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IDENTIFICATION

PRODUCT CODE: AC-F001B-MC
PRODUCT NAME: CXXWFB0 GROSS TMNG MOD
PRODUCT DATE: SEPTEMBER 1978
MAINTAINER: DEC/X11 SUPPORT GROUP

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1.0 ABSTRACT

"KWF" IS A GROSS TIMING ANALYSIS MODULE THAT USES THE KW11-L LINE CLOCK OPTION TO PERFORM AN OVERALL TIMING ANALYSIS ON THE 2040 PDP11 CONSOLE PROCESSOR SYSTEM OR A DN2X SECONDARY P.E. IT WILL BE CONFIGURED IN THE EXERCISER TO BE THE FIRST MODULE INITIALIZED BY THE MONITOR AND SINCE IT IS A "NBKMOD" IT WILL RUN ONLY ONE PASS AND NEVER RUN AGAIN UNTIL THE EXERCISER IS RESTARTED. ITS PURPOSE IS TO ESTABLISH CONFIDENCE IN THE HARDWARE AFFECTING OVERALL SYSTEM TIMING. IF THE TIMING IS FOUND TO BE WITHIN A PRE-ESTABLISHED, EMPIRICALLY DETERMINED LIMIT, THE MODULE WILL ENABLE USE OF THE SYSTEM TIMER MODULE. IF NOT IT WILL REPORT THE ERROR AND DISABLE USE OF THE SYSTEM TIMER MODULE.

2.0 REQUIREMENTS

HARDWARE: ANY PDP11/40 OR 11/34A SYSTEM WITH CORE MEMORY AND A KW11-L LINE CLOCK.

STORAGE:: KWF REQUIRES:
1. DECIMAL WORDS: 355
2. OCTAL WORDS: 0543
3. OCTAL BYTES: 1306

3.0 PASS DEFINITION

ONE PASS OF KWF CONSISTS OF A SINGLE PASS THROUGH THE MODULE CODE TO PERFORM THE REQUIRED DIAGNOSIS AND ANALYSIS.

4.0 EXECUTION TIME

ONE PASS OF KWF RUNNING ON AN 11/40 CPU TAKES APPROXIMATELY ONE MINUTE.

NOTE: THE TIMING INFORMATION IN THE "ENDPAS" MESSAGE FOR THE "KWF" MODULE IS MEANINGLESS SINCE THE TIMER MODULE DOES NOT GET STARTED UNTIL "KWF" REPORTS ITS END OF PASS.

5.0 CONFIGURATION PARAMETERS

DEFAULT PARAMETERS:

DVA: 177546 VCT: 100 BR1: 6 BR2: 0 DVC: 1 SP1: 000037

REQUIRED PARAMETERS:

FOR 50 CYCLE SYSTEMS THE TIMING PARAMETER IN SR1 SHOULD BE SET TO 000030. (APPROX)

FOR CPU'S OTHER THAN THE KD11-A, THE VALUE OF SR1 WILL HAVE TO BE EMPIRICALLY DETERMINED BY RUNNING THIS MODULE ALONE AND NOTING THE INFORMATION PROVIDED IN THE ERROR PRINTOUT.

FOR AN 1134A 60 CYCLE SYSTEM THE TIMING PARAMETER IN SR1 SHOULD BE SET TO 000031.

6.0 DEVICE OPTION SET-UP

NONE REQUIRED

7.0 MODULE OPERATION

- A. VERIFY THAT THE KW11-L MONITOR BIT CAN BE SET BY THE POWER SUPPLY SIGNAL. IF A FAILURE IS DETECTED, REPORT THE ERROR AND DROP THE MODULE.
- B. VERIFY THAT THE KW11-L CAN GENERATE AN INTERRUPT TO THE PROPER VECTOR WHEN ENABLED. IF A FAILURE IS DETECTED REPORT THE ERROR AND DROP THE MODULE.
- C. PERFORM THE TIMING ANALYSIS:
 - 1. SYNC THE LINE CLOCK
 - 2. COUNT THE NO. OF ITERATIONS THROUGH A MONITOR "BREAK" LOOP WHILE WAITING FOR AN INTERRUPT.
 - 3. STORE THE COUNT IN A TABLE
 - 4. REPEAT (1) THRU (3) SIXTEEN TIMES TO STORE 16 COUNTS IN THE TABLE
 - 5. SUM ALL ENTRIES IN THE TABLE AND DIVIDE BY 16 TO GET THE AVERAGE.
 - 6. CHECK THAT THE AVERAGE IDS WITHIN LIMITS
 - 7. IF WITHIN TOLERANCE, ENABLE SYSTEM TIMER TO BE ABLE TO RUN AND REPORT END OF PASS.
 - 8. IF NOT WITHIN TOLERANCE, REPORT THE ERROR AND DROP THE MODULE. (SYSTEM TIMER NOT ENABLED TO RUN)

