

-SBTTL DOCUMENTATION
-REV -

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IDENTIFICATION

PRODUCT CODE: AC-E881R-MC
PRODUCT NAME: CYBRAR0 KIT-11D MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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1. ABSTRACT

BBA IS AN IJMOD THAT EXERCISES THE KITLD. DURING A SINGLE PASS, KITLD CHECKS THAT THE KITLD WILL PERFORM A PROGRAMMED DATA TRANSFER (PDT) FOLLOWED BY A NON PROCESSOR REQUEST (NPR) TRANSFER. ANY ERRORS DETECTED DURING THE PASS ARE REPORTED ON THE CONSOLE ITY. THE PROGRAM WILL RUN INDEFINITELY UNTIL HALTED BY THE USER (PROVIDED THAT HARD FAIL SYSTEM ERRORS HAVE NOT BEEN ENCOUNTERED).

2. REQUIREMENTS

HARDWARE: KITLD AND AA SPECIAL WRAP-AROUND CABLE.
STORAGE:: BBA REQUIRES:
1. DECIMAL WORDS: 476
2. OCTAL WORDS: 0734
3. OCTAL BYTES: 1670

3. PASS DEFINITION

ONE PASS OF THE KITDO CONSISTS OF 70000 ITERATIONS 1 PROGRAMMED DATA TRANSFER AND ONE 64 WORDS.

4. EXECUTION TIME

RUNNING ALONE ON A PDP11/05 TAKES APPROXIMATELY 1 MINUTE PER PASS.

5. CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:

BR1: 5
BR2: 0

REQUIRED PARAMETERS:
NONE, EXCEPT FOR THE ADDRESS AND VECTOR MUST BE ASSIGNED AT CONFIGURATION TIME (OR RUN TIME VIA THE MOD COMMAND). THE PROGRAM WILL NOT RUN UNLESS YOU SUPPLY THE ADDRESS AND FLOATING VECTOR.
NONE

6. DEVICE/OPTION SETUP

- A. THE KIT1D UNDER TEST MUST CONTAIN THE SPECIAL
*** ** WRAP-AROUND CABLE FOR THIS TEST. ****
- B. THE VECTOR ADDRESS MAY BE SPECIFIED AT RUN TIME BY USING
THE FOLLOWING MODIFY COMMAND AT RUN TIME:

.MODIFY KITD0 10(CR)

THE SYSTEM WILL ISSUE A CR/LF AND PRINT OUT THE
PRESENT CONTENTS OF THAT LOCATION (CALLED VECTOR).

AT THAT TIME, YOU MAY ENTER THE NEW VVECTOR ADDRESS AND
FOLLOW IT BY A CARRIAGE RETURN (CR).

IF A DEVICE ADDRESS OTHER THAN 160000 IS USED.
THAT ADDRESS MAY BE UPDATED BY USING THE
MODIFY COMMAND:

.MODIFY KTDO 6 <CR>

- C. THE MODULE IS SELECTED AT RUN TIME BY TYPING:
.SEL KITD0 <CR>

- D. THE MODULE IS RUN BY TYPING:
.RUN <CR>

AT RUN TIME.

- E. A LOAD MAP IS OBTAINED AT RUN TIME BY SAYING:
.MAP <CR>

- F. PROGRAMMERS GUIDE TO DECX11 IS AVAILABLE FROM PROGRAM
LIBRARY.

7. MODULE OPERATION

- A. INITIALIZE THE PROGRAM TO ALLOW FOR PREVIOUS DEVICE AND/
OR VECTOR ADDRESS MODIFICATIONS.

- B. CLEAR THE CSR AND DBR AND TEST FOR DEVICE READY

- C. BEGIN (PDT) TEST 1. ENABLE AND CHECK THE INTERRUPT.

- D. TRANSMIT A WORD (#32525) AND CHECK THAT THE INTERRUPT
SERVICE ROUTINE WAS ENTERED. (SWITCH ENTERI WILL BE
SET WHEN THE SERVICE ROUTINE IS ENTERED).

- E. CHECK THE CSR FOR CORRECT STATUS THEN CHECK THAT THE
CORRECT WORD WAS RETURNED. END TFST1.

- F. BEGIN (NPR) TFST2, CHECK THECSR FOR CORRECT STATUS.

