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DPVB DEC/X11 SYSTEM EXERCISER M MACRO M1200 01-DEC-83 09:48 PAGE 2
DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

SEQ 0001

.REM \$

IDENTIFICATION

PRODUCT CODE: AC-S0398-MC
PRODUCT NAME: CXDPVBO DPV-11 MODULE
PRODUCT DATE: SEPTEMBER 1983
MAINTAINER: DEC/X11 SUPPORT GROUP

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1. ABSTRACT

DPV IS AN IOMOD THAT EXERCISES UP TO SIX CONSECUTIVELY
 ADDRESSED SYNCHRONOUS LINE INTERFACES (DPV11) BY TRANSMITTING A
 STANDARD BINARY COUNT PATTERN IN EITHER INTERNAL OR EXTERNAL
 LOOPBACK. THE USER MAY ALSO SELECT EITHER BIT ORIENTED PROTOCOL
 (BOP) OR BYTE ORIENTED PROTOCOL (BCP). THE RECEIVED DATA IS
 COMPARED WITH THE TRANSMITTED DATA AND ANY ERRORS
 ARE REPORTED VIA THE CONSOLE TTY. ALL AVAILABLE INTERFACES
 (UP TO 6) ARE ACTIVATED AND RUNNING SIMULTANEOUSLY.

(NOTE: THIS MODULE IS A MODIFICATION OF CXDPBB WHICH IS THE
 DEC/X11 MODULE FOR THE DUP11).

2. REQUIREMENTS

HARDWARE: DPV11 SYNCHRONOUS INTERFACE
 STORAGE:: THE DPV REQUIRES:
 1. DECIMAL WORDS: 604
 2. OCTAL WORDS: 1134
 3. OCTAL BYTES: 2270

3. PASS DEFINITION

ONE PASS OF THE DPV MODULE CONSISTS OF TRANSMITTING AND RECEIVING
 14,400 8-BIT CHARACTERS (TOTAL) PER ACTIVE DEVICE.

4. EXECUTION TIME

ONE DPV RUNNING ALONE ON A LSI 11/23 PROCESSOR TAKES APPROXIMATELY
 1 MINUTE TO COMPLETE ONE PASS. THIS TIME INCREASES SLIGHTLY
 AS MORE DEVICES ARE ADDED.

5. CONFIGURATION PARAMETERS

DEFAULT PARAMETERS:

DEVADR: 000001, VECTOR:001, BR1:5, BR2:5, DEVCNT:1
 THE DEVICE IS TESTED IN SDLC MODE AS A SECONDARY STATION,
 WITH A HARDWARE BCC CHECK USING THE CRC/CCITT POLYNOMIAL.

REQUIRED PARAMETERS: THE CSR AND VECTOR MUST BE SET UP BY THE USER.

6. DEVICE/OPTION SETUP

SR1

BIT 0 = 0 BIT ORIENTED PROTOCOL
 BIT 0 = 1 BYTE ORIENTED PROTOCOL

D1

DPVB DEC/X11 SYSTEM EXERCISER M MACRO M1200 01-DEC-83 09:48 PAGE 3-1

DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

SEQ 0003

BIT 1 = 0 INTERNAL LOOPBACK (MAINTENANCE MODE)
BIT 1 = 1 EXTERNAL LOOPBACK (ONBOARD CONNECTOR - H3260 R5423)

7. MODULE OPERATION

TEST SEQUENCE:

- A. TEST UP TO 6 POSSIBLE DEVICES FOR SELECTION
- B. STORE THE NO. OF DEVICES TO BE TESTED AND SET UP THE VECTORS AND PRIORITIES FOR THESE DEVICES
- C. LOAD ALL REGISTERS--SET UP IN USER DEFINED MODE, TURN RECEIVER AND TRANSMITTER ON, AND INTERRUPT ENABLES FOR ALL ACTIVE DEVICES. ENABLE SELECTED DEVICES.
- D. TRANSMITTER INTERRUPT SERVICE:
 - 1.) TEST FOR FALSE INTERRUPT (READY (0)); REPORT ERRORS
 - 2.) OUTPUT NEXT CHARACTER TO THE DEVICE
 - 3.) RETURN TO MONITOR TO WAIT FOR RECEIVER INTERRUPT.
- E. RECEIVER INTERRUPT SERVICE:
 - 1.) TEST FOR FALSE INTERRUPT (DONE (0)); REPORT ERRORS
 - 2.) CHECK FOR DATA ERROR; REPORT ERRORS
 - 3.) IF LAST CHARACTER, CHECK FOR BCC ERROR.
 - 4.) RETURN TO MONITOR TO WAIT FOR TRANSMITTER INTERRUPT
- F. REPEAT D AND E UNTIL ALL DEVICES HAVE BEEN PROCESSED.
- G. TURN OFF ALL ACTIVE DEVICES AND DECREMENT ITERATION COUNT. IF NOT 0, RESTART AT B.
- H. SIGNAL END PASS.

8. OPERATION OPTIONS

- A. LOCATION DVID1 (DPV 14) MAY BE CHANGED TO SELECT ANY COMBINATION OF DEVICES BIT0-DEV0, BIT1-DEV1BIT5-DEV5.

NOTE: IF DVID1 IS INITIALLY 0 DPV WILL BE DROPPED FROM TEST.

9. NON STANDARD PRINTOUTS

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

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F1

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159      ;**
160      ;  EDIT          BY          DATE          REASON
161      ;
162      ;  001          R. SOLER      12-SEP-83      PART OF THE IDNUM UPDATE
163      ;
164      ;
165      ;
166      ;--
167 000000      IOMOD <DPVB > .1,1,5,5,0,151,70      ;RS001
      000000      MODULE 140000,DPVB .1,1,5,5,0,151,70.....
      .TITLE DPVB DEC/X11 SYSTEM EXERCISER MODULE
      ; DDXCOM VERSION 6.4 28-JAN-82
      .LIST BIN
      ;*****
      000000      REGIN:
      000000      104      120      176 MODNAM: .ASCII /DPVB / ;MODULE NAME.
      000003      102      040
      000005      000      XFLAG: .BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
      000006      000001      ADDR: 1+0 ;1ST DEVICE ADDR.
      000010      000001      VECTOR: 1+0 ;1ST DEVICE VECTOR.
      000012      240      BR1: .BYTE PRTY5+0 ;1ST BR LEVEL.
      000013      240      BR2: .BYTE PRTY5+0 ;2ND BR LEVEL.
      000014      000001      DVID1: 0+1 ;DEVICE INDICATOR 1.
      000016      000000      SR1: OPEN ;SWITCH REGISTER 1
      000020      000000      SR2: OPEN ;SWITCH REGISTER 2
      000022      000000      SR3: OPEN ;SWITCH REGISTER 3
      000024      000000      SR4: OPEN ;SWITCH REGISTER 4
      ;*****
      000026      140000      STAT: 140000 ;STATUS WORD.
      000030      000244      INIT: START ;MODULE START ADDR.
      000032      000224      SPOINT: MODSP ;MODULE STACK POINTER.
      000034      000000      PASCNT: 0 ;PASS COUNTER.
      000036      000151      ICNT: 151 ;# OF ITERATIONS PER PASS=151
      000040      000000      ICOUNT: 0 ;LOC TO COUNT ITERATIONS
      000042      000000      SOFCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
      000044      000000      HRDCNT: 0 ;LOC TO SAVE TOTAL HARD ERRORS
      000046      000000      SOFPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
      000050      000000      HRDPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
      000052      000000      SYSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
      000054      000000      RANNUM: 0 ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
      000056      000000      CONFIG: ;RESERVED FOR MONITOR USE
      000056      000000      RES1: 0 ;RESERVED FOR MONITOR USE
      000060      000000      RES2: 0 ;RESERVED FOR MONITOR USE
      000062      000000      SVR0: OPEN ;LOC TO SAVE R0.
      000064      000000      SVR1: OPEN ;LOC TO SAVE R1.
      000066      000000      SVR2: OPEN ;LOC TO SAVE R2.
      000070      000000      SVR3: OPEN ;LOC TO SAVE R3.
      000072      000000      SVR4: OPEN ;LOC TO SAVE R4.
      000074      000000      SVR5: OPEN ;LOC TO SAVE R5.
      000076      000000      SVR6: OPEN ;LOC TO SAVE R6.
      000100      000000      CSRA: OPEN ;ADDR OF CURRENT CSR.
      000102      000000      SBADR: ;ADDR OF GOOD DATA, OR
      000102      000000      ACSR: OPEN ;CONTENTS OF CSR.
      000104      000000      WASADR: ;ADDR OF BAD DATA, OR
      000104      000000      ASTAT: OPEN ;STATUS REG CONTENTS.
      000106      ERRYP: ;TYPE OF ERROR
    