8.0 OPERATOR OPTIONS

"SR1" AND THE CONTENTS OF LOCATION "TOL" MAY HAVE TO BE MODIFIED FOR UNUSAL CASES TO COMPENSATE FOR A PARTICULAR SYSTEM INSTALLATION. (SR1) IS THE AVERAGE TIMER COUNT AND IF FOUND TO BE 000000 THE MODULE ASSUMES A DEFAULT OF "000037" (KD11-A CPU). IF NOT 000000, THE MODULE TAKES THE CONTENTS OF "SR1" AS THE AVERAGE TIME VALUE. THE LOCATION TAGGED "TOL" IS THE ALLOWABLE TOLERANCE AND IS PROGRAM LOADED AS A "3".

9.0 NON-STANDARD PRINTOUTS

KWFB DEC/X11 SYSTEM EXERCISER MODULE MACY11 30A(1052) 12-OCT-78 16:48 PAGE 5
XKWFR0.P11 12-OCT-78 12:07

SEQ 0004

IF A TIMING ANALYSIS ERROR IS DETECTED IT IS REPORTED
VIA AN EXTENDED ERROR PRINTOUT OF FOUR OCTAL NUMBERS:

WWWWW SSSSS HHHHH LLLLL

WHERE: WWWWW IS THE WAS AVERAGE
SSSSS IS WHAT THE AVERAGE SHOULD HAVE BEEN
HHHHH IS THE HIGH LIMIT
LLLLL IS THE LOW LIMIT


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000000 NBRMOD <KWFB>,177546,100,6,1,162
000000 MODULE 41000,KWFB,177546,100,6,1,162
; TITLE KWFB DEC/X11 SYSTEM EXERCISER MODULE
; DOXCOM VERSION 6 23 MAY-78
; ***** LIST *****
000000 BEGIN:
000000 MODNAM: ASCII / KWFB / ;MODULE NAME.
000000 RFLAS: BYTE OPEN ;USED TO KEEP TRACK OF WBUF USAGE
000000 ADDR: 177546+0 ;1ST DEVICE ADDR.
000000 VECTOR: 100+0 ;1ST DEVICE VECTOR.
000000 BR1: -BYTE PRTY6+0 ;1ST BR LEVEL.
000000 BR2: -BYTE PRTY+0 ;2ND BR LEVEL.
000000 DVID1: +1 ;DEVICE INDICATOR 1.
000000 SR1: OPEN ;SWITCH REGISTER 1
000000 SR2: OPEN ;SWITCH REGISTER 2
000000 SR3: OPEN ;SWITCH REGISTER 3
000000 SR4: OPEN ;SWITCH REGISTER 4
; *****
000000 STAT: 41000 ;STATUS WORD
000000 INIT: START ;MODULE START ADDR.
000000 SPOINT: MODSP ;MODULE STACK POINTER.
000000 PASCNT: 0 ;PASS COUNTER
000000 ICONF: 0 ;# OF ITERATIONS PER PASS=1
000000 ICONF: 0 ;LOC TO COUNT ITERATIONS
000000 SOFCNT: 0 ;LOC TO SAVE TOTAL SOFT ERRORS
000000 HRDCNT: 0 ;LOC TO SAVE TOTAL HARD ERRORS
000000 SOFPAS: 0 ;LOC TO SAVE SOFT ERRORS PER PASS
000000 HRDPAS: 0 ;LOC TO SAVE HARD ERRORS PER PASS
000000 SYSCNT: 0 ;# OF SYS ERRORS ACCUMULATED
000000 RANMOD: 0 ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
000000 CONFIG: ;RESERVED FOR MONITOR USE
000000 RES1: 0 ;RESERVED FOR MONITOR USE
000000 RES2: 0 ;RESERVED FOR MONITOR USE
000000 SVR0: OPEN ;LOC TO SAVE R0.
000000 SVR1: OPEN ;LOC TO SAVE R1.
000000 SVR2: OPEN ;LOC TO SAVE R2.
000000 SVR3: OPEN ;LOC TO SAVE R3.
000000 SVR4: OPEN ;LOC TO SAVE R4.
000000 SVR5: OPEN ;LOC TO SAVE R5.
000000 SVR6: OPEN ;LOC TO SAVE R6.
000000 CSRA: OPEN ;ADDR OF CURRENT CSP.
000000 SBADR: ;ADDR OF GOOD DATA, OR
000000 ACSR: OPEN ;CONTENTS OF CSR.
000000 BADADR: ;ADDR OF BAD DATA, OR
000000 ASTAT: OPEN ;STATUS REG CONTENTS.
000000 ERRTP: ;TYPE OF ERROR
000000 ASB: OPEN ;EXPECTED DATA.
000000 AMAS: OPEN ;ACTUAL DATA.
000000 RESTR: RESTR ;RESTART ADDRESS AFTER END OF PASS
000000 WDT0: OPEN ;WORDS TO MEMORY PER ITERATION
000000 WDFR: OPEN ;WORDS FROM MEMORY PER ITERATION
000000 INTR: OPEN ;# OF INTERRUPTS PER ITERATION
000000 IDNUM: 162 ;MODULE IDENTIFICATION NUMBER=162
; *****
; REPT SPSIZ
; NLIST

