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IDENTIFICATION

PRODUCT CODE: AC-E697D-MC  
PRODUCT NAME: CXKEADO KE11 MODULE  
PRODUCT DATE: SEPTEMBER 1978  
MAINTAINER: DEC/X11 SUPPORT GROUP

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1.    ABSTRACT:

KEA IS A BKMOD THAT EXERCISES THE KE11 EXTENDED ARITHMETIC ELEMENT. IT TESTS ALL THE KE11 INSTRUCTIONS INCLUDING LEFT SHIFT, RIGHT SHIFT, NORMALIZE, MULTIPLY, AND DIVIDE.

2.    REQUIREMENTS

HARDWARE: ONE KE11 EXTENDED ARITHMETIC ELEMENT

STORAGE:: KEA REQUIRES:

1. DECIMAL WORDS: 307
2. OCTAL WORDS: 0463
3. OCTAL BYTES: 1146

3.    PASS DEFINITION:

ONE PASS OF THE KEA MODULE CONSISTS OF 10. ITERATIONS OF THE INSTRUCTION TEST SEQUENCE

4.    EXECUTION TIME:

KEA RUNNING ALONE ON A PDP11/05 PROCESSOR TAKES APPROXIMATELY---MINUTES TO COMPLETE ONE PASS.

5.    CONFIGURATION REQUIREMENTS:

DEFAULT PARAMETERS:

DEVADR: 177300

REQUIRED PARAMETERS:

NONE

6.    DEVICE/OPTION SETUP:

NONE

7. MODULE OPERATION:

TEST SEQUENCE:

- A. SET UP KE11 REGISTER ADDRESSES
- B. TEST LEFT SHIFT - REPORT ERRORS
- C. TEST RIGHT SHIFT - REPORT ERRORS
- D. TEST NORMAUZE - REPORT ERRORS
- E. TEST MULTIPLY - REPORT ERRORS
- F. TEST DIVIDE - REPORT ERRORS
- G. TEST MULTIPLY/DIVIDE BACK TO BACK - REPORT ERRORS
- H. IF NOT 10. TIMES REPEAT A-G
- I. REPORT END OF PASS ; RESTART AT B

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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    000000* BKM0D <KEAD > 177300,1000,1000,1000,17
    000000* MODULE 40020,KEAD / 17,466,1000,17
    ; TITLE KEAD DEC / X11 SYSTEM EXERCISER MODULE
      DDXCOM VERSION 6 23-MAY-78
    ;***** LIST BIN *****
    000000* BEGIN:
    000000* 042513 042101 040 MODNAM: .ASCII / KEAD / ;MODULE NAME.
    000005* 000 XFLAG: .BYTE OPEN ;USED TO KEEP TRACK OF WBUFF USAGE
    000006* 177300 ADDR: 177300+0 ;NOT DEVICE ADDR
    000010* 000000 VECTOR: +0 ;1ST DEVICE VECTOR.
    000012* 000 BR1: .BYTE PRTY+0 ;1ST BR LEVEL.
    000013* 000 BR2: .BYTE PRTY+0 ;2ND BR LEVEL.
    000014* 000001 DVID: +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* 040020 STAT: 40020 ;STATUS WORD.
    000030* 000246 INIT: START ;MODULE START ADDR.
    000032* 000224 SPOINT: MODSP ;MODULE STACK POINTER.
    000034* 000000 PASCNT: 0 ;PASS COUNTER.
    000036* 001750 ICOUNT: 1000. ;# OF ITERATIONS PER PASS=1000.
    000040* 000000 ICOUNT: 0 ;LOC TO COUNT ITERATIONS
    000042* 000000 SOFCMT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
    000044* 000000 HRDPA: 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 RANRN: 0 ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
    000056* 000000 CONFIG: ;RESERVED FOR MONITOR USE
    000058* 000000 RES1: 0 ;RESERVED FOR MONITOR USE
    000060* 000000 RES2: 0 ;RESERVED FOR MONITOR USE
    000062* 000000 SVR0: OPEN ;LOC TO SAVE P0.
    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.
    001000* 000000 CSRA: OPEN ;ADDR OF CURRENT CSR.
    001002* 000000 SBADR: OPEN ;ADDR OF GOOD DATA, OR
    001004* 000000 ACSR: OPEN ;CONTENTS OF CSR.
    001006* 000000 WASADR: OPEN ;ADDR OF BAD DATA, OR
    001010* 000000 STAT: OPEN ;STATUS REG CONTENTS.
    001012* 000000 ERTVFP: ;TYPE OF ERROR
    001014* 000000 ASB: OPEN ;EXPECTED DATA.
    001016* 000000 AWAS: OPEN ;ACTUAL DATA.
    001018* 000246 RSTRT: RSTRT ;RESTART ADDRESS AFTER END OF PASS
    001020* 000000 WDFR: OPEN ;WORDS FROM MEMORY PER ITERATION
    001022* 000000 INTR: OPEN ;# OF INTERRUPTS PER ITERATION
  