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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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000106 000000      ASB:  OPEN      ;EXPECTED DATA.
000110 000000      AWAS:  OPEN      ;ACTUAL DATA.
000112 000330      RSTRT: RESTRT    ;RESTART ADDRESS AFTER END OF PASS
000114 000000      WDT0:  OPEN      ;WORDS TO MEMORY PER ITERATION
000116 000000      WDFR:  OPEN      ;WORDS FROM MEMORY PER ITERATION
000120 000000      INTR:  OPEN      ;# OF INTERRUPTS PER ITERATION
000122 000070      IDNUM: 70        ;MODULE IDENTIFICATION NUMBER=70
      000040      .REPT  SPSIZ      ;MODULE STACK STARTS HERE.
      .NLIST
      .WORD  0
      .LIST
      .ENJR

000224 MODSP:
;*****

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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169
170
171          100000      ;BIT DEFINITIONS
172          040000      BIT15= 100000
173          020000      BIT14= 40000
174          010000      BIT13= 20000
175          004000      BIT12= 10000
176          002000      BIT11= 4000
177          001000      BIT10= 2000
178          000400      BIT9= 1000
179          000200      BIT8= 400
180          000100      BIT7= 200
181          000040      BIT6= 100
182          000020      BIT5= 40
183          000010      BIT4= 20
184          000004      BIT3= 10
185          000002      BIT2= 4
186          000001      BIT1= 2
187
188
189
190          ;CONTROL AND STATUS REGISTER DEFINITIONS
191          ;-----
192          ;RXCSR = RECEIVER CONTROL AND STATUS (16XXX0)
193          ;RDSR = RECEIVER DATA AND STATUS (16XXX2) READ ONLY
194          ;PCSAR = PARAMETER CONTROL SYNC/ADDRESS (16XXX2) WRITE ONLY
195          ;TXCSR = TRANSMITTER CONTROL AND STATUS (16XXX4)
196          ;TDSR = TRANSMITTER DATA AND STATUS (16XXX6)
197          RXCSR= 0      ;RECEIVER CONTROL AND STATUS REG
198          RDSR= 2      ;RECEIVER DATA BUFFER REGISTER
199          PCSAR= 2      ;PARAMETER CONTROL SYNC/ADDRESS
200          TXCSR= 4      ;TRANSMITTER CONTROL AND STATUS REGISTER
201          TDSR= 6      ;TRANSMITTER DATA BUFFER REGISTER
202
203          ;RXCSR BIT DEFINITIONS
204          RXACT= BIT11   ;RECEIVER ACTIVE
205          RXSTAT= BIT10 ;RECEIVER STATUS AVAILABLE
206          RXIE= BIT6    ;RECEIVE INTERRUPT ENABLE
207          RXEN= BIT4    ;RECEIVER ENABLE
208          RTS= BIT2     ;REQUEST TO SEND
209
210          ;RDSR BIT DEFINITIONS
211          ERR= BIT15    ;RECEIVER ERROR
212          ROVER= BIT11  ;RECEIVER OVERRUN
213          RABORT= BIT10 ;RECEIVER ABORT
214          REOM= BIT9   ;RECEIVE END OF MESSAGE
215          RSM= BIT8    ;RECEIVE START OF MESSAGE
216
217          ;PCSAR BIT DEFINITIONS
218          BCP= BIT14    ;PROTOCOL SELECTION, SET = BCP, CLEAR = BOP.
219          SECADR= BIT12 ;SECONDARY ADDRESS.
220          CRC16= BIT8:BIT9 ;CRC16
221
222          ;TXCSR BIT DEFINITIONS
223          TXIE= BIT6    ;TRANSMITTER INTERRUPT ENABLE
224          TXEN= BIT4    ;TRANSMITTER ENABLE
225          MAINT= BIT3   ;MAINTENANCE MODE

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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226          000004          TBE= BIT2          ;TRANSMIT BUFFER EMPTY
227          000002          TXACT= BIT1          ;TRANSMITTER ACTIVE
228          000001          RESET= BIT0          ;DPV RESET
229
230          ;TDSR BIT DEFINITIONS
231          100000          TERR= BIT15          ;TRANSMIT DATA LATE ERROR
232          002000          TABORT= BIT10          ;TRANSMIT ABORT
233          001000          TEOM= BIT9           ;TRANSMIT END OF MESSAGE
234          000400          TSOM= BIT8           ;TRANSMIT START OF MESSAGE
235
236          ;MISCELLANEOUS STORAGE
237 000224 000000          N.DPVS: OPEN          ;SOFTWARE MEMORY
238 000226 000000          TOTAL: OPEN          ;STORAGE FOR DATA CHECK
239 000230 000000          COUNT: OPEN          ;ITERATION COUNT
240 000232 000000          RXBF: OPEN          ;REC BUFFER ADRS STORAGE
241 000234 000000          SAVBF: OPEN          ;REC ISR TEMPORARY STORAGE
242 000236 000000          SELECT: OPEN          ;SOFTWARE POINTER TO ACTIVE DEVICES
243
244 000240 000000          MODE: .WORD 0          ;PROTOCOL MODE (0 = BOP, 1 = HCP)
245 000242 000000          LOOP: .WORD 0          ;LOOPBACK FLAG (0 = MAINTENANCE, 1 = EXTERNAL)
246
247
248          .MACRO $PUSH $A,$B,$C,$D,$E,$F
249          .IF NB <$A>, MOV $A,-(SP)          ;SAVE '$A ON THE STACK
250          .IF NB <$B>, MOV $B,-(SP)          ;SAVE '$B ON THE STACK
251          .IF NB <$C>, MOV $C,-(SP)          ;SAVE '$C ON THE STACK
252          .IF NB <$D>, MOV $D,-(SP)          ;SAVE '$D ON THE STACK
253          .IF NB <$E>, MOV $E,-(SP)          ;SAVE '$E ON THE STACK
254          .IF NB <$F>, MOV $F,-(SP)          ;SAVE '$F ON THE STACK
255          .ENDM $PUSH
256          .MACRO $POP $A,$B,$C,$D,$E,$F
257          .IF NB <$A>, MOV (SP)+,$A          ;POP STACK TO '$A
258          .IF NB <$B>, MOV (SP)+,$B          ;POP STACK TO '$B
259          .IF NB <$C>, MOV (SP)+,$C          ;POP STACK TO '$C
260          .IF NB <$D>, MOV (SP)+,$D          ;POP STACK TO '$D
261          .IF NB <$E>, MOV (SP)+,$E          ;POP STACK TO '$E
262          .IF NB <$F>, MOV (SP)+,$F          ;POP STACK TO '$F
263          .ENDM $POP