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;WORD 0
;LIST
;ENDR
000224 MODSP:
; *****
;GLOBL CLOCK,CLOCKL,CLOCKP,LCLEAR,PCLEAR ;MONITOR AND TIMER MODULE LOCATIONS
000224 START: BITB #BIT0,CLOCK ;USING A KW11-L TIMER ?
000224 BNE IS ;BRR IF YES
000224 BITB #BIT1,CLOCK ;USING THE KW11-P TIMER ?
000224 BNE IS ;BRR IF YES
000224 ENDS,BEGIN
000224 MOV CLOCKL,R0 ;GET POINTER TO TIMING INFORMATION
000224 MOV #LCLEAR,TCLEAR ;SET PROPER JSR ADDR
000224 BR 3S ;CONTINUE
000224 MOV CLOCKP,R0 ;GET POINTER TO TIMING INFORMATION
000224 MOV #PCLEAR,TCLEAR ;SET PROPER JSR ADDR
000224 TST (R0)+ ;POINT TO LOCATION CONTAINING "TIME"
000224 CLZ ;INIT RUN TIME = 000000
000224 JSR PC,TCLEAR ;CLEAR MODULE PASSTIME TABLE IN CLOCK MODULE
000224 SR1 ;DOES SR1 SPECIFY A TIME ?
000224 BNE RESTR ;BRR IF IT DOES
000224 #3,SR1 ;DEFAULT TO 37(9) - KD11-A CPU
000224 MOV ADDR,CSRA ;SAVE KW11-L ADDRESS
000224 MOV VECTOR,R0 ;GET VECTOR ADDRESS
000224 MOV #KWINT,(R0)+ ;STEER KW INTR'S TO KWINT
000224 MOVB R1,(R0)
000224 CLR @ADDR
;VERIFY THAT KW MONITOR BIT (BIT07) CAN BE SET BY PCWER SUPPLY SIGNAL
; *****
000350 KWD1: CLR R5 ;INIT TIMER
000350 IS: BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR....
000350 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
000350 DEC R5 ;COUNT TIMER
000350 CNE 15 ;BRR UNTIL TIMER = 0
000350 CNE 100,@ADDR ;DID MONITOR BIT SET?
000350 BEQ KWD2 ;BRR IF YES
000350 MOV @ADDR,ACSR ;SAVE CONTENTS OF LKCSR
000350 MOV #25,BRTYP
; *****
000412 HDRS,BEGIN,NULL ;KW11-L MONITOR BIT WON'T SET
000412 CLRB CLOCK ;DISABLE ALL TIMING CHECKS
000412 ENDS,BEGIN
;VERIFY THAT KW11-L CAN GENERATE AN INTERRUPT PROPERLY
; *****
000430 KWD2: CLR KWFLG1 ;CLEAR SOFTWARE INTR. FLAG
000430 CLR R5 ;INIT TIMER
000430 BIS #100,@ADDR ;SET LKCSR INTR ENAB

