PASS
302 *****
303 000574 000627 BR RESTR ;BACK TO BEGINNING
304 *****
305 *****
306 *****
307 *****
308 000576 000002 ;INPUT/OUTPUT SERVICE ROUTINES
309 DRACTII: RTI ;RETURN
310 *****
311 000600 000004 000000 000606 DRACTO: -----
312 000606 000766 1S: PIRQS,BEGIN,1S ; QUEUE UP TO CONTINUE AT 1S AND RTI
313 -----
314 BR EMPS ;GO REPORT END OF PASS
315 *****
316 *****
317 .END
```


WASADR	000104R	176#	244*	258*
WDPR	000116R	183#	213*	
WDTO	000114R	182#	212*	
XFLAG	000005R	140#		

. ABS. 000000 000
000610 001

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0
XDRADO,XDRADO/SOL/CRF:SYN=DDXCOM,XDRADO
RUN-TIME: 1 1.3 SECONDS
RUN-TIME RATIO: 8/2=3.0
CORE USED: 7K (13 PAGES)