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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265
266
267
268 000244          ;BEGIN TESTING FOR THE DPV-11
269 000244 032767 000001 177544  START:
270 000252 001003          BIT      #BIT0,SR1      ;WHAT PROTOCOL?
271 000254 005067 177760          BNE      1$          ;IF SET, BCP
272 000260 000403          CLR      MODE          ;FLAG THAT BOP MODE REQUESTED.
273 000262          BR      2$
274 000262 012767 000001 177750  1$:      MOV      #1,MODE      ;FLAG THAT BCP MODE REQUESTED.
275 000270          2$:
276 000270 032767 000002 177520          BIT      #BIT1,SR1      ;WHAT LOOPBACK
277 000276 001003          BNE      3$          ;IF SET, EXTERNAL LOOPBACK.
278 000300 005067 177736          CLR      LOOP          ;FLAG THAT MAINTENANCE MODE (INTERNAL
279          BR      4$          ;LOOPBACK) REQUESTED.
280 000304 000403          3$:
281 000306          MOV      #1,LOOP      ;FLAG THAT EXTERNAL LOOPBACK REQUESTED.
282 000306 012767 000001 177726          4$:
283 000314          MOV      DVID1,SELECT      ;GET ACTIVE DEVICES
284 000314 016767 177474 177714          BNE      RESTR1      ;BR IF ANY ARE SELECTED
285 000322 001002          DROP:
286 000324          END$,BEGIN          ;INCORRECT NUMBER OF DPV11'S
287 000324 104410 000000'
288
289          ;SETUP VECTORS FOR ACTIVE DEVICES
290 000330          RESTR1:
291 000330 032767 177700 177700          BIT      #C<77>,SELECT ;MAKE SURE NO MORE THAN 6 SELECTED.
292 000336 001372          BNE      DROP          ;INVALID-NO MORE THAN 6 DEVICES!!
293 000340 016701 177672          MOV      SELECT,R1      ;GET IMAGE OF RUNNING DEVICES
294 000344 001767          BEQ      DROP          ;BR IF ALL DPV'S DROPPED
295 000346 005067 177652          CLR      N.DPV5          ;CLEAR THE # OF DPV'S (SOFTWARE)
296 000352 016702 177432          MOV      VECTOR,R2      ;GET INITIAL VECTOR
297 000356 016700 177424          MOV      ADDR,R0        ;GET INITIAL ADDRESS
298 000362 012703 001752'          MOV      #LNKTAB,R3      ;SET ISR POINTER
299 000366 012767 002172' 177636          MOV      #RXBFO,RXBFB   ;SET UP BUFFER POINTERS
300 000374          1$:
301 000374 006201          ASR      R1              ;ACTIVE?
302 000376 103410          BCS      3$              ;BR IF YES
303 000400 001437          BEQ      SETUP1          ;BR IF DONE
304 000402 062703 000024          ADD      #24,R3          ;POP ISR POINTER
305 000406          2$:
306 000406 062702 000010          ADD      #10,R2          ;NEXT DEVICE VECTOR
307 000412 062700 000010          ADD      #10,R0          ;NEXT DEVICE CSR
308 000416 000766          BR      1$              ;CONTINUE
309 000420          3$:
310 000420 005267 177600          INC      N.DPV5          ;UPDATE THE # TO RUN
311 000424 010312          MOV      R3,(R2)         ;LOAD ISR POINTER (RECEIVER)
312 000426 116762 177360 000002          MOVB    BR1,2(R2)        ;LOAD PRIORITY
313 000434 010063 000004          MOV      R0,4(R3)        ;LOAD CSR POINTER
314 000440 005063 000010          CLR      10(R3)          ;CLR REC BYTE COUNT
315 000444 062703 000012          ADD      #12,R3          ;UPDATE POINTER
316 000450 010362 000004          MOV      R3,4(R2)        ;LOAD TRANSMITTER ISR
317 000454 116762 177333 000006          MOVB    BR2,6(R2)        ;LOAD PRIORITY
318 000462 010063 000004          MOV      R0,4(R3)        ;LOAD CSR POINTER
319 000466 005063 000010          CLR      10(R3)          ;CLEAR TX BYTE COUNT
320 000472 062703 000012          ADD      #12,R3          ;NEXT ISR POINTER
321 000476 000743          BR      2$              ;CONTINUE

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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322
323
324 000500          ;SET UP BUFFERS
325 000500 016767 177520 177412 SETUP1: MOV N.DPVS,INTR ;SET # OF INTERRUPTS
326 000506 016767 177512 177400 MOV N.DPVS,WDT0 ;SET # OF WORDS TO MEM
327 000514 016767 177504 177374 MOV N.DPVS,WDFR ;SET # OF WORDS FROM MEM
328 000522 006367 177372 ASL INTR ;DOUBLE INTERRUPTS
329 000526 012700 000006 MOV #6,R0 ;LOAD BUFFER SIZE
330 000532 012703 002156 MOV #TXBF0,R3 ;LOAD BUFFER START
331 000536
332 000536 012723 000135 1$: MOV #135,(R3)+ ;FIRST CHARACTER TO TRANSMIT.
333 000542 005300 DEC R0 ;LOAD UNTIL DONE.
334 000544 001374 BNE 1$ ;BR IF MORE TO GO
335 000546 012700 000006 MOV #6,R0 ;LOAD BUFFER SIZE
336 000552 012703 002172 MOV #RXBF0,R3 ;LOAD START ADDRESS
337 000556
338 000556 012723 000135 2$: MOV #135,(R3)+ ;FIRST CHARACTER TO RECEIVE.
339 000562 005300 DEC R0 ;LOAD BUFFER UNTIL DONE.
340 000564 001374 BNE 2$ ;BR IF MORE TO GO
341
342          ;PRELIMINARY DEVICE SETUP
343 000566          SETUP2:
344 000566 016700 177214 MOV ADDP,R0 ;LOAD FIRST CSR
345 000572 016701 177440 MOV SELECT,R1 ;SET UP TO GET ACTIVE DEVICES
346 000576
347 000576 006201 1$: ASR R1 ;GET AN ACTIVE
348 000600 103404 BCS 2$ ;ONE
349 000602 001410 BEQ ACTIV ;BR IF DONE
350 000604 062700 000010 ADD #10,R0 ;UPDATE FOR THE NEXT ONE
351 000610 000772 BR 1$ ;CONTINUE
352 000612
353 000612 004767 001024 2$: JSR PC,PRELIM ;GO DO THE DEVICE SETUP
354 000616 062700 000010 ADD #10,R0 ;UPDATE FOR THE NEXT ONE
355 000622 000765 BR 1$ ;CONTINUE
356 000624
357 000624 016701 177406 ACTIV: MOV SELECT,R1 ;GET THE ACTIVE DPV'S
358 000630 016767 177370 177370 MOV N.DPVS,TOTAL ;SET UP FOR DATA CHECK
359 000636 016700 177144 MOV ADDR,R0 ;GET FIRST CSR
360 000642
361 000642 006201 1$: ASR R1 ;GET AN ACTIVE ONE
362 000644 103404 BCS 3$ ;BR IF ACTIVE
363 000646 001406 BEQ WAIT ;BR IF DONE
364 000650
365 000650 062700 000010 2$: ADD #10,R0 ;UPDATE CSR
366 000654 000772 BR 1$ ;CONTINUE
367 000656
368 000656 004767 001052 3$: JSR PC,READY ;TURN ON DEVICE
369 000662 000772 BR 2$ ;CONTINUE
370
371          ;DELAY AND SCAN FOR FINISH ROUTINE
372 000664          WAIT:
373 000664 012705 020000 MOV #20000,R5 ;SET UP FOR A LONG DELAY
374
375          ;APPROX 30 SECONDS ON A LSI 11/23
376 000670          SCAN: ;APPROX 60 SECONDS ON A LSI 11/2
377 000670 1$:
378 000670 104407 000000 BREAK$,BEGIN ;TEMPORARY RETURN TO MONITOR....

