

ADF11

CONVERSION RATE TEST
MD-11-DZADF-A

EP-DZADF-A-DL
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IDENTIFICATION

PRODUCT CODE: MD-11-DZADF-A-D
PRODUCT NAME: ADF11 CONVERSION RATE TEST
DATE CREATED: FEB. 1976
MAINTAINER: IPGCP
AUTHOR: RAY BALDWIN

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ADF11 CONVERSION RATE TIMING TEST

REQUIREMENTS:

PDP11, KW11L OR KW11P REAL TIME OPTION, ADF11
, ASR33 OR EQUIVALENT.

MEMORY STORAGE:

4K OCTAL MEMORY UPPER 2K IS READ/WRITE.

LOADING PROCEDURE:

PAPER TAPE SUPPLIED, LOADED USING NORMAL
BINARY PROCEDURE.

STARTING PROCEDURE:

STARTING ADDRESS 200:
ADDRESS 000200 ENTERS THE PROGRAM HEADER ROUTINE
WHICH WILL ASK, VIA TELETYPE THE FOLLOWING QUESTIONS.

1. TYPE (L) FOR LINE OR (P) FOR PROG. CLK.

THE OPERATOR MUST RESPOND BY TYPING AN "L" IF USING
THE KW11L OR A "P" IF THE KW11P REAL TIME
CLOCKS FOR THE TIME BASE.

IF AN "L" IS TYPED THE NEXT QUESTION IS

2. TYPE (5) FOR 50 OR (6) FOR 60 HZ.

TO WHICH THE OPERATOR MUST TYPE A "5" IF THE POWER
REFERENCE IS 50 CPS, OR A "6" IF THE POWER REFERENCE
IS 60 CPS.

IF A "P" IS TYPED THE NEXT QUESTION IS

2. TYPE (L) FOR 10 KHZ, (H) FOR 100KHZ.

TO WHICH THE OPERATOR MUST TYPE AN "L" IF
USING THE 10KHZ CRYSTAL OR (H) IF USING THE 100KHZ
CRYSTAL.

THE PROGRAM WILL THEN LIST THE 4 MODES
OF CONVERSION TO WHICH THE OPERATOR MUST TYPE THE
DESIGNATED LETTER OF ENTRY.

P=PROGRAM CONTROL
S=SINGLECHANNEL
Q=SEQUENTIAL
R=RANDOM

AFTER ENTERING ONE OF THE PROGRAMING MODES
LISTED ABOVE THE PROGRAM WILL REPORT THE MODE
SELECTED ON THE TELETYPE.

CONVERSIONS ARE TAKEN FOR 10 SECONDS (TIMED
BY KW11N OR KW11P) AND ARE REPORTED ON THE TELETYPE
AS KILO-HERTZ.

SYSTEM STATUS ERROR REPORTS

SHOULD A SYSTEM STATUS ERROR BE REPORTED FROM THE
REAL TIME CLOCK OR THE ADF11, THE PROGRAM WILL REPORT.

CLOCK STATUS ERROR (KW11L OR KW11P ERROR)

ADF11 STATUS ERROR (ADF11 STATUS ERROR)

EITHER STATUS ERROR WILL CAUSE A HALT AND
MUST BE RECOVERED BY THE OPERATOR.
MODE CHANGING:

TO CHANGE THE MODE OF CONVERSION THE "CONTROL C"
FUNCTION IS USED, THE KEYBOARD (ASR33 OR EQUIVALENT)
IS SENSED AFTER EVERY DATA OUTPUT.

