

.REM -

IDENTIFICATION

PRODUCT CODE: AC-E733I-MC
PRODUCT NAME: CXDRCIO DR11-C MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT CORPORATION. DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY FOR ANY ERRORS THAT MAY APPEAR IN THIS MANUAL.

THE SOFTWARE DESCRIBED IN THIS DOCUMENT IS FURNISHED TO THE PURCHASER UNDER A LICENSE FOR USE ON A SINGLE COMPUTER SYSTEM AND CAN BE COPIED (WITH INCLUSION OF DIGITALS COPYRIGHT NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT AS MAY OTHERWISE BE PROVIDED IN WRITING BY DIGITAL.

DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS SOFTWARE ON EQUIPMENT THAT IS NOT SUPPLIED BY DIGITAL.

COPYRIGHT (C) 1973,1978 DIGITAL EQUIPMENT CORPORATION

1. ABSTRACT

DRC IS A IOMOD THAT EXERCISES UP TO SIXTEEN DR11-C'S. THE MODULE USES THE MAINTENANCE MODE TO CHECK DATA TRANSFERS TO AND FROM THE DR11-C. IT TRANSMITS AND RECEIVES 64 WORST-CASE 16 BIT WORDS AND ALSO TESTS THE ABILITY OF THE DR11C TO GENERATE BOTH A-REQUEST AND B-REQUEST INTERRUPTS. IT WILL DROP ITSELF IF RUN IN AN XXOP CHAIN WHEN THE MANUAL INTERVENTION BIT IS NOT SET. (BIT 0 IN LOC.52

2. REQUIREMENTS

HARDWARE: ONE DR11-C WITH A MAINTENANCE CABLE

STORAGE:: DRC REQUIRES:

- 1. DECIMAL WORDS: 308
- 2. OCTAL WORDS: 0464
- 3. OCTAL BYTES: 1150

3. PASS DEFINITION

ONE PASS OF THE DRC MODULE CONSISTS OF TRANSMITTING AND RECEIVING 64 WORDS AND GENERATING ONE A-REQUEST AND ONE B-REQUEST INTERRUPT.

4. EXECUTION TIME

ONE PASS OF DRC RUNNING ALONE ON A PDP11/03 PROCESSOR TAKES APPROXIMATELY THIRTY SECONDS

5. CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:

DEVADR: 167770, VECTOR: 1, BRI: 5, DEVCNT: 1

REQUIRED PARAMETERS:

AT CONFIGURATION TIME USER MUST SUPPLY THE LOWEST VECTOR OF THE DR11-C'S.

6. DEVICE/OPTION SET-UP

CONNECT THE MAINTENANCE CABLE TO THE 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, BUBBLE TEST DATA2 AND REPEAT B-D
 - F. IF 64 TRANSFERS GENERATED AND TEST A/B 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 A MESSAGE WILL BE PRINTED.