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283 000444 042777 000200 177334 1$: BIC #200, @ADDR ;CLEAR MONITOR BIT
284 000452 005767 000544 TST #WFLG1 ;DID KW11-L INTR OCCUR
285 000456 100425 BNE #25 ;BR IF YES
286 000460 104407 000000 BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR...
287 000464 104407 000000 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
288 000470 005305 DEC R5 ;COUNT TIMER
289 000472 001367 BNE #15 ;BR IF NO TIMEOUT
290 000476 017730 MOV @ADDR,ACSR ;SAVE CONTENTS OF LKCSR
291 000502 015077 CLR @ADDR ;CLEAR INTR ENAR
292 000506 012767 000023 177372 MOV #23,ERRTYP
293 000514 104405 000000 000000 HRDRS,BEGIN,NULL ;KW11-L FAILED TO INTR ON TIME
294 000522 105067 000000G CLR @CLOCK ;DISABLE ALL TIMING CHECKS
295 000526 104410 000000G ENDS,BEGIN
296 000532 032777 000100 177246 2$: BIT #100, @ADDR ;DID INTR SERVICE CLEAR BIT 06?
297 000536 005767 000372 BNE #R0 ;BR IF YES
298 000540 017724 MOV @ADDR,ACSR ;SAVE CONTENTS OF LKCSR
299 000544 005077 177232 CLR @ADDR ;CLEAR LKCSR
300 000550 012767 000025 177324 MOV #25,ERRTYP
301 000562 104405 000000 000000 HRDRS,BEGIN,NULL ;KW11 INTR SERVICE FAILED TO CLR BIT06
302 000570 105067 000000G CLR @CLOCK ;DISABLE ALL TIMING CHECKS
303 000574 104410 000000G ENDS,BEGIN
304 000582 104405 000000 000000 ;GROSS TIMING ANALYSIS ROUTINE - PERFORMS GROSS CPU/MEMORY TIMING ANALYSIS
305 000586 104410 000000G ;USING THE KW11-L
306 000590 104405 000000 000000
307 000594 104410 000000G
308 000598 104405 000000 000000
309 000602 104410 000000G
310 000606 104405 000000 000000
311 000610 104410 000000G
312 000614 005000 000100 177162 KWD3: JSR PC,CLRTAB ;GO CLEAR LOOP COUNTERS TABLE
313 000618 005767 000372 KWSYMC: CLR @CTRAB,R1 ;R1 POINTS TO LOOP COUNTERS TABLE
314 000622 005000 000100 CLR R0 ;INIT SOFTWARE INTR. FLAG
315 000626 005767 000372 1$: BIS #100, @ADDR ;INIT TIMER
316 000630 005767 000372 TST #WFLG1 ;ENABLE INTR
317 000634 005767 000372 BNE #R0 ;INTR OCCUR YET?
318 000638 005767 000372 BNE #R0 ;BR IF YES
319 000642 005767 000372 BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR....
320 000646 005767 000372 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
321 000650 005767 000372 DEC R5 ;COUNT TIMER
322 000654 005767 000372 BNE #R0 ;BR IF NO TIMEOUT
323 000658 005767 000372 MOV @ADDR,ACSR ;SAVE CONTENTS OF LKCSR
324 000662 005767 000372 CLR @ADDR ;CLEAR OUT LKCSR
325 000666 005767 000372 MOV #23,ERRTYP
326 000670 104405 000000 000000 HRDRS,BEGIN,NULL ;KW11-L TIMEOUT
327 000674 105067 000000G CLR @CLOCK ;DISABLE ALL TIMING CHECKS
328 000678 104410 000000G ENDS,BEGIN
329 000682 005067 000312 2$: CLR #WFLG1 ;INIT SOFTWARE INTR FLAG
330 000686 005000 000100 CLR R0 ;INIT LOOP COUNTER
331 000690 005767 000170 177066 3$: BIS #100, @ADDR ;ENABLE KW11-L INTR
332 000694 005767 000170 TST #WFLG1 ;INTR OCCUR YET?
333 000698 005767 000170 BNE #R0 ;BR IF YES
334 000702 005767 000170 BREAKS,BEGIN ;TEMPORARY RETURN TO MONITOR....