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    000122* 000017 IDNUM: 17 ;MODULE IDENTIFICATION NUMBER=17
    000040* 000040 ;MODULE STACK STARTS HERF.
      .REPT SPSIZ
      .LIST
      .WORD 0
      .LIST
      .ENDR
    000224* MODSP:
    ;***** *****
    ;CONSTANTS AND VARIABLES UNIQUE TO THIS MODULE
    000224* 000000 MQ: OPEN
    000226* 000000 AC: OPEN
    000230* 000000 SC: OPEN
    000234* 000000 SR: OPEN
    000236* 000000 MUL: OPEN
    000240* 000000 DIV: OPEN
    000242* 000000 NOR: OPEN
    000244* 000000 LSH: OPEN
    000246* 000000 ASH: OPEN
    ;INITIALIZATION
    000246* 016705 177534 START: MOV ADDR,R5 ;GET THE FIRST ADDRESS
    000248* 010567 177760 RSTRT: MOV R5, DIV ;START BUILDING ALL REG. ADDRESSES
    000250* 005725 (5)+
    000252* 010567 177742 MOV R5, AC
    000254* 005725 (5)+
    000256* 010567 177732 WDT0: MOV R5, MQ
    000258* 005725 (5)+
    000260* 010567 177734 MOV R5, MUL
    000262* 005725 (5)+
    000264* 010567 177722 TST (5)+
    000266* 105725 MOV R5, SC
    000268* 010567 177716 MOV R5, SRE
    000270* 005725 (5)+
    000272* 010567 177716 TSTB (5)+
    000274* 005725 MOV R5, NOR
    000276* 010567 177712 TST (5)+
    000278* 005725 MOV R5, LSH
    000280* 010567 177706 TST (5)+
    000282* 005725 MOV R5, ASH
    ;TEST LEFT SHIFT
    000336* 012777 000000 177660 LS: MOV #0, MQ ;LOAD THE MQ WITH ALL ZEROS
    000338* 012777 125252 177654 MOV #125252, @AC ;LOAD THE AC WITH 125252
    000340* 012777 177660 MOV #-16, @LSH ;LOAD THE SHIFT COUNT WITH -16.
    000342* 022777 000000 177640 CMP #0, @AC ;IS THE AC ALL ZERDES ?
    000366* 001403 BEQ 15 ;BR IF YES
    ;***** *****
    000370* 104405 000000 000000 HDRS: BEGIN, NULL
    000376* 022777 125252 177620 1$: CMP #125252, @MQ ;MQ = 125252 ??
    000404* 001403 BEQ 25 ;BR IF YES
  