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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000674 104407 000000'
379 000700 005767 177322
380 000704 001004
381
382
383 000706 104413 000000'
384 000712
385 000712 000167 177412
386 000716
387 000716 005305
388 000720 001363
389 000722 104403 000000' 000734'
390 000730 104410 000000'
391 000734
392 000734 002222'
393 000736 177777

(BREAK$,BEGIN
1ST TOTAL
BNE 3$
-----
ENDIT$,BEGIN
2$: JMP RESTRT
3$: DEC R5
BNE 1$
MSGN$,BEGIN,HUNG
END$,BEGIN
HUNG: MHUNG
-1

;THEN CONTINUE AT NEXT INSTRUCTION.
;GET THE # OF ACTIVE DPVS
;BR IF MORE TO GO
;SIGNAL END OF ITERATION.
;MONITOR SHALL TEST END OF PASS
;RESTART PROGRAM
;STALL FOR ALL DPV'S TO FINISH
;BR IF DELAY NOT ZERO
;ASCII MESSAGE CALL WITH COMMON HEADER
;;DROP THE MODULE
;POINTER TO ASCII MESSAGE
;TERMINATOR

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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395                                     ;TRANSMITTER INTERRUPT SERVICE ROUTINE
396 000740 TXISR:
397 000740 0.0046 MOV R0,-(SP) ;SAVE R0 ON THE STACK
000742 010146 MOV R1,-(SP) ;SAVE R1 ON THE STACK
398 000744 012500 MOV (R5)+,R0 ;GET DEVICE CSR AND POP OFFSET TO R5
399 000746 012501 MOV (R5)+,R1 ;GET DATA ADDRESS AND LEAVE R5=COUNT ADDRESS
400 000750 032760 100000 000006 PIY #TERR,TDSR(R0) ;DATA LATE ERROR?
401 000756 001430 BCU 2# ;BR IF NO
402 000760 010067 177114 MCV R0,CSRA ;ADDRESS OF RXCSR FOR TYPEOUT
403 000764 011067 177112 MOV (R0),ACSR ;CONTENTS OF RXCSR FOR TYPEOUT
404 000770 016067 000006 177106 MOV TDSR(R0),ASTAT ;CONTENTS OF TDSR FOR TYPEOUT
405 000776 012760 000001 000004 MOV #RESET, TXCSR(R0) ;TURN OFF THE DEVICE
406 001004 012601 MOV (SP)+,R1 ;POP STACK TO R1
001006 012600 MOV (SP)+,R0 ;POP STACK TO R0
001010 012605 MOV (SP)+,R5 ;POP STACK TO R5
407 -----
001012 000004 000000' 001020' PIRQ$,BEGIN,1# ; QUEUE UP TO CONTINUE AT 1$ AND RTI
-----
408 001020 1$:
409 001020 012767 000041 177060 MOV #41,ERRTYP ;XMITTER DATA LATE
410 001026 104406 000000' 000000 ;*****
SOFER$,BEGIN,NULL ; ;TRANSMIT DATA LATE ERROR
;*****
411 001034 000167 177630 JMP SCAN ;CONTINUE SCANNING FOR END
412 001040 2$:
413 001040 005215 INC (R5) ;UPDATE THE COUNTER
414 001042 022715 000001 CMP #1,(R5) ;IS THIS THE FIRST ONE?
415 001046 001004 BNE 3# ;IF NOT, SEND DATA
416 001050 052760 000400 000006 BIS #TSOM,TDSR(R0) ;IF YES, DON'T TRANSMIT DATA
417 ;SEND OUT A SECOND FLAG (OR SYNCH)
418 ;NOTE: IN BOP MODE ONLY 1 FLAG IS
419 ;NECESSARY. IN BCP MODE, 2 SYNCHS
420 ;ARE NEEDED. IN BOTH CASE WE SEND OUT
421 ;2 JUST FOR EASE OF CODING.
422 001056 000414 BR 4# ;
423 001060 3$:
424 001060 011160 000006 MOV (R1),TDSR(R0) ;PUSH OUT DATA.
425 001064 105211 INCB (R1) ;CHANGE DATA FOR NEXT CHARACTER.
426 001066 022715 002261 CMP #1201,,(R5) ;CHECK FOR FINISH. (THE TRANSMIT COUNTER IS
427 ;1201. BECAUSE WE COMPENSATE FOR THE EXTRA
428 ;FLAG OR SYNCH).
429 001072 001006 BNE 4# ;BR IF MORE TO GO
430 001074 052760 001000 000006 BIS #TEOM,TDSR(R0) ;END OF MESSAGE.
431 001102 042760 000100 000004 BIC #TXIE, TXCSR(R0) ;TURN OFF INTERRUPTS
432 001110 4$:
433 001110 012601 MOV (SP)+,R1 ;POP STACK TO R1
001112 012600 MOV (SP)+,R0 ;POP STACK TO R0
001114 012605 MOV (SP)+,R5 ;POP STACK TO R5
434 001116 000002 RTI ;RETURN FROM INTERRUPT

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DEC/X11 SYSTEM EXERCISER MACRO DEFINITION MODULE

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436                                     ;RECEIVER INTERRUPT SERVICE ROUTINE
437 001120                               RXISR:
438 001120 010046                         MOV    R0,-(SP)          ;SAVE R0 ON THE STACK
      001122 010146                         MOV    R1,-(SP)          ;SAVE R1 ON THE STACK
439 001124 012500                         MOV    (R5)+,R0         ;GET CSR
440 001126 012501                         MOV    (R5)+,R1         ;GET BUFFER ADDR AND LEAVE R5=F . COUNT
441 001130 105710                         TSTB  (R0)              ;IS RECEIVER DATA AVAILABLE? (1 7 OF RXCSR)
442 001132 100430                         BMI    2$               ;OK IF SET - BR
443
444 001134 010067 176740                   MOV    R0,CSRA          ;ADDRESS OF RXCSR FOR HARD ERROR MESSAGE.
445 001136 011067 176736                   MOV    (R0),ACSR        ;CONTENTS OF RXCSR FOR HARD ERROR MESSAGE.
446 001144 016067 000002 176732           MOV    RDSR(R0),ASTAT   ;CONTENTS OF RDSR FOR HARD ERROR MESSAGE.
447 001152 012760 000001 000004           MOV    #RESET,TXCSR(R0);TURN OFF THE DEVICE
448
449 001160 012601                         MOV    (SP)+,R1         ;POP STACK TO R1
      001162 012600                         MOV    (SP)+,R0         ;POP STACK TO R0
      001164 012605                         MOV    (SP)+,R5         ;POP STACK TO R5
450
      001166 000004 000000' 001174'         PIRQ$,BEGIN,1$         ; QUEUE UP TO CONTINUE AT 1$ AND RTI
      ;-----
451 001174                               1$:
452 001174 012767 000011 176704           MOV    #11,ERRTYP      ;ILLEGAL INTERRUPT
453
      001202 104495 000000' 000000         HRDR$,BEGIN,NULL      ;FALSE INTERRUPT
      ;-----
454 001210 000457 177454                   JMP    SCAN             ;CONTINUE SCANNING FOR END
455 001214                               2$:
456 001214 016067 000002 177012           MOV    RDSR(R0),SAVBF   ;SAVE THE CHARACTER IN THE BUFFER
457
      001222 032767 006000 177004           BIT    #ROVER!RABORT,SAVBF ;WAS THERE AN OVERRUN OR ABORT?
458 001230 001012                         BNE    5$               ;BRANCH TO ERROR IF AN OVERRUN OR ABORT REC.
459 001232 005215                         INC    (R5)              ;UPDATE THE CHARACTER COUNT.
460 001234 022715 002260                   CMP    #1200,(R5)       ;DONE?
461 001240 001467                         BEQ    13$              ;BR IF DATA DONE
462 001242 121167 176766                   CMPB  (R1),SAVBF        ;IS THE DATA OK?
463 001246 001033                         BNE    10$              ;IF NOT, PROCEED.
464 001250 105711                         INCB  (R1)              ;UPDATE DATA
465 001252 000167 000354                   JMP    20$
466
467                               5$:
468 001256
469 001256 010067 176616                   MOV    R0,CSRA          ;ADDRESS OF RXCSR FOR HARD ERROR MESSAGE.
470 001262 011067 176614                   MOV    (R0),ACSR        ;CONTENTS OF RXCSR FOR HARD ERROR MESSAGE.
471 001266 016067 000002 176610           MOV    RDSR(R0),ASTAT   ;CONTENTS OF RDSR FOR HARD ERROR MESSAGE.
472 001274 012760 000001 000004           MOV    #RESET,TXCSR(R0);TURN OFF THE DEVICE
473
474 001302 012601                         MOV    (SP)+,R1         ;POP STACK TO R1
      001304 012600                         MOV    (SP)+,R0         ;POP STACK TO R0
      001306 012605                         MOV    (SP)+,R5         ;POP STACK TO R5
475
      001310 000004 000000' 001316'         PIRQ$,BEGIN,6$         ; QUEUE UP TO CONTINUE AT 6$ AND RTI
      ;-----
476 001316                               6$:
477 001316 012767 000017 176562           MOV    #17,ERRTYP      ;OVERRUN OR ABORT.
478
      001324 104405 000000' 000000         HRDR$,BEGIN,NULL      ;HARDWARE DATA ERROR
      ;-----
479 001332 000167 177332                   JMP    SCAN             ;CONTINUE SCANNING FOR END