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- SET UP THE WORST CASE DATA PATTERN AND LOAD IT INTO TRANSMIT BUFFER.
6. SET UP THE NPR PARAMETERS AND START THE NPR TRANSFER. CHECK THAT THE INTERRUPT ROUTINE WAS ENTERED. CHECK THE CSR FOR CORRECT STATUS. CHECK THAT ALL 54 WORDS WERE TRANSMITTED AND RECEIVED. CHECK THAT TRANSMITTED BUFFER MATCHES RECEIVED BUFFER.
4. IF TEST IS SUCCESSFUL, PRINT OUT "ENDPASS" AFTER 130000 ITERARIONS OF THE TEST, AND LOOP TO BEGINNING OF TEST.
8. OPERATION OPTIONS

- NONE
9. NON-STANDARD PRINTOUTS

- MOST PRINTOUTS HAVE STANDARD FORMATS AS DESCRIBED IN THE DEC/X11 DOCUMENT.
THE ONLY EXCEPTION IS THE KIT11D PROGRAM ERROR PRINTOUTS.
ON THESE PRINTOUTS:
THE CSRA WILL INDICATE THE CONTENTS OF THE WORD COUNT REGISTER.
THE ACSR WILL INDICATE THE CONTENTS OF THE CSR AND THE ASTAT WILL BE THE KIT11D PROGRAM ERROR NUMBER.
10. LOADING THE BINARY (IF CONFIGURED EXERCISER) PROGRAM
THE PROGRAM IS LOADED VIA THE ABSOLUTE LOADER.
START ADDRESS=200
RESTART ADDRESS=1000


