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IDENTIFICATION

PRODUCT CODE: AC-E727F-MC
PRODUCT NAME: CXLBPF0 LPS-KW MODULE
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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1. ABSTRACT:-----

LPB IS AN IOMOD THAT EXERCISES THE LPS-KW REAL TIME CLOCK CONTROL.
IT PERFORMS A CONFIDENCE TEST ON THE CLOCK PRESET BUFFER
AND THE CONTROL REGISTER. THE MAJOR PORTION OF THE MODULE
IS DEFERRED TO PRIORITY LEVEL 0 WITH ANY ERROR BEING RE-
PORTED ON THE CONSOLE TTY.

2. REQUIREMENTS:-----

HARDWARE: LPS-11 INTERFACE WITH A LPS-KW CLOCK CONTROL INSTALLED

STORAGE:: LPB REQUIRES:

1. DECIMAL WORDS: 301
2. OCTAL WORDS: 0455
3. OCTAL BYTES: 1132

3. PASS DEFINITION:-----

ONE PASS OF THE LPB MODULE CONSISTS OF COUNTING THRU SIX SELECTABLE
CLOCK FREQUENCY (EXCEPT EXTERNAL CLOCK) 1024. TIMES
THIS COULD ALSO BE EXPRESSED AS 6144. INTERRUPTS.

4. EXECUTION TIME:-----

VARIABLES WITH LINE FREQ. BUT SHOULD TAKE AN AVERAGE OF ONE
MINUTE TO COMPLETE ONE PASS WHEN RUNNING ALONE.

5. CONFIGURATION PARAMETERS:

DEFAULT PARAMETERS:

DVA: 170404, VCT: 1, BRI: 6

REQUIRED PARAMETERS:

AT CONFIGURATION TIME THE USER MUST SPECIFY:

VCT: VECTOR ADDRESS OF LPS-KW

6. DEVICE OPTION SETUP:

NONE REQUIRED

7. MODULE OPERATION:

7.1 TEST SEQUENCE:

A. START:

USING THE DEVICE ADDRESS, THIS SECTION OF CODE DETERMINES THE CONTROL, BUFFER PRESET AND INTERRUPT ADDRESSES.

B. TSTCLK:

THIS SECTION OF CODE PERFORMS A CONFIDENCE REGISTER TEST OF THE PRESET BUFFER AND THE CONTROL REGISTERS.

C. PRIME:

IN THIS SECTION, THE CLOCK PRESET BUFFER AND CONTROL REGISTERS ARE LOADED. THE CLOCK IS ENABLED AND AN "EXIT" RETURN TO THE MONITOR.

D. LPSKW:

UPON A CLOCK INTERRUPT, THE PROGRAM WILL RETURN TO THIS CODE. ENTER DEGRADED SERVICE MODE AND TEST FOR A MODE FLAG. IF NO MODE FLAG, REPORT IT AS AN ERROR.

F. LPSKWG:

UPDATE THE CLOCK RATE LOCATION AND JUMP TO A NEW RATE SELECTION BY INDEXING THRU THE "DSPKW" TABLE.

F. LPSKWA: THRU LPSKWF: THESE SIX
PIECES OF CODE, SELECT A NEW
CLOCK COUNTING RATE AND
COUNTER PRESET BUFFER VALUE.
G. KWDONE: ENDIT CALL TO THE MONITOR TO SIGNAL END
OF ITERATION.