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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480
481
482 001336          10$:
483 001336 010167 176540      MOV     R1,SBADR      ;LOAD GOOD DATA ADRS
484 001342 010067 176532      MOV     R0,CSRA      ;LOAD CS#
485 001346 012767 000234' 176530  MOV     @SAVBF,WASADR ;LOAD BAD DATA ADRS
486 001354 111167 176526      MOV     (R1),ASB     ;LOAD GOOD DATA
487 001360 116767 176650 176522  MOV     SAVBF,AWAS   ;LOAD BAD DATA
488 001366 012760 000001 000004  MOV     @RESET,IXCSR(R0) ;TURN OFF THE DEVICE
489 001374 012601      MOV     (SP)+,R1     ;POP STACK TO R1
      001376 012600      MOV     (SP)+,R0     ;POP STACK TO R0
      001400 012605      MOV     (SP)+,R5     ;POP STACK TO R5
490
      001402 000004 000000' 001410'  |-----|
      PIRQ$,BEGIN,11$           ; QUEUE UP TO CONTINUE AT 11$ AND RTI
      |-----|
491 001410          11$:
492
      001410 104404 000000'      ;*****
      DATER$,BEGIN           ;DATA ERROR!!!
      ;*****
493 001414 000167 177250      JMP     SCAN             ;CONTINUE SCANNING FOR END
494
495
496 001420          13$:
497 001420 005767 176614      TST     MOUE           ;PROTOCOL?
498 001424 001405          BEQ     14$            ;BR IF BOP MODE
499 001426 032767 100000 176600  BIT     @ERR,SAVBF     ;CHECK FOR CRC ERROR
500 001434 001071          BNE     19$            ;BR IF NO ERROR
501 001436 000440          BR      17$            ;CRC ERROR
502 001440          14$:
503 001440 032767 100000 176566  BIT     @ERR,SAVBF     ;CHECK FOR CRC ERROR
504 001446 001034          BNE     17$            ;BR IF ERROR
505 001450 032767 001000 176556  BIT     @REOM,SAVBF   ;WAS RECEIVE END OF MESSAGE RECEIVED?
506 001456 001060          BNE     19$            ;IF YES, OK.
507
508 001460 010067 176414      MOV     R0,CSRA      ;ADDRESS OF RXCSR FOR HARD ERROR MESSAGE.
509 001464 011067 176412      MOV     (R0),ACSR    ;CONTENTS OF RXCSR FOR HARD ERROR MESSAGE.
510 001470 016767 176540 176406  MOV     SAVBF,ASTAT  ;CONTENTS OF RDSR FOR HARD ERROR MESSAGE.
511 001476 012760 000001 000004  MOV     @RESET,IXCSR(R0) ;TURN OFF THE DEVICE
512
513 001504 012601      MOV     (SP)+,R1     ;POP STACK TO R1
      001506 012600      MOV     (SP)+,R0     ;POP STACK TO R0
      001510 012605      MOV     (SP)+,R5     ;POP STACK TO R5
514
      001512 000004 000000' 001520'  |-----|
      PIRQ$,BEGIN,16$           ; QUEUE UP TO CONTINUE AT 16$ AND RTI
      |-----|
515 001520          16$:
516 001520 012767 000017 176360  MOV     @17.ERRTYP   ;RECEIVE END OF MESSAGE NOT RECEIVED
517
      001526 104405 000000' 000000  ;*****
      HRDER$,BEGIN,NULL       ;RECEIVER ERROR
      ;*****
518 001534 000167 177130      JMP     SCAN             ;CONTINUE SCANNING FOR END
519
520 001540          17$:
521
522 001540 010067 176334      MOV     R0,CSRA      ;ADDRESS OF RXCSR FOR HARD ERROR MESSAGE.
523 001544 011067 176332      MOV     (R0),ACSR    ;CONTENTS OF RXCSR FOR HARD ERROR MESSAGE.
524 001550 016067 000002 176326  MOV     RDSR(R0),ASTAT ;CONTENTS OF RDSR FOR HARD ERROR MESSAGE.

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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525 001556 012760 000001 000004      MOV    #RESET, TXCSR(R0) ;TURN OFF THE DEVICE
526
527 001564 012601      MOV    (SP)+,R1          ;POP STACK TO R1
    001566 012600      MOV    (SP)+,R0          ;POP STACK TO R0
    001570 012605      MOV    (SP)+,R5          ;POP STACK TO R5
528
    001572 000004 000000' 001600'      PIRQ#,BEGIN,18#        ; QUEUE UP TO CONTINUE AT 18# AND RTI
    .....
529 001600 012767 000043 176300      MOV    #43,ERRTYP      ;CRC ERROR
530 001600 012767 000043 176300      ;*****
531 001606 104405 000000' 000000      HRDR#,BEGIN,NULL      ;HARDWARE DETECTED CRC ERROR
    ;*****
532 001614 000167 177050      JMP    SCAN            ;CONTINUE SCANNING FOR END
533 001620
534 001620 012760 000001 000004      MOV    #RESET, TXCSR(R0) ;TURN OFF THE DEVICE
535 001626 005367 176374      DEC    TOTAL          ;DECREMENT DEVICE COUNTER
536 001632
537 001632 012601      MOV    (SP)+,R1          ;POP STACK TO R1
    001634 012600      MOV    (SP)+,R0          ;POP STACK TO R0
    001636 012605      MOV    (SP)+,R5          ;POP STACK TO R5
538 001640 000002      RTI                   ;RETURN FROM INTERRUPT

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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540
541
542           ;SUBROUTINES
543
544           ;PRELIM SUBROUTINE SETS UP THE DPV
545           ; RO = CSR ADDRESS
546 001642    PRELIM:  BIS      @RESET, TXCSR(RO) ; RESET THE DPV11
547 001642    052760  000001  000004    TST      MODE           ; WHAT PROTOCOL?
548 001650    005767  176364             BNE     1$             ; BRANCH IF BCP.
549
550
551 001656    012760  010135  000002    MOV     @SECADR!135, PCSAR(RO) ; BOP MODE - CRC-CCITT AND SECONDARY ADDRESS
552 001664    000403             BR      2$
553 001666
554
555 001666    012760  041626  000002    MOV     @BCP!CRC16!226, PCSAR(RO) ; BCP MODE - CRC16 AND SYNCH CHARACTER
556 001674
557 001674    005767  176342             TST     LOOP           ; WHAT LOOPBACK?
558 001700    001004             BNE     3$             ; BRANCH IF EXTERNAL LOOPBACK.
559 001702    052760  000010  000004    BIS     @MAINT, TXCSR(RO) ; TURN ON MAINTENANCE MODE (INTERNAL LOOP)
560 001710    000403             BR      4$
561 001712
562 001712    052760  000004  000000    BIS     @RTS, RXCSR(RO) ; SET RTS IN ORDER TO USE TURNAROUND.
563 001720
564 001720    052710  000120             BIS     @RXEN!RXIE, (RO) ; TURN ON RECEIVER AND INT. ENABLE
565 001724    052760  000020  000004    BIS     @TXEN, TXCSR(RO) ; ENABLE THE TRANSMITTER
566 001732    000207             RTS     PC             ; RETURN
567
568           ;READY SUBROUTINE TURNS ON THE TRANSMITTER
569           ; RO = CSR ADDRESS
570 001734    READY:  BIS     @TSM, (RO) ; TURN ON TRANSMITTER
571 001734    052760  000400  000006    BIS     @TXIE, TXCSR(RO) ; TURN ON TRANSMITTER INT. ENABLE
572 001742    052760  000100  000004    RTS     PC             ; RETURN
573 001750    000207
574
575