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505 ;WITH THE DATA THAT WAS RECEIVED.
506 ;
507 000760 006300 ASL R0 ;START SHIFTING R0 TO FORM
508 ; THE NEXT SET OF DATA TO BE
509 ; LOADED.
510 000762 001370 BNE NPR2 ;HP COUNTER TO
511 000764 005267 177250 INC NPRCTR ;LOOP X TIMES TO
512 ; OBTAIN 32X
513 ; WORDS TO XFER.
514 ;
515 ;
516 ;
517 000770 026767 177240 177242 CMP NPRMAX,NPRCTR ;X TIMES THRU LOOP?
518 ; (HERE, X=1.)
519 000776 001360 BNE NPRIA ;NO, SO DO IT AGAIN.
520 ;
521 ;YES, THE XMIT RUFFER HAS BEEN SET UP.
522 ;
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523 ;NOW SETUP THE TRANSFER (NPR) PARAMETERS.
524 ;
525 ;
526 001000 016777 177232 177224 MOV NPRLMT, @MC ;32X WORDS
527 001006 012777 001486 177214 MOV @BUFFER, @BAR ;SET UP THE ADDRESS
528 ; OF THE BUFFER.
529 ;
530 ;START THE ACTUAL TRANSFER HERE.
531 001014 052777 000103 177204 BVS #103, @CSR ;SET IN AND OUT.
532 ; ENABLE THE INTERRUPT.
533 001022 004767 000236 JSR PC, TIMEOUT ;CHECK THE INTERRUPT SERVICE
534 ; ROUTINE VIA TIME-
535 ; OUT LOOP.
536 ;
537 ;
538 ;AT THIS POINT, WE HAVE VERIFIED THAT AN INTERRUPT HAS
539 ; OCCURRED. CHECK THE CSR FOR ERRORS.
540 ;
541 ;
542 001026 027727 177174 000210 1S: CMP @CSR, #210 ;CSR=310?
543 001034 001415 BFE NPR4 ;YES, GOTO WORD COUNT OVERFLOW CHECK
544 001036 012767 000006 000216 MOV #6, @ERRORN ;ERROR #6
545 001044 004767 000332 JSR PC, SETUP ;NO, GET READY TO RREPORT ERROR.
546 ;
547 001050 012767 000025 177030 MOV #25, @ERRTYP ;BIT STUCK IN REG.
548 ;*****
549 001056 104405 000000 000000 @RDERS, @BEGIN, NULL ;CSR NOT 310 --- ERROR #6---
550 ;*****
551 JMP START ;RESTART
552 ;
553 ;NOW CHECK THE BAR TO MAKE SURE THAT THE
554 ; INTERRUPT WAS NOT DUE TO A PREMATURE WC OVERFLOW.
555 ;
556 001070 005777 177136 NPR4: TST @MC
557 BFE NPR4
558 001076 012767 000007 000156 MOV #7, @ERRORN ;ERROR 7.
559 001104 012767 000011 176774 MOV #11, @ERRTYP ;ILLEGAL INTERRUPT
560 ;*****
561 001112 104405 000000 000000 @RDERS, @BEGIN, NULL ;WORD COUNT NOT ZERO ---ERROR #7---
562 ;*****
563 JMP START ;RESTART.
564 ;
565 ;NOW CHECK TO MAKE SURE THAT 100 WORDS WERE TRANSFERRED.
566 ;THE BAR SHOULD BE EQUAL TO BUFFER START ADDRESS PLUS 200.
567 ;
568 001124 017767 177100 177114 NPR4: MOV @BAR, @TEMP ;SAVE BAR.
569 001132 162767 001466 177106 SUB @BUFFER, @TEMP ;GET THE OFFSET.
570 001140 026767 177102 000200 CMP @TEMP, #200 ;ALL WORDS XFERRED?
571 001146 001415 BFE NPWS ;YES.
572 001150 012767 000010 000104 MOV #10, @ERRORN ;ERROR #10
573 001156 004767 000220 JSR PC, SETUP ;NO
574 001162 012767 000011 176716 MOV #11, @ERRTYP ;ILLEGAL INTERRUPT
575 ;*****
576 001170 104405 000000 000000 @RDERS, @BEGIN, NULL ;ALL WORDS NOT TRANSFERRED ---ERROR #10---
577 ;*****
578 ;
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579 ;*****
580 001176* 000167 177052 JMP START ;RESTART.
581 ;
582 ;
583 ;ALL X WORDS HAVE BEEN XFERRED.
584 ;CHECK THE XMITTED/RCVD DATA-
585 ;CONTENTS OF BUFFER LOCATION X SHOULD EQUAL
586 ;CONTENTS OF X+2.
587 ;
588 ;
589 001202* 012701 001466* NPR5: MOV #BUFFER,R1 ;GET THE STARTING
590 ;ADDRESS OF
591 001206* 021121 NPR5A: CMP (R1),(R1)+ ;BUFFER
592 001210* 001415 BEQ NPR5B ;MATCH-
593 001212* 012767 000011 000042 MOV #11,ERRORN ;ERROR #11.
594 ;
595 001220* 004767 000156 JSR PC,SETUP ;NO MATCH.
596 ;
597 001224* 012767 000001 176654 MOV #1,ERRTYP ;DATA ERROR
598 ;*****
599 001232* 104405 000000* 000000 HRDRS,BEGIN,NULL ;DATA MISMATCH INPR CHECK ----ERROR #11----
600 ;*****
601 001240* 000167 177010 JMP START ;RESTART.
602 ;
603 ;LOOP UNTIL ENTIRE BUFFER HAS BEEN CHECKED.
604 ;
605 001244* 020127 001666* NPR5B: CMP R1,BUFFER+200 ;HAVE WE CHECKED THE ENTIRE BUFFER?
606 001250* 100756 BMI NPR5A ;GET PAIRS AND
607 ;CHECK THEM UNTIL
608 ;ALL HAVE BEEN CHECKED.
609 ;
610 ;TEST RAN SUCCESSFULLY. TYPE OUT A MESSAGE
611 ;OF "ENOPASS" AND THEN RE-RUN THE TEST.
612 ;
613 ;
614 ;LET 70000 PASSES THROUGH THE KIT EXERCISFR
615 ;BE EXECUTED BEFORE PRINTING ENDPASS MESSAGE.
616 ;
617 ;
618 ;ELSE PRINT OUT THE MESSAGE AND RESTART THE EXERCISFR.
619 ;A PASS HAS BEEN COMPLETED.
620 ;
621 ;*****
622 ;***** END OF TEST *****
623 ;*****
624 001252* 104413 000000* NPR6: ENDTIS,BEGIN ;SIGNAL END OF ITERATION.
625 ;MONITOR SHALL TEST END OF PASS
626 ;
627 001256* 000167 177062 RESTR: JMP R0 RESTR ;COMES HERE IF NOT YET 70000 ITERATIONS OF THE EXERCISER
628 001262* 000000 ERRORN: WORD 0 ;ERROR NUMBER.
629 ;SBTTL SUBROUTINES
630