8. OPERATOR OPTIONS:

A. NONE

9. NON-STANDARD PRINTOUTS:

NONE: ALL PRINTOUTS HAVE THE STANDARD FORMAT.

```
158 ;LPS-11 KW DEC/X11 EXERCISER MODULE
159
160 IOMOD <LPBF > 170404 1 64 1 2000 46
161 000000 000000
162 000000 000000
163 MODULE 140000 LPBF 170404 1 64 1 2000 46
164 .TITLE LPBF DEC/X11 SYSTEM EXERCISER MODULE
165 ; DDXCOM VERSION 6 23-MAY-78
166 LIST BIN
167 *****
168 BEGIN:
169 MODNAM: -ASCII /LPBF / ;MODULE NAME
170 XFLAG: BYTE OPEN ;USED TO KEEP TRACK OF WRUFF USAGE
171 ADDR: 170404+0 ;1ST DEVICE ADDR
172 VECTOR: 1+0 ;1ST DEVICE VECTOR
173 BR1: -BYTE PRTY6+0 ;1ST BR LEVEL
174 BR2: -BYTE PRTY+0 ;2ND BR LEVEL
175 DVID1: 1 ;DEVICE INDICATOR 1
176 SRI: OPEN ;SWITCH REGISTER 1
177 SR2: OPEN ;SWITCH REGISTER 2
178 SR3: OPEN ;SWITCH REGISTER 3
179 SR4: OPEN ;SWITCH REGISTER 4
180 *****
181 STAT: 140000 ;STATUS WORD
182 INIT: START ;MODULE START ADDR
183 SPINT: MODSP ;MODULE STACK POINT
184 PASCNT: 0 ;PASS COUNTER
185 ICONT: 2000 ;# OF ITERATIONS PER PASS=2000
186 LCCNT: 0 ;LOC TO COUNT ITERATIONS
187 HRDCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
188 HRDPAS: 0 ;LOC TO SAVE TOTAL HARD ERRORS
189 SOFPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
190 HRDPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
191 SYSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
192 RANNUM: 0 ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
193 CONFIG: 0 ;RESERVED FOR MONITOR USE
194 RES1: 0 ;RESERVED FOR MONITOR USE
195 RES2: 0 ;RESERVED FOR MONITOR USE
196 SVR0: OPEN ;LOC TO SAVE R0
197 SVR1: OPEN ;LOC TO SAVE R1
198 SVR2: OPEN ;LOC TO SAVE R2
199 SVR3: OPEN ;LOC TO SAVE R3
200 SVR4: OPEN ;LOC TO SAVE R4
201 SVR5: OPEN ;LOC TO SAVE R5
202 SVR6: OPEN ;LOC TO SAVE R6
203 CSRA: OPEN ;LOC TO SAVE R6
204 SBADR: OPEN ;ADDR OF GOOD DATA, OR
205 ACSR: OPEN ;CONTENTS OF CSR
206 WBSADR: OPEN ;ADDR OF BAD DATA, OR
207 ASTAT: OPEN ;STATUS REG CONTENTS
208 ERRTP: OPEN ;TYPE OF ERROR
209 ASB: OPEN ;EXPECTED DATA
210 AWAS: OPEN ;ACTUAL DATA
211 RSTRT: RSTRT ;RESTART ADDRESS AFTER END OF PASS
212 WDTD: OPEN ;WORDS TO MEMORY PER ITERATION
213 WDFR: OPEN ;WCARDS FROM MEMORY PER ITERATION
214 INTR: OPEN ;# OF INTERRUPTS PER ITERATION
```

```
214 000122 000046 IDNUM: 46 ;MODULE IDENTIFICATION NUMBER=46
215 000040 000040 ;MODULE STACK STARTS HERE.
216
217 .REPT SPSIZ
218 .NLST
219 .WORD 0
220 .LIST
221 .ENDR
222 MODSP:
223 *****
```

223
 224
 225
 226
 227
 228 000224* 000000
 229
 230
 231
 232 000226* 170404
 233 000230* 170406
 234
 235
 236
 237
 238 000232* 000304
 239 000234* 000306
 240

```

;LPS-KW OPERATOR CHANGEABLE LOCATION
KWRATE: 0 ;CLOCK RATE
;COMMON LPS-KW DEVICE ADDRESSES
CSR: 170404 ;CLOCK STATUS
CSB: 170406 ;CLOCK PRESET BUFFER
;COMMON LPS-KW DEVICE VECTOR
CKV: 304
CKVS: 306 ;CLOCK VECTOR
  