8. OPERATION OPTIONS

- NONE
- NON-STANDARD PRINTOUTS

9. "DEVICE FAILED TO INTERRUPT" MESSAGE IF INTERFACE FAILS TO INTERRUPT ON EITHER REQUEST BIT.


```
241 000406 016722 177400 MOV B1,(R2)+ ;SET B PRIORITY
242 000414 016764 BR 25 ;GO ADJUST ADDRESS POINTER
243 000414 016700 177606 SETUP1: MOV SELECT,R0 ;COPY SELECTION PARAMETER
244 000420 016705 177362 MOV ADDR,R5 ;RESET POINTER TO FIRST ADDRESS
245 000424 005725 TST (R5)+ ;POINT TO DATA BUFFER WORD
246 000436 011787 177777 NEXT: MOV R4,-CRIT ;FIRST ROTATE WANTS '1' INTO LSB
247 000434 005084 CLR R4 ;FLAG REGISTER (DENOTES SWITCH FROM ALLOW PATTERN TO ALL
248 000436 016701 177566 MOV ALLOW,R1 ;SET UP INITIAL DATA PATTERN
249 000442 016703 177566 MOV BUBBLE,R3 ;SET UP ALTERNATE DATA PATTERN
250 000446 006200 ASR R0 ;ISOLATE A SELECTION FLAG
251 000450 013404 BCS DRACT1 ;IF SELECTED GO CHECK DATA
252 000452 001532 BEQ ENPS ;IF NO MORE SELECTED, CALL FOR END OF PASS
253 000454 162705 000010 SETUP2: SUB #10,R5 ;POINT TO THE NEXT DEVICE'S BUFFER WORD
254 000460 000762 BR NEXT ;GO PROCESS NEXT DEVICE
*****
;CHECK DR11-C DATA TRANSFER CAPABILITY
SEND VERIFY AND CHECK (THROUGH MAINTENANCE CABLE) ALTERNATING WORDS
OF 17777 AND 0-BUBBLING-THROUGH-1'S THEN ALTERNATING 0 AND 0-
BUBBLING-THROUGH-1'S. TOTAL OF 64 BIT-PATTERNS SENT AND TESTED IN
EACH PASS.
DRACT1: MOV R1,(R5) ;MOVE DATA TO OUTPUT BUFFER
CMP R1,(R5) ;CHECK DATA
BEQ 25 ;BRANCH IF DATA GOOD
MOV R5,WASADR ;BAD DATA ADDRESS
MOV R1,ASB ;MOVE 'SHOULD BE'
MOV R5,WAS ;MOVE 'WAS'
*****
DATER$ BEGIN ;DATA ERROR!!!
*****
1$: CMP Z1,Z(R5) ;NEXT DATA
BEQ 25 ;CHECK RECEIVED DATA
MOV R5,WASADR ;BRANCH IF DATA GOOD
ADD #2,WASADR ;BAD DATA ADDRESS
MOV W1,ASB ;MAKE IT THE CORRECT ADDRESS
MOV W2,(R5),AWAS ;MOVE 'SHOULD BE'
MOV W3,WAS ;MOVE 'WAS'
*****
DATER$ BEGIN ;DATA ERROR!!!
*****
2$: CMP R1,ALLOW ;SWITCH TO BUBBLE PATTERN
BEQ 45 ;IF STRAIGHT I/O PATTERN
CMP R1,ALLOFF ;IS NON
TST R4 ;IN USE
BEQ 35 ;SWITCH TO STRAIGHT I/O; DECIDE WHICH
MOV ALLOFF,R1 ;FLAG RESET, SO IT'S ALL-ON PATTERN
DRACT1 ;FLAG SET, IT'S ALL-OFF PATTERN
3$: MOV ALLOW,R1 ;REPEAT TEST WITH NEW WORD
BR ;ALL-ON PATTERN
DRACT1 ;REPEAT TEST SEQUENCE
4$: MOV R3,R1 ;PUT IN DATA BUFFER
ROL CRIT ;LOAD C BIT'S MSB OF CRIT (LAST MSB OF P3)
;SHIFT 0 THROUGH WORD, TO LEFT
```

```
297 000614 103403 BCS 55 ;DO WE SET CR RESET NEXT CRIT?
298 000616 005067 177414 CLR CRIT ;CR WAS 0, SO CRIT RESET
299 000624 000403 BR 65 ;CONTINUE
300 000624 177777 177404 5$: MOV #1,CRIT ;CR WAS 1, SO CRIT SET
301 000632 026701 177376 6$: CMP CRIT,R1 ;CR 0 BACK TO LSB WHERE IT STARTED?
302 000636 001311 BNE DRACT1 ;IF NOT, CONTINUE
303 000640 005704 TST R4 ;DO HAS BUBBLED ALL AROUND. ARE WE FINISHED?
304 000642 100404 BMT INTEST ;YES (FLAG SET); TEST INTERRUPTS
305 000644 005304 DEC R4 ;SET FLAG
306 000646 016701 177360 MOV ALLOFF,R1 ;REPEAT WHOLE THING, WITH ALL-OFF PATTERN INSTEAD
307 000652 000703 BR DRACT1 ;RETURN TO TEST LOOP
*****
;CHECK INTERRUPTS ON DR11-C
INTEST: CLR (R5) ;CLEAR OUTPUT & INPUT (VIA CABLE) BUFFERS
MOV #2,R4 ;BREAK LOOP COUNTER
CLR -R4 ;FLAG: BOTH INTERRUPTS IN
CLR -(R5) ;CLEAR CONTROL REGISTER
MOV #3,(R5) ;SET MAINTENANCE BITS
MOV #3,SVRS ;SAVE R5 BEFORE INTERRUPT COMES
BIS #40,(R5) ;ENABLE A INTERRUPT
TIMER: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR...
BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION
MOV #1,R4 ;IF FLAG IS CLEAR, GO START NEXT DEVICE
BNE RESET ;IF FLAG SET, GO START NEXT DEVICE
DEC R4 ;REDUCE COUNT. IF NOT EXCEEDED, BREAK AGAIN
RNE TIMER ;WAIT A LITTLE LONGER
MSGNS,REGIN,HUNG ;ASCII MESSAGE CALL WITH COMMON HEADER
RESET: TST (R5)+ ;RESTORE R5 VALUE
BR SETUP2 ;GO PROCESS NEXT DEVICE
ENPS: ENDSIT$ BEGIN ;SIGNAL END OF ITERATION.
JMP RESTRT ;MONITOR SHALL TEST END OF PASS
CHAIN: CHAINM
HUNG: 177777
177777
;INPUT/OUTPUT SERVICE ROUTINES
DRACTA: BIC #100,@SVRS ;DISABLE A INTERRUPT IMMEDIATELY, THROUGH SAVED R5
INC FLAG ;RETURN TO BREAK LOOP
DRACTB: BIC #40,@SVRS ;DISABLE B INTERRUPT IMMEDIATELY, THROUGH SAVED R5
BIS #100,@SVRS ;ENABLE A INTERRUPT NOW
```

```

353 001010* 000002 RTI ;RETURN
354
355
356 001012* 051104 020103 040503 CHAINM: .ASCIZ "DRC CANNOT BE RUN IN THIS CHAIN, MANUAL INTERVENTION NOT ALLOWED."
357 001020* 047116 052117 041040
358 001026* 020105 052522 020116
359 001034* 047111 052940 044510
360 001042* 020113 044403 044501
361 001050* 026116 046440 047101
362 001056* 040525 020114 047111
363 001064* 042524 053122 047105
364 001072* 044524 047117 047040
365 001100* 052117 040440 046114
366 001106* 053517 042105 000056
367 001114* 042504 044526 042503
368 001122* 043040 044501 042514
369 001130* 020104 047524 044440
370 001136* 052116 051105 052522
371 001144* 052117 000000
372 .EVEN
373 .END
  