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335 000732 104407 000000 BREAKS,BEGIN ;THEN CONTINUE AT NEXT INSTRUCTION.
336 000736 005200 INC R0 ;COUNT ONE PASS THRU BREAK LOOP
337 000740 001367 BNE #R0 ;BR IF NO TIMEOUT
338 000744 001367 MOV @ADDR,ACSR ;SAVE CONTENTS OF LKCSR
339 000748 005077 177032 CLR @ADDR ;CLEAR OUT LKCSR
340 000752 012767 000023 177124 MOV #23,ERRTYP
341 000756 104405 000000 000000 HRDRS,BEGIN,NULL ;KW11-L TIMEOUT
342 000760 105067 000000G CLR @CLOCK ;DISABLE ALL TIMING CHECKS
343 000764 104410 000000G ENDS,BEGIN
344 000768 005067 000100 4$: CMP #CTRAB+40,R1 ;SAVE LOOP COUNT IN TABLE
345 000772 005067 000100 BNE #R0 ;END OF TABLE ??
346 000776 005067 000100 GO DO IT AGAIN
347 000780 005067 000100 JSR PC,TIMEAVG ;GO COMPUTE TABLE AVERAGE
348 000784 005067 000100 MOV R0,R3 ;R3 CONTAINS AVERAGE COUNT
349 000788 005067 000100 MOV SR,R1 ;GET WHAT AVERAGE COUNT SHOULD BE
350 000792 005067 000100 MOV R1,R2 ;PUT IT IN R2 TOO
351 000796 005067 000100 ADD #1,R2 ;R2 CONTAINS HIGH LIMIT COUNT
352 000800 005067 000100 SUB #1,R2 ;R2 CONTAINS LOW LIMIT COUNT
353 000804 005067 000100 BCS #R3,R1 ;LESS THAN HIGH LIMIT?
354 000808 005067 000100 BNE #R0 ;BR IF NOT
355 000812 005067 000100 SUB #1,R3 ;GREATER THAN LOW LIMIT?
356 000816 005067 000100 BCS #R2,R3 ;BR IF NOT
357 000820 005067 000100 ENDS,BEGIN ;SIGNAL END OF ITERATION.
358 000824 005067 000100 ;MONITOR SHALL TEST END OF PASS
359 000828 005067 000100
360 000832 005067 000100
361 000836 005067 000100
362 000840 005067 000100
363 000844 005067 000100
364 000848 005067 000100
365 000852 005067 000100
366 000856 005067 000100
367 000860 005067 000100
368 000864 005067 000100
369 000868 005067 000100
370 000872 005067 000100
371 000876 005067 000100
372 000880 005067 000100
373 000884 005067 000100
374 000888 005067 000100
375 000892 005067 000100
376 000896 005067 000100
377 000900 005067 000100
378 000904 005067 000100
379 000908 005067 000100
380 000912 005067 000100
381 000916 005067 000100
382 000920 005067 000100
383 000924 005067 000100
384 000928 005067 000100
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387 000940 005067 000100
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400 000992 005067 000100
401 000996 005067 000100
402 001000 005067 000100
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420 001072 005067 000100
421 001076 005067 000100
422 001080 005067 000100
423 001084 005067 000100
424 001088 005067 000100
425 001092 005067 000100
426 001096 005067 000100
427 001100 005067 000100
428 001104 005067 000100
429 001108 005067 000100
430 001112 104405 000000 001224 HRDRS,BEGIN,KWMSG ;PRINT COUNTER INFORMATION
431 001116 104410 000000 001224 ENDS,BEGIN
432 001120 104410 000000 001224
433 001124 104410 000000 001224
434 001128 104410 000000 001224
435 001132 104410 000000 001224
436 001136 104410 000000 001224
437 001140 104410 000000 001224
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594 001768 104410 000000 001224
595 001772 104410 000000 001224
596 001776 104410 000000 001224
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601 001796 104410 000000 001224
602 001800 104410 000000 001224
603 001804 104410 000000 001224
604 001808 104410 000000 001224
605 001812 104410 000000 001224
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607 001820 104410 000000 001224
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627 001900 104410 000000 001224
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629 001908 104410 000000 001224
630 001912 104410 000000 001224
631 001916 104410 000000 001224
632 001920 104410 000000 001224
633 001924 104410 000000 001224
634 001928 104410 000000 001224
635 001932 104410 000000 001224
636 001936 104410 000000 001224