```

241
 242
 243
 244
 245 000236* 016767 177544 177762
 246 000244* 016767 177536 177756
 247 000252* 062767 000002 177750
 248 000260* 016767 177524 177744
 249 000266* 016767 177516 177740
 250 000274* 062767 000002 177732
 251 000302* 012767 000006 177610
 252
 253
 254
 255 000310* 005067 177710
 256 000314* 005077 177706
 257 000320* 005077 177704
 258 000324* 005777 177700
 259 000330* 001066
 260
 261 000332* 012777 125252 177670
 262 000340* 012767 125252 177536
 263 000346* 022777 125252 177654
 264 000354* 001054
 265
 266 000356* 012777 052525 177644
 267 000364* 012767 052525 177512
 268 000372* 022777 052525 177630
 269 000400* 001042
 270
 271 000402* 012777 041112 177616
 272 000410* 012767 041112 177466
 273 000416* 022777 041112 177602
 274 000424* 001050
 275
 276 000426* 012777 000404 177572
 277 000434* 012767 000404 177442
 278 000442* 022777 000404 177556
 279 000450* 001036
 280
 281 000452* 005077 177550
 282 000456* 012777 100200 177542
 283 000464* 012767 100200 177412
 284 000472* 022777 100200 177526
 285 000506* 001022
 286
 287 000502* 000167 000100

```

;NOW SET UP THE ADDRESS AND VECTOR DISPATCH LOC.
START: MOV ADDR,CSR
      MOV ADDR,CSB ;LOAD DEVICE ADDRESSES
      ADD #2,CSB
      MOV VECTOR,CKV
      MOV VECTOR,CKVS
      ADD #2,CKVS
      MOV #6,INTR ;6 INTERRUPTS/ITERATION
;LOGIC TEST
RESTART: CLR KWRATE ;CLR RATE
        CLR @CSR ;CLEAR STATUS
        CLR @CSB ;CLEAR BUFFER
        TST @CSB ;TEST BUFFER
        RNE IS ;BR IF ERROR
        MOV #125252,@CSB ;LOAD PRESET BUFFER
        MOV #125252,ASTAT ;LOAD EXPECTED
        CMP #125252,@CSB ;TEST BUFFER
        BNE IS ;BR IF ERROR
        MOV #52525,@CSB ;LOAD PRESET BUFFER
        MOV #52525,ASTAT ;LOAD EXPECTED
        CMP #52525,@CSB ;TEST BUFFER
        BNE IS ;BR IF ERROR
        MOV #41112,@CSR ;LOAD CONTROL
        MOV #41112,ASTAT ;LOAD EXPECTED
        CMP #41112,@CSR ;TEST CONTROL
        BNE IS ;BR IF ERROR
        MOV #404,@CSR ;LOAD CONTROL
        MOV #404,ASTAT ;LOAD EXPECTED
        CMP #404,@CSR ;TEST CONTROL
        BNE IS ;BR IF ERROR
        CLR @CSR ;CLEAR CONTROL
        MOV #100200,@CSR ;LOAD CONTROL
        MOV #100200,ASTAT ;LOAD EXPECTED
        CMP #100200,@CSR ;TEST CONTROL
        BNE IS ;BR IF NOT
        JMP PRIME
  
```

```

288
289
290 000506 017767 177516 177366 1S:  MOV @CSB,ACSR ;LOAD READ
291 000514 016767 177510 177356  MOV CSB,CSRA ;LOAD ADDRESS
292 000522 005077 177500 177346  CLR @CSR ;CLEAR STATUS
293 000526 012767 000025 177352  MOV #25,ERRTYP ;BIT STUCK IN REGISTER
294 ;*****ERRTYP*****
295 000534 104405 000000 000000  HDRS$,BEGIN,NULL ;BUFFER BIT IN ERROR
296 ;*****ERRTYP*****
297 000542 104410 000000 000000  ENDS,BEGIN ;
298
299 000546 017767 177454 177326 2S:  MOV @CSR,ACSR ;LOAD READ
300 000554 016767 177446 177316  MOV CSR,CSRA ;LOAD ADDRESS
301 000562 005077 177440 177306  CLR @CSR ;CLEAR STATUS
302 000566 012767 000025 177312  MOV #25,ERRTYP ;BIT STUCK IN REG
303 ;*****ERRTYP*****
304 000574 104405 000000 000000  HDRS$,BEGIN,NULL ;CONTROL/STATUS BIT ERROR
305 ;*****ERRTYP*****
306 000602 104410 000000 000000  ENDS,BEGIN ;
307
308 ; PRIMER ROUTINE
309
310 000606 012777 000650 177416  PRIME: MOV #LPSKW,@CKV ;SET UP LPSKW VECTOR
311 000614 016777 177412  MOV#BRI,@CKVS
312 000622 016767 177400 177396  MOV CSR,CSRA ;LOAD DEVICE ADDRESS
313 000630 012777 050000 177392  MOV #5000,@CSR ;LOAD CLOCK PRESET
314 000636 012777 000103 177362  MOV #103,@CSR ;START THE CLOCK AND INTERRUPT ENABLE
315
316 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
317
318 ;LPS KW SUB-TEST
319
320 000650 000000 000000 000656  LPSKW:
321
322 000650 000004 000000 000656  PIRQS$,BEGIN,1S ; QUEUE UP TO CONTINUE AT 1S AND RTI
323 ;-----
324 000656 005777 177344 177210 1S:  TSTB @CSR ;TEST FOR CLOCK DONE
325 000662 100417 177344 177204  BNE LPSKWG
326 000664 017767 177336 177210  MOV @CSR,ACSR ;LOAD VALUE
327 000672 005077 177330 177204  CLR @CSR ;CLEAR STATUS
328 000676 005067 177202 177198  CLR @STAT ;ENSURE 0
329 000702 012767 000011 177176  MOV #11,ERRTYP ;ILLEGAL INTERRUPT OR DONE NOT SET
330 ;*****ERRTYP*****
331 000710 104405 000000 000000  HDRS$,BEGIN,NULL ;NO CLOCK DONE (MODE FLAG)
332 ;*****ERRTYP*****
333 000716 104410 000000 000000  ENDS,BEGIN ;