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DEC/X11 SYSTEM EXERCISER MACRO DEFINITION MODULE

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577                                     ;SERVICE CODE FOR LINKING A PARTICULAR DEVICE
578                                     ;TO A COMMON TRANSMIT OR RECEIVE INTERRUPT SERVICE ROUTINE.
579
580 001752                               LNKTAB:
581                                     ,MACRO $JS,$Q
582                                     JSR    R5,RXISR           ;ANSWER FOR DEVICE '$Q REC ISR
583                                     0                       ;CSR FOR DEVICE '$Q REC ISR
584                                     RXBF'$Q                ;BUFFER LOC FOR DEVICE '$Q
585                                     BCNT'$Q                ;BYTE COUNT ADDRESS FOR RXBF'$Q
586
587                                     JSR    R5,TXISR           ;ANSWER FOR DEVICE '$Q TX ISR
588                                     0                       ;CSR FOR DEVICE '$Q TX ISR
589                                     TXBF'$Q                ;DATA ADDRESS FOR DEVICE '$Q
590                                     OFFSET'$Q              ;BYTE COUNT ADDRESS FOR DEVICE '$Q
591
592                                     .ENDM $JS
593
595                                     $JS $Q
596                                     .ENDM

001752 004567 177142                   JSR    R5,RXISR           ;ANSWER FOR DEVICE 0 REC ISR
001756 000000                           0                       ;CSR FOR DEVICE 0 REC ISR
001760 002172'                          RXBF0                    ;BUFFER LOC FOR DEVICE 0
001762 002206'                          BCNT0                    ;BYTE COUNT ADDRESS FOR RXBF0

001764 004567 176750                   JSR    R5,TXISR           ;ANSWER FOR DEVICE 0 TX ISR
001770 000000                           0                       ;CSR FOR DEVICE 0 TX ISR
001772 002156'                          TXBF0                    ;DATA ADDRESS FOR DEVICE 0
001774 002142'                          OFFSET0                  ;BYTE COUNT ADDRESS FOR DEVICE 0

001776 004567 177116                   JSR    R5,RXISR           ;ANSWER FOR DEVICE 1 REC ISR
002002 000000                           0                       ;CSR FOR DEVICE 1 REC ISR
002004 002174'                          RXBF1                    ;BUFFER LOC FOR DEVICE 1
002006 002210'                          BCNT1                    ;BYTE COUNT ADDRESS FOR RXBF1

002010 004567 176724                   JSR    R5,TXISR           ;ANSWER FOR DEVICE 1 TX ISR
002014 000000                           0                       ;CSR FOR DEVICE 1 TX ISR
002016 002160'                          TXBF1                    ;DATA ADDRESS FOR DEVICE 1
002020 002144'                          OFFSET1                  ;BYTE COUNT ADDRESS FOR DEVICE 1

002022 004567 177072                   JSR    R5,RXISR           ;ANSWER FOR DEVICE 2 REC ISR
002026 000000                           0                       ;CSR FOR DEVICE 2 REC ISR
002030 002176'                          RXBF2                    ;BUFFER LOC FOR DEVICE 2
002032 002212'                          BCNT2                    ;BYTE COUNT ADDRESS FOR RXBF2

002034 004567 176700                   JSR    R5,TXISR           ;ANSWER FOR DEVICE 2 TX ISR
002040 000000                           0                       ;CSR FOR DEVICE 2 TX ISR
002042 002162'                          TXBF2                    ;DATA ADDRESS FOR DEVICE 2
002044 002146'                          OFFSET2                  ;BYTE COUNT ADDRESS FOR DEVICE 2

002046 004567 177046                   JSR    R5,RXISR           ;ANSWER FOR DEVICE 3 REC ISR
002052 000000                           0                       ;CSR FOR DEVICE 3 REC ISR
002054 002200'                          RXBF3                    ;BUFFER LOC FOR DEVICE 3
002056 002214'                          BCNT3                    ;BYTE COUNT ADDRESS FOR RXBF3

002060 004567 176654                   JSR    R5,TXISR           ;ANSWER FOR DEVICE 3 TX ISR
002064 000000                           0                       ;CSR FOR DEVICE 3 TX ISR
002066 002164'                          TXBF3                    ;DATA ADDRESS FOR DEVICE 3

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DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

002070	002150'		OFSET3		;BYTE COUNT ADDRESS FOR DEVICE 3
002072	004567	177022	JSR	R5,RXISR	;ANSWER FOR DEVICE 4 REC ISR
002076	000000		0		;CSR FOR DEVICE 4 REC ISR
002100	002202'		RXBF4		;BUFFER LOC FOR DEVICE 4
002102	002216'		BCNT4		;BYTE COUNT ADDRESS FOR RXBF4
002104	004567	176630	JSR	R5, TXISR	;ANSWER FOR DEVICE 4 TX ISR
002110	000000		0		;CSR FOR DEVICE 4 TX ISR
002112	002166'		TXBF4		;DATA ADDRESS FOR DEVICE 4
002114	002152'		OFSET4		;BYTE COUNT ADDRESS FOR DEVICE 4
002116	004567	176776	JSR	R5,RXISR	;ANSWER FOR DEVICE 5 REC ISR
002122	000000		0		;CSR FOR DEVICE 5 REC ISR
002124	002204'		RXBF5		;BUFFER LOC FOR DEVICE 5
002126	002220'		BCNT5		;BYTE COUNT ADDRESS FOR RXBF5
002130	004567	176604	JSR	R5, TXISR	;ANSWER FOR DEVICE 5 TX ISR
002134	000000		0		;CSR FOR DEVICE 5 TX ISR
002136	002170'		TXBF5		;DATA ADDRESS FOR DEVICE 5
002140	002154'		OFSET5		;BYTE COUNT ADDRESS FOR DEVICE 5

DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

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598                                     ;BUFFER AREAS
599
600                                     .MACRO $OF,$Q
601 OFSET' $Q:                          .WORD 0      ;TRANSMITTER BYTE COUNT POINTER FOR DEVICE '$Q
602                                     .ENDM
604 $OF $Q
605                                     .ENDM
002142 000000 OFSET0: .WORD 0      ;TRANSMITTER BYTE COUNT POINTER FOR DEVICE 0
002144 000000 OFSET1: .WORD 0      ;TRANSMITTER BYTE COUNT POINTER FOR DEVICE 1
002146 000000 OFSET2: .WORD 0      ;TRANSMITTER BYTE COUNT POINTER FOR DEVICE 2
002150 000000 OFSET3: .WORD 0      ;TRANSMITTER BYTE COUNT POINTER FOR DEVICE 3
002152 000000 OFSET4: .WORD 0      ;TRANSMITTER BYTE COUNT POINTER FOR DEVICE 4
002154 000000 OFSET5: .WORD 0      ;TRANSMITTER BYTE COUNT POINTER FOR DEVICE 5