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234 000406* 104405 000000* 000000 ;*****  
235 ;*****  
236 000414* 122777 000020 177610 2$: CMPB #20,@SRE ;SRE=20 ??  
237 BEQ RS ;BR IF YES  
238 ;*****  
239 000424* 104405 000000* 000000 ;*****  
240 ;*****  
241 ;*****  
242 ;*****  
243 ;*****  
244 ;*****  
245 ;*****  
246 ;*****  
247 ;*****  
248 ;*****  
249 ;*****  
250 000464* 104405 000000* 000000 ;*****  
251 ;*****  
252 ;*****  
253 000472* 022777 000000 177524 1$: CMP #0,@MQ ;WAS MQ=0 ??  
254 BEQ #0 ;BR IF YES  
255 ;*****  
256 000502* 104405 000000* 000000 ;*****  
257 ;*****  
258 000510* 122777 000110 177514 2$: CMPB #10,@SRE ;WAS THE SRE=110 ??  
259 BEQ #0 ;BR IF YES  
260 ;*****  
261 000520* 104405 000000* 000000 ;*****  
262 ;*****  
263 ;*****  
264 ;*****  
265 ;*****  
266 000526* 012777 125252 177470 NOM: MOV #125252,@MQ ;LOAD THE MQ WITH 125252  
267 000534* 012777 170000 177464 MOV #170000,@AC ;LOAD THE AC WITH 170000  
268 CLR #0 ;START NORMALIZE  
269 000546* 022777 100005 177452 CMP #100005,@AC ;WAS AC=100005 ??  
270 BEQ #0 ;BR IF YES  
271 ;*****  
272 000556* 104405 000000* 000000 ;*****  
273 ;*****  
274 000564* 022777 052520 177432 1$: CMP #52520,@MQ ;DID THE MQ=52520 ??  
275 BEQ #0 ;BR IF YES  
276 ;*****  
277 000574* 104405 000000* 000000 ;*****  
278 ;*****  
279 000602* 122777 000003 177420 2$: CMPB #3,@SC ;DID THE SC=3 ??  
280 BEQ #0 ;BR IF YES  
281 ;*****  
282 000612* 104405 000000* 000000 ;*****  
283 ;*****  
284 ;*****  
285 ;*****  
286 ;*****  
287 000620* 012777 125252 177376 MLP: MOV #125252,@MQ ;LOAD THE MQ WITH 125252  
288 000626* 012777 40000 177400 MOV #40000,@MUL ;LOAD MUL WITH 40000  
289 000634* 022777 165252 177364 CMP #165252,@AC ;WAS AC=165252 ??
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290 000642* 001403 BEQ #1 ;BR IF YES  
291 ;*****  
292 000644* 104405 000000* 000000 ;*****  
293 ;*****  
294 000652* 022777 100000 177344 1$: CMP #100000,@MQ ;WAS MQ=100000 ??  
295 BEQ #0 ;BR IF YES  
296 ;*****  
297 000662* 104405 000000* 000000 ;*****  
298 ;*****  
299 000670* 122777 000300 177334 2$: CMPB #300,@SRE ;WAS SRE=300 ??  
300 BEQ #0 ;BR IF YES  
301 ;*****  
302 000700* 104405 000000* 000000 ;*****  
303 ;*****  
304 ;*****  
305 ;*****  
306 ;*****  
307 000706* 012777 125252 177310 DVD: MOV #125252,@MQ ;LOAD THE MQ WITH 125252  
308 000714* 012777 177777 177304 MOV #177777,@AC ;LOAD THE AC WITH 177777  
309 000722* 012777 000002 177306 MOV #2,@DIV ;LOAD DIV WITH 2 AND DIVIDE  
310 000730* 012777 000000 177270 CMP #0,@AC ;WAS QUOTIENT=0 ??  
311 BEQ #0 ;BR IF YES  
312 ;*****  
313 000740* 104405 000000* 000000 ;*****  
314 ;*****  
315 000746* 022777 152525 177250 1$: CMP #152525,@MQ ;WAS MQ=152525 ??  
316 BEQ #0 ;BR IF YES  
317 ;*****  
318 000756* 104405 000000* 000000 ;*****  
319 ;*****  
320 ;*****  
321 ;*****  
322 ;*****  
323 000764* 012777 052525 177232 ML.DV: MOV #52525,@MQ  
324 000772* 012777 040000 177234 MOV #40000,@MUL  
325 001000* 012777 040000 177230 MOV #40000,@DIV  
326 001006* 012777 040000 177220 MOV #40000,@MUL  
327 001014* 012777 040000 177214 MOV #40000,@DIV  
328 001022* 012777 040000 177204 MOV #40000,@MUL  