```

```

ACSR 000102R 174#
ADDR 000006R 140#
ADDR22= 01000 192#
ALLOFF= 000232R 196# 286 290 306
ALLOF 000230R 195# 248 284 292
ASB 000106R 178# 265* 275*
ASTAT 000104R 176#
AWAS 000110R 179# 266* 276*
BEGIN 000000R 137# 220 221 225 268 278 323 324 329 333
BIT0 = 000001 192#
BIT1 = 000002 192#
BIT10 = 002000 192#
BIT11 = 004000 192#
BIT12 = 010000 192#
BIT13 = 020000 192#
BIT14 = 040000 192#
BIT15 = 100000 192#
BIT2 = 000004 192#
BIT3 = 000010 192#
BIT4 = 000020 192#
BIT5 = 000040 192#
BIT6 = 000100 192#
BIT7 = 000200 192#
BIT8 = 000400 192#
BIT9 = 001000 192#
BREAKS = 104407R 192# 323 324
BR1 000012R 142# 239 241
BR2 000013R 143#
BTODS = 104421R 192#
BUBBLE 000234R 197# 249 301
CBIT 000236R 198# 246* 295* 298* 300*
CDATAS = 104412 192#
CHAIN 000750R 220 338#
CHAINM 001022R 338#
CONFIG 000056R 162#
CSRA 000100R 172#
DATCKS = 104411 192#
DATES = 104404 192# 268 278
DRACTA 000760R 238 348#
DRACTB 000774R 240 351#
DRACT1 000462R 251 261# 291 293 302 307
DROP 000322R 224# 228
DVID1 000014R 144# 222
ENDITS = 104413 192# 335
ENDS = 104410 192# 221
ENPS 000740R 252# 332#
ERRTYP = 104400 177#
EXITS = 104400 192#
FAIL 001114R 340 367#
FLAG 000224R 193# 317* 325 349*
GETPAS = 104415 192#
GWBUPS = 104414 192#
HRDCNT 000044R 157#
HRDEBS = 104405 192#
HRDPAS 000050R 199#
HUNG 000754R 329 340#
  
```