606
607
608                                     .MACRO $TB,$Q
609 TXBF' $Q:                            .WORD 0      ;TRANSMITTER BUFFER FOR DEVICE '$Q
610                                     .ENDM
612 $TB $Q
613                                     .ENDM
002156 000000 TXBF0: .WORD 0      ;TRANSMITTER BUFFER FOR DEVICE 0
002160 000000 TXBF1: .WORD 0      ;TRANSMITTER BUFFER FOR DEVICE 1
002162 000000 TXBF2: .WORD 0      ;TRANSMITTER BUFFER FOR DEVICE 2
002164 000000 TXBF3: .WORD 0      ;TRANSMITTER BUFFER FOR DEVICE 3
002166 000000 TXBF4: .WORD 0      ;TRANSMITTER BUFFER FOR DEVICE 4
002170 000000 TXBF5: .WORD 0      ;TRANSMITTER BUFFER FOR DEVICE 5

614
615
616                                     .MACRO $RB,$Q
617 RXBF' $Q:                          .WORD 0      ;RECEIVER BUFFER FOR DEVICE '$Q
618                                     .ENDM
620 $RB $Q
621                                     .ENDM
002172 000000 RXBF0: .WORD 0      ;RECEIVER BUFFER FOR DEVICE #0
002174 000000 RXBF1: .WORD 0      ;RECEIVER BUFFER FOR DEVICE #1
002176 000000 RXBF2: .WORD 0      ;RECEIVER BUFFER FOR DEVICE #2
002200 000000 RXBF3: .WORD 0      ;RECEIVER BUFFER FOR DEVICE #3
002202 000000 RXBF4: .WORD 0      ;RECEIVER BUFFER FOR DEVICE #4
002204 000000 RXBF5: .WORD 0      ;RECEIVER BUFFER FOR DEVICE #5

622
623
624                                     .MACRO $BC,$Q
625 BCNT' $Q:                          .WORD 0      ;RECEIVER BYTE COUNT POINTER FOR DEVICE '$Q
626                                     .ENDM
628 $BC $Q
629                                     .ENDM
002206 000000 BCNT0: .WORD 0      ;RECEIVER BYTE COUNT POINTER FOR DEVICE 0
002210 000000 BCNT1: .WORD 0      ;RECEIVER BYTE COUNT POINTER FOR DEVICE 1
002212 000000 BCNT2: .WORD 0      ;RECEIVER BYTE COUNT POINTER FOR DEVICE 2
002214 000000 BCNT3: .WORD 0      ;RECEIVER BYTE COUNT POINTER FOR DEVICE 3
002216 000000 BCNT4: .WORD 0      ;RECEIVER BYTE COUNT POINTER FOR DEVICE 4
002220 000000 BCNT5: .WORD 0      ;RECEIVER BYTE COUNT POINTER FOR DEVICE 5

630
631
632
633                                     ;ASCII MESSAGES
637 002222 045 104 120 MHUNG: .ASCIIZ 'DPV11 MODULE IS HUNG - SEE LISTING'

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H2

DEC/X11 SYSTEM EXERSIZER MACRO DEFINITION MODULE

641		.EVEN
642	00C001	.END

SYMBOL TABLE

ACSR	000102R	CLKSP#	104422	NOAPTY	000002	RANNUM	000054R	SR1	000016R
ACTIV	000624R	CONFIG	000056R	NULL	000000	RDSR	000002	SR2	000020R
ADDR	000006R	COUNT	000230R	N.DPVS	000224R	READY	001734R	SR3	000022R
ADDR22	001000	CRC16	001400	OFSET0	002142R	REOM	001000	SR4	000024R
APTPRE	000200	CSRA	000100R	OFSET1	002144R	RESET	000001	START	000244R
ASB	000106R	DATCK#	104411	OFSET2	002146R	RESTRT	000330R	STAT	000026R
ASTAT	000104R	DATER#	104404	OFSET3	002150R	RES1	000056R	SVR0	000062R
AUTO	000010	DROP	000324R	OFSET4	002152R	RES2	000060R	SVR1	000064R
AWAS	000110R	DVID1	000014R	OFSET5	002154R	RH70	001000	SVR2	000066R
BCNT0	002206R	ECCMEM	000100	OPEN	000000	ROVER	004000	SVR3	000070R
BCNT1	002210R	ENDIT#	104413	OTOA#	104420	RSON	000400	SVR4	000072R
BCNT2	002212R	END#	104410	PARPRE	002000	RSTRT	000112R	SVR5	000074R
BCNT3	002214R	ERR	100000	PASCNT	000034R	RTS	000004	SVR6	000076R
BCNT4	002216R	ERRTYP	000106R	PCSAR	000002	RXACT	004000	SYSCNT	000052R
BCNT5	002220R	EXIT#	104400	PDPF11	000002	RXBF	000232R	TABORT	002000
BCP	040000	GETPA#	104415	PDPLSI	020000	RXBF0	002172R	TRE	000004
BEGIN	000000R	GMBUF#	104414	PDP44	100000	RXBF1	002174R	TDSR	000006
BIT0	000001	HRDCNT	000044R	PDP60	004000	RXBF2	002176R	TEOM	001000
BIT1	000002	HRDER#	104405	PDP70	010000	RXBF3	002200R	TERR	100000
BIT10	002000	HRDPAS	000050R	PIRQ#	000004	RXBF4	002202R	TOTAL	000226R
BIT11	004000	HUNG	000734R	POPSP	005726	RXBF5	002204R	TRPDFD	000023
BIT12	010000	ICONT	000036R	POPSP2	022626	RXCSR	000000	TSOM	000400
BIT13	020000	ICOUNT	000040R	PRELIM	001642R	RXEN	000020	TXACT	000002
BIT14	040000	IDNUM	000122R	PRHMS#	000002	RXIE	000100	TXBF0	002156R
BIT15	100000	INDPAR	000040	PRTY	000000	RXISR	001120R	TXBF1	002160R
BIT2	000004	INIT	000030R	PRTY0	000000	RXSTAT	002000	TXBF2	002162R
BIT3	000010	INTR	000120R	PRTY1	000040	R6	000006	TXBF3	002164R
BIT4	000020	KTPRES	000400	PRTY2	000100	R7	000007	TXBF4	002166R
BIT5	000040	KTXTND	040000	PRTY3	000140	SAVBF	000234R	TXBF5	002170R
BIT6	000100	LNKTAB	001752R	PRTY4	000200	SBADR	000102R	TXCSR	000004
BIT7	000200	LOOP	000242R	PRTY5	000240	SCAN	000670R	TXEN	000020
BIT8	000400	MAINT	000010	PRTY6	000300	SECADR	010000	TXIE	000100
BIT9	001000	MAP22#	104416	PRTY7	000340	SELECT	000236R	TXISR	000740R
BREAK#	104407	MILING	002222R	PS	177776	SETUP1	000500R	USTACK	000001
BR1	000012R	MODE	000240R	PSW	177776	SETUP2	000566R	VECTOR	000010R
BR2	000013R	MODNAM	000000R	PUSH	005746	SOFCNT	000042R	WAIT	000664R
BTOD#	104421	MODSP	000224R	PUSH2	024646	SOFR#	104406	WASADR	000104R
CAPRES	000004	MSGN#	104403	PWRFLG	000002	SOPAS	000046R	WDFR	000116R
CDATA#	104412	MSG#	104402	QMON22	000010	SPOINT	000032R	WDT0	000114R
CKHNG#	000001	MSG#	104401	RABORT	002000	SPSIZ	000040	XFLAG	000005R
CLKPRE	000001	NCFUOP	000020	RAND#	104417				

. ABS. 000000 000
002270 001
ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 13897 WORDS (55 PAGES)
DYNAMIC MEMORY: 19748 WORDS (75 PAGES)
ELAPSED TIME: 00:00:37
XDPVBO, XDPVBO/CR/ -SP=DDXCOM, XDPVBO