329 001030* 012777 040000 177200 MOV #40000,@DIV  
330 001036* 012777 040000 177170 MOV #40000,@MUL  
331 001044* 012777 040000 177164 MOV #40000,@DIV  
332 001052* 012777 040000 177154 MOV #40000,@MUL  
333 001060* 012777 040000 177150 MOV #40000,@DIV  
334 001066* 012777 052525 177130 CMP #52525,@MQ  
335 BEQ #0 ;BR IF YES  
336 ;*****  
337 001076* 104405 000000* 000000 ;*****  
338 ;*****  
339 001104* 005777 177116 1$: ST #0,@AC  
340 001110* 001403 BEQ #0 ;BR IF YES  
341 ;*****  
342 001112* 104405 000000* 000000 ;*****  
343 ;*****  
344 001120* 122777 000022 177104 2$: CMPB #22,@SRE  
345 001126* 001403 BEQ #0 ;BR IF YES
```



MAP22S=	104416	186#																
MEDV	000764R	316																
MFP	000620R	180																
MDDNAM	000000R	152#																
MDDSP	000224R	146																
MQ	000224R	189#																
		334																
MSGNS =	104403	186#																
MSGSS =	104402	186#																
MSG\$ =	104401	186#																
MUL	000734R	193																
WDR	000526R	259																
NDR	000240R	195#																
NULL	000000	186#																
		313																
OPEN =	000000	168																
		170																
		195																
OTOAS =	104420	186#																
PASCNT =	000054R	147#																
PIRQS =	000004	186#																
POPS =	005726	186#																
POPS2 =	022626	186#																
PRTV	000000	156																
PRTV0	000000	186#																
PRTV1	000040	186#																
PRTV2	000140	186#																
PRTV3	000140	186#																
PRTV4	000200	186#																
PRTV5	000240	186#																
PRTV6	000340	186#																
PRTV7	000340	186#																
PS	177776	186#																
PSM	177776	186#																
PUSH	005776	186#																
PUSH2	024646	186#																
RANDS	104417	186#																
RANNUM	000054R	155#																
RESTR	002268	174																
RES1	000056R	157#																
RES2	000060R	158#																
RS	000432R	238																
RSRT	001122R	174#																
SADR	001122R	167#																
SC	000230R	191																
SOF CNT	000042R	150																
SOFERS =	104406	186#																
SOFPS =	000468	186#																
SPOINT	000032R	146																
SPSIZ =	000040	186#																
SRE	000072R	191																
SR1	000012R	139																
SR2	000020R	140																
SR3	000022R	141																
SR4	000024R	142																
SPART	000246R	145																

STAT	000026R	144#																
SVR0	000062R	159																
SVR1	000064R	160																
SVR2	000066R	161																
SVR3	000070R	162																
SVR4	000072R	163																
SVR5	000074R	164																
SVR6	000076R	165																
SYSCNT	000052R	154																
TRPDPD =	000022	186#																
VECTOR	000010R	156																
WASADR	000104R	169#																
WDFR	000116R	176																
WDTG	000114R	175																
XFLAG	000005R	133#																

\* ABS. 000000 000  
 001146 001

ERRORS DETECTED: 0  
 DEFAULT GLOBALS GENERATED: 0  
 XKEADO, XKEADO/SOL/CRF:SYM=DDXCON, XKEADO  
 RUN-TIME: 1 1.2 SECONDS  
 RUN-TIME RATIO: 15/3=5.1  
 CORE USED: 7K (13 PAGES)