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631 ;*****
632 ;***** TIME OUT ROUTINE *****
633 ;*****
634 ;
635 ;THIS IS A CLOSE (TIGHT) LOOP TO SERVICE OTHERE DEVICES.
636 ;THE ONLY WAY THIS LOOP CAN BE BROKEN OUT OF IS VIA
637 ;AN INTERRUPT FROM THE KIT/ID MODULE.
638 ;AN ERROR IS PRODUCED IF THE INTERRUPT DOES NOT OCCUR
639 ;WITHIN LIMITS.
640 ;
641 001264* 016767 176754 176754 TIMEOUT: MOV TLIMIT,TTEMP ;SET THE TIMEOUT WAIT LIMIT.
642 ;
643 ;WHEN AN INTERRUPT IS SERVICED, "ENTERI"
644 ;WILL BE SET. THIS SOFTWARE SWITCH WILL EXIT US OUT OF
645 ;THE BREAK LOOP
646 ;
647 ;
648 001272* 000000* TIM1: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR....
649 001276* 104407 000000* BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
650 ;
651 001302* 005767 176742 TST ENTERI ;CHECK TO SEE IF AN INTERRUPT
652 ;HAS OCCURRED.
653 ;
654 001306* 001021 BNE TIMOK ;AN INTERRUPT DID OCCUR--BRANCH
655 ;
656 001310* 005367 176732 DFC TTEMP ;DOWN THE WAIT COUNTER.
657 001314* 001306 BNE TIM1 ;NO, CONTINUE ON.
658 001316* 012767 000012 177736 MOV #12,ERRORN ;ERROR #12.
659 ;
660 001324* 004767 000052 JSR PC,SETUP ;TAKE AN RTS TO CLEAN UP THE STACK
661 001330* 005726 (SP)+ ;POP THE STACK
662 001332* 012767 000023 176546 MOV #23,ERRTYP ;MISSING INTERRUPT
663 ;*****
664 001340* 104405 000000* 000000 HRDRS,BEGIN,NULL ;TIMEOUT ERROR ---- ERROR #12----
665 ;*****
666 001346* 000167 176702 JMP START ;RESTART
667 ;
668 001352* 005067 176672 TIMOK: CLR ENTERI ;RESET THE FLAG TO ZERO.
669 001356* 005767 176670 TST SLVSVN ;TEST FOR A POSSIBLE SLAVE SYNCH
670 ;ERROR.
671 ;IF SLAVE SYNCH DOESN'T COME RACK
672 ;WITHIN 20 US, BIT 14 WILL GENERATE AN INTERRUPT.
673 ;
674 ;
675 001362* 001406 BEQ 1$ ;BRANCH IF NOT SLAVE SYNCH.
676 001364* 012767 000013 177670 MOV #13,ERRORN ;TAKE AN RTS TO CLEANUP STACK
677 001372* 005726 TST (SP)+ ;RESTART.
678 001374* 000167 176654 JMP START ;
679 ;
680 001400* 000207 1$: RTS PC ;RETURN TO MAIN PROGRAM.
681 ;(NORMAL RETURN.)

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682 ;*****  
683 ;***** SETUP ROUTINE *****  
684 ;  
685 ;ROUTINE TO LOAD THE CSRA,ACSR,ASTAT  
686 ;FOR DEC/X11 ERROR ROUTINES.  
687 ;PRINTOUT INCLUDES: WC,CONTENTS OF CSR, ERROR #  
688 ;  
689 ;  
690  
691 001402 017767 176624 176470 SETUP: MOV @WC,CSRA ;SAVE THE CSR.  
692 001410 017767 176612 176464 MOV @CSR,ACSR ;SAVE CONTENTS OF CSR.  
693 001418 016767 177640 176460 MOV ERRORN,ASTAT ;GET ERROR #.  
694 001424 005077 176576 CLR @CSR ;CLEAR THE (INTERRUPT ENABLE)CSR  
695 001430 000207 ;AND RETURN.  
696  
697 .SBTTL INTERRUPT SERVICE ROUTINE
```

```
698 ;*****  
699 ;***** INTERRUPT SERVICE ROUTINE *****  
700 ;*****  
701 ;*****  
702 ;  
703 ;SET THE INTERRUPT ENTERED FLAG (ENTERI) AND  
704 ;RETURN.  
705  
706 001432 042777 000100 176566 KITSRV: BIC #100,@CSR ;DISABLE THE INTERRUPT.  
707 001440 012767 000001 176602 MOV #1,ENTERI ;SET THE "INTERRUPT ENTERED" FLAG.  
708 001446 032777 040000 176552 BIT #40000,@CSR ;DO US SLAVE SYNCH FAILURE??.  
709 001454 001403 ;BRANCH IF NOT  
710 001456 012787 000001 176566 MOV #1,SLVSYN ;ELSE SET THE SLAVE ERROR FLAG.  
711  
712 001464 000002  
713  
714 ;  
715 ;KIT INTERRUPT VECTOR ADDRESS  
716 ;  
717 ;  
718 001466 000100 .SBTTL DATA BUFFER  
719 001666 000000 BUFFER: .BLKW 100  
720 000001 .WORD 0  
721  
722 .END
```