```

```

334
335 000722 005267 177276 177236 LPSKWG: INC KWRATE ;UPDATE RATE
336 000726 016700 177272 177230 MOV KWRATE,R0 ;LOAD R0
337 000732 006300 177266 177224 RO ;R7
338 000734 042700 177262 177220 BIC #177761,R0 ;MASK BITS
339 000740 000170 000744 177216 JMP @DSPKW(R0) ;JUMP THERE
340
341 000744 000764 177212 177176 DSPKW: LPKWA ;1 MHZ.
342 000746 001004 177208 177172 LPKWB ;100KHZ.
343 000750 001054 177204 177168 LPKWC ;10KHZ.
344 000752 001044 177200 177164 LPKWD ;1KHZ.
345 000754 001064 177196 177160 LPKWE ;100HZ.
346 000756 001104 177192 177156 LPKWF ;LINE FREQ.
347 000760 000124 177188 177152 LPKWA ;1MHZ.
348 000762 001124 177184 177148 KWDONE ;DCNR.
349
350 000764 012777 174900 177236 LPKWA: MOV #4000,@CSR ;LOAD PRESET BUFFER
351 000772 012777 000103 177228 MOV #103,@CSR ;LOAD RATE
352 001000 104400 000000 000000 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
353
354 001004 012777 177400 177216 LPKWB: MOV #400,@CSB ;LOAD PRESET
355 001012 012777 000105 177208 MOV #105,@CSR ;LOAD RATE
356 001020 104400 000000 000000 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
357
358 001024 012777 177740 177176 LPKWC: MOV #40,@CSB ;LOAD PRESET
359 001032 012777 000107 177168 MOV #107,@CSR ;LOAD RATE
360 001040 104400 000000 000000 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
361
362 001044 012777 177774 177156 LPKWD: MOV #4,@CSB ;LOAD PRESET
363 001052 012777 000111 177148 MOV #111,@CSR ;LOAD RATE
364 001060 104400 000000 000000 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
365
366 001064 012777 177777 177136 LPKWE: MOV #1,@CSB ;LOAD PRESET
367 001072 012777 000113 177128 MOV #113,@CSR ;LOAD RATE
368 001100 104400 000000 000000 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
369
370 001104 012777 177777 177116 LPKWF: MOV #1,@CSB ;LOAD PRESET
371 001112 012777 000117 177108 MOV #117,@CSR ;LOAD RATE
372 001120 104400 000000 000000 EXIT$,BEGIN ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
373
374 001124 104413 000000 000000 KWDONE: ENDT$,BEGIN ;SIGNAL END OF ITERATION.
375 001124 104413 000000 000000 BR LPKWA ;MONITOR SHALL TEST END OF PASS
376
377 001130 000715 000000 000000 .END
378 000001

```


LDPF DEC/X11 SYSTEM EXERCISER MODULE
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GROSS REFERENCE TABLE -- USER SYMBOLS

SFQ 0013

SVR1	000064R	196#		
SVR2	000066R	197#		
SVR3	000070R	198#		
SVR4	000072R	199#		
SVR5	000074R	200#		
SVR6	000076R	201#		
SYSCNT	000052R	190#		
TRDPFD=	000022R	222#		
VECTOR	000010R	171#	248	249
WASADR	000104R	205#		
WDFR	000116R	212#		
WDTD	000114R	211#		
XFLAG	000005R	169#		

- ABS. 000000 000
001132 001

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

XLPBFO, XLPBFO/SOL/CRF:SYM=DDXCOM, XLPBFO
RUN-TIME: 1 1 2 SECONDS
RUN-TIME RATIO: 25/2=8.5
CORE USED: 7K (13 PAGES)