637 001940 104410 000000 001224
638 001944 104410 000000 001224
639 001948 104410 000000 001224
640 001952 104410 000000 001224
641 001956 104410 000000 001224
642 001960 104410 000000 001224
643 001964 104410 000000 001224
644 001968 104410 000000 001224
645 001972 104410 000000 001224
646 001976 104410 000000 001224
647 001980 104410 000000 001224
648 001984 104410 000000 001224
649 001988 104410 000000 001224
650 001992 104410 000000 001224
651 001996 104410 000000 001224
652 002000 104410 000000 001224
653 002004 104410 000000 001224
654 002008 104410 000000 001224
655 002012 104410 000000 001224
656 002016 104410 000000 001224
657 002020 104410 000000 001224
658 002024 104410 000000 001224
659 002028 104410 000000 001224
660 002032 104410 000000
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395	001144	022701	001306
396	001150	001374	
397	001152	000207	
398			
399			
400			
401			
402	001154	012701	001246
403	001160	005502	
404	001162	005503	
405	001164	062403	
406	001166	005504	
407	001170	002701	001306
408	001174	001373	
409	001176	005500	
410	001178	005501	000020
411	001204	005503	
412	001206	103402	
413	001210	003400	
414	001212	003401	
415	001214	000207	

```

CMP      BNE     RTS     I$      PC      ;CARTAB+40,R1          ;DONE 16 WORDS?
;BR IF NOT
;RETURN TO TIMING ANALYSIS ROUTINE

-----
;ROUTINE TO COMPUTE AVERAGE LOOP COUNT
;-----
TIMAVG:  MOV     RCTRTAB,R1        ;R1 POINTS TO 1ST TABLE ENTRY
         CLR     R4                ;INIT 32 BIT ACCUMULATOR
1$:      ADD     (R1)+,R2           ;ADD TABLE ENTRY TO LOW ACCUM.
         ADC     R3                ;ADD IN ANY CARRIES TO HI ACCUM.
         CMP     RCTRTAB+40,R1     ;SUMMED ALL 16 ENTRIES?
         BNE     R0                ;BR IF NOT
         INIT    R0 TO ACCUMULATE AVERAGE
         SUBTRACT CONSTANT 16(10)
         BCARRY  IF REQUIRED
         BRIF    OVER SUBTRACT - (WE'RE DONE)
         COUNT   NO. OF TIMES 16 WENT IN
         GO      SUBTRACT ANOTHER 16(10)
3$:      RETURN - AVERAGE IN R0
         RTS

;CONSTANTS, VARIABLES, AND MISCELLANEOUS DATA AREAS
;-----
TCLEAR:  J       0                ;HOLDS SUBROUTINE ADDR.
TOL:     J       0                ;TOLERANCE FOR LOOP COUNTER AVG.
SWFLAG:  J       0                ;SOFTWARE INTERRUPT FLAG
RWMSG:   J       TIMES            ;POINTS TO WAS AVERAGE
         TIMES+2                 ;POINTS TO SHOULD BE AVERAGE
         TIMES+4                 ;POINTS TO HIGH LIMIT
         TIMES+6                 ;POINTS TO LOW LIMIT
         14777                  ;TABLE TERMINATOR

TIMES:   .BLKW   4                ;RESERVE FOUR WORDS FOR ERROR INFO.

;16. WORD TABLE TO STORE SIXTEEN LOOP COUNTS
;-----
RCTRTAB .BLKW   16.

.END
```

```

ACSR      000102R
ADDR      000000R
ADDR22=   001000
ASRSTAT   000010R
ASRSTAT   000104R
BEGIN      000100R
           000000R

BIT0      0000001
BIT1      0000002
BIT10     0000000
BIT11     0000000
BIT12     0000000
BIT13     0000000
BIT14     0000000
BIT15     0000000
BIT16     0000000
BIT17     0000000
BIT18     0000000
BREAK     1044007
BR1        000102R
BR2        000102R
BR3        000102R
BR4        000102R
BR5        000102R
BR6        000102R
BR7        000102R
BR8        000102R
BR9        000102R
BR10       000102R
BR11       000102R
BR12       000102R
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BR36       000102R
BR37       000102R
BR38       000102R
BR39       000102R
BR40       000102R
BR41       000102R
BR42       000102R
BR43       000102R
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214	269*	290*	300*	325*	342*	373*						
180	252	256*	267	269	282*	283*	290	291*	296	300	301*	318*
225	326*	335*	342	343*	373	386*						
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