SYMBOL CROSS REFERENCE

CREF VO1

SYMBOL	VALUE	REFERENCES	CREF	VO1						
ACSR	000102 R	05-167	*8-403	*9-445	*9-470	*9-509	*9-523			
ACTIV	000624 R	7-349	07-356							
ADDR	000006 R	05-157	7-297	7-344	7-359					
ADDR22	* 001000	05-167								
APTPRE	* 000200	05-167								
ASB	000106 R	05-167	*9-486							
ASTAT	000104 R	05-167	*8-404	*9-446	*9-471	*9-510	*9-524			
AUTO	* 000010	05-167								
AWAS	000110 R	05-167	*9-487							
BCNT0	002206 R	11-596	012-629							
BCNT1	002210 R	11-596	012-629							
BCNT2	002212 R	11-596	012-629							
BCNT3	002214 R	11-596	012-629							
BCNT4	002216 R	11-596	012-629							
BCNT5	002220 R	11-596	012-629							
BCP	* 040000	06-218	10-555							
BEGIN	000000 R	05-167	7-287	7-378	7-378	7-383	7-389	7-390	8-407	8-410
		9-450	9-453	9-475	9-478	9-490	9-492	9-514	9-517	9-528
		9-531								
BIT0	* 000001	05-167	06-186	6-228	7-269					
BIT1	* 000002	05-167	06-185	6-227	7-276					
BIT10	* 002000	05-167	06-176	6-205	6-213	6-232				
BIT11	* 004000	05-167	06-175	6-204	6-212					
BIT12	* 010000	05-167	06-174	6-219						
BIT13	* 020000	05-167	06-173							
BIT14	* 040000	05-167	06-172	6-218						
BIT15	* 100000	05-167	06-171	6-211	6-231					
BIT2	* 000004	05-167	06-184	6-208	6-226					
BIT3	* 000010	05-167	06-183	6-225						
BIT4	* 000020	05-167	06-182	6-207	6-224					
BIT5	* 000040	05-167	06-181							
BIT6	* 000100	05-167	06-180	6-206	6-223					
BIT7	* 000200	05-167	06-179							
BIT8	* 000400	05-167	06-178	6-215	6-220	6-234				
BIT9	* 001000	05-167	06-177	6-214	6-220	6-233				
BREAK\$	* 104407	05-167	7-378	7-378						
BR1	000012 R	05-167	7-312							
BR2	000013 R	05-167	7-317							
BTOD\$	* 104421	05-167								
CAPRES	* 000004	05-167								
CDATA\$	* 104412	05-167								
CKHNG\$	* 000001	05-167								
CLKPRE	* 000001	05-167								
CLKSP\$	* 104422	05-167								
CONFIG	000056 R	05-167								
COUNT	000230 R	06-239								
CRC16	* 001400	06-220	10-555							
CSRA	000100 R	05-167	*8-402	*9-444	*9-469	*9-484	*9-508	*9-522		
DATCK\$	* 104411	05-167								
DATER\$	* 104404	05-167	9-492							
DROP	000324 R	07-286	7-292	7-294						
DVID1	000014 R	05-167	7-284							

SYMBOL CROSS REFERENCE

CREF V01

SYMBOL	VALUE	REFERENCES										
PDP70	= 010000	05-167										
PIRQ\$	= 000004	05-167	8-407	9-450	9-475	9-490	9-514	9-528				
POPSP	= 005726	05-167										
POPSP2	= 022626	05-167										
PRELIM	001642 R	7-353	010-545									
PRHMS\$	= 000002	05-167										
PRTY	= 000000	05-167										
PRTY0	= 000000	05-167										
PRTY1	= 000040	05-167										
PRTY2	= 000100	05-167										
PRTY3	= 000140	05-167										
PRTY4	= 000200	05-167										
PRTY5	= 000240	5-167	5-167	05-167								
PRTY6	= 000300	05-167										
PRTY7	= 000340	05-167										
PS	= 177776	05-167										
PSW	= 177776	05-167										
PUSH	= 005746	05-167										
PUSH2	= 024646	05-167										
PWRFLG	= 000002	05-167										
QMON22	= 000010	05-167										
RABORT	= 002000	06-213	9-458									
RAND\$	= 104417	05-167										
RANUM	000054 R	05-167										
RDSR	= 000002	06-197	9-446	9-456	9-471	9-524						
READY	001734 R	7-368	010-570									
REOM	= 001000	06-214	9-505									
RESET	= 000001	06-228	8-405	9-447	9-472	9-488	9-511	9-525	9-534	10-546		
RESTR	000330 R	5-167	7-285	07-290	7-385							
RES1	000056 R	05-167										
RES2	000060 R	05-167										
RH70	= 001000	05-167										
ROVER	= 004000	06-212	9-458									
RSM	= 000400	06-215										
RSTR	000112 R	05-167										
RTS	= 000004	06-208	10-562									
RXACT	= 004000	06-204										
RXBF	000232 R	06-240	07-299									
RXBFO	002172 R	7-299	7-336	11-596	012-621							
RXBF1	002174 R	11-596	012-621									
RXBF2	002176 R	11-596	012-621									
RXBF3	002200 R	11-596	012-621									
RXBF4	002202 R	11-596	012-621									
RXBF5	002204 R	11-596	012-621									
RXCSR	= 000000	06-196	010-562									
RXEN	= 000020	06-207	10-564									
RXIE	= 000100	06-206	10-564									
RXISR	001120 R	09-437	11-596	11-596	11-596	11-596	11-596	11-596				
RXSTAT	= 002000	06-205										
R6	*000006	05-167										
R7	*000007	05-167										
SAVBF	000234 R	06-241	09-456	9-458	9-463	9-485	9-487	9-499	9-503	9-505		

SYMBOL CROSS REFERENCE

CREF V01

SEQ 0026

SYMBOL	VALUE	REFERENCES
USTACK	* 000001	*5-167
VECTOR	000010 R	*5-167 7-296
WAIT	000664 R	7-363 *7-372
WASADR	000104 R	*5-167 *9-485
WDFR	000116 R	*5-167 *7-327
WOTO	000114 R	*5-167 *7-326
XFLAG	000005 R	*5-167

MACRO CROSS REFERENCE

CREF V01

MACRO NAME	REFERENCES									
BKMOD	01-125									
BREAK	01-223	7-378								
BTOO	01-247									
CKDATA	01-283									
CLKSP	01-150									
DATAACK	01-292									
DATERR	01-176	9-492								
DFSEVN	01-315	5-167	5-167	5-167	5-167	5-167	5-167	5-167	5-167	5-167
	5-167	5-167	5-167							
DSEVNT	01-325	5-167	5-167	5-167	5-167	5-167	5-167	5-167		
END	01-213	7-287	7-390							
ENDIT	01-204	7-383								
ENDMOD	01-209									
EQUATS	01-331	5-167								
EXIT	01-158									
GETPA	01-274									
GLBUFF	01-262									
HLFBRK	01-228									
HRDER	01-166	9-453	9-478	9-517	9-531					
IOMOD	01-121	5-167								
IOMODP	01-145									
IOMODR	01-141									
IOMODX	01-137									
MAP22	01-278									
MODULE	01-30	5-167								
MSG	01-192									
MSGN	196	7-389								
MSGS	200									
NBKMOD	33									
OTOA	01-233									
PIRQ	01-217	8-407	9-450	9-475	9-490	9-514	9-528			
RAND	01-162									
SBKMOD	01-129									
SOFER	01-182	8-410								
\$EC	012-624	12-629	12-629	12-629	12-629	12-629	12-629			
\$JS	011-581	11-596	11-596	11-596	11-596	11-596	11-596			
\$OF	012-600	12-605	12-605	12-605	12-605	12-605	12-605			
\$POP	06-256	8-406	8-433	9-449	9-474	9-489	9-513	9-527	9-537	
\$PUSH	06-248	8-397	9-438							
\$RB	012-616	12-621	12-621	12-621	12-621	12-621	12-621			
\$TB	012-608	12-613	12-613	12-613	12-613	12-613	12-613			

DPV8 DEC/X11 SYSTEMB1
.....C1
.....E1
.....F1
.....G1
.....H1
.....I1
.....J1
.....K1
.....L1
.....M1
.....N1

.....O2
.....P2
.....Q2
.....R2
.....S2
.....T2
.....U2
.....V2
.....W2
.....X2

.....B3