1

172544			K=PC	=172544		
172546			K=PIX	=172546		
177546			LKS	=177546		
000240			NOP	=240		
000000			HLT	=0		
000000			R0	=R0		
000001			R1	=R1		
000002			R2	=R2		
000003			R3	=R3		
000004			R4	=R4		
000005			R5	=R5		
000006			SP	=R6		
000007			PC	=R7		
			; ADF11			
164000			SWAR	=164000		;ADFI1=STATUS WORD ADDRESS REG.
164002			ADW	=164002		;DATA WORD ADDRESS REG.
164004			=CR	=164004		;WORD COUNT REGISTER
164006			CR	=164006		;CONTROL REGISTER
164010			CSR	=164010		;CONTROL AND STATUS REGISTER
164012			DR	=164012		;DATA REGISTER
164014			BDW	=164014		;DATA WORD ADDRESS REG. B
164016			IOR	=164016		;INCREMENT MEMORY OFF SET
			; BUSS ERROR TIME OUT			
			; ;			
			.B4			
000004	003376		BERR			
000006	000340		340			
			; KWIIL TRAP VECTOR			
			.B100			
000100	002332		TIMA			;LINE TIME CLOCK
000102	000340		340			
			.B104			
000104	002404		TIMB			;PROGRAMABLE TIME CLOCK
000106	000340		340			
			.B200			
000200	000167	000574	JMP	PRIME		
			; ADF11			
			.B274			
000274	003176		ADCR7			;ADFI1 CONVERSION RATE ROUTINE
000276	000340		340			
			.B600			
000600	000000		0			
			.B1000			
			; INITIATE PROGRAM HEADER			
001000	012706	000600	MOV	#STACK, SP		;INIT STACK
001004	012767	000340	MOV	#340, PS		
001012	005067	001364	CLR	CLKRET		;CLR CLOCK RETURN LOC
001016	005067	000170	CLR	PGCLK		
001022	005067	000162	CLR	LECLK		
001026	012704	003415	MOV	#TEXT, R4		;PRINT HEADER AND ASK INITIAL QUESTIONS
001032	004367	002044	JSR	R3, PRINT		;ASK TYPE OF CLOCK
001036	004267	001452	JSR	R2, REP		;RECEIVE A CHARACTER
001042	004367	001466	JSR	R3, EC=0		;ECHO CHARACTER

176764

SURV:

STACK:

PRIME:

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221040 022767 000314 021450      CMP      #314, R0      ;WAS CLOCK K=11L
001054 001412                      BEQ      SETLNF      ;BRANCH TO SET LINE CLOCK ROUTINE
001056 022767 000320 001440      CMP      #320, R0      ;WAS CLOCK K=11P
001064 001453                      BEQ      SETPRG      ;BRANCH TO SET PROGRAM CLOCK ROUTINE
001066 012704 003413                      MOV      #0, R4      ;PRINT?
001072 004367 002004                      JSR      R3, PRINT    ;
221076 000167 177676                      JMP      PRIME      ;RECYCLE

;
; SET LINE CLOCK CONSTANTS
001102 012704 003467      SETLNF: MOV      #ASK56, R4      ;ASK FOR 50 OR 60 CPS?
021106 004367 001770                      JSR      R3, PRINT
001112 004267 001376                      JSR      R2, REC      ;RECEIVE A 5 OR A 6
001116 004367 001412                      JSR      R3, EC=0     ;EC=0 CHAR.
001122 022767 000265 001402      CMP      #265, R0      ;SET 50 CYCLE RATE
001130 001412                      BEQ      SET5       ;
001132 022767 000266 001372      CMP      #266, R0      ;
001140 001412                      BEQ      SET6       ;
001142 012704 003413                      MOV      #0, R4      ;RECYCLE QUESTION
001146 004367 001730                      JSR      R3, PRINT
001152 000167 177724                      JMP      SETLNF
001156 012767 000764 000222      SET5:  MOV      #764, COUNT    ;SET 50 CYCLE K FOR 10 SEC
001164 000403                      BR      ,+10
001166 012767 001130 000012      SET6:  MOV      #1130, COUNT    ;SET 60 CYCLE K FOR 10 SEC
001174 012767 177777 000006      MOV      #=1, LECLK    ;SET LOC. K=11L FOR FURTHER REF.
001202 000167 000114                      JMP      MODE
001206 000000      COUNT: 0      ;K FOR LINE CLOCK
001210 000000      LECLK: 0      ;LINE CLOCK INDICATOR
001212 000000      PGCLK: 0      ;PROGRAM CLOCK INDICATOR

; SET PROGRAMABLE CRYSTAL CONTROL CLOCK VARIABLES
;
001214 012704 003643      SETPRG: MOV      #ASK12, R4    ;ASK IF 10KC OR 100KC
001220 004367 001656                      JSR      R3, PRINT
001224 004267 001264                      JSR      R2, REC      ;RECEIVE ONE CHARACTER
001230 004367 001300                      JSR      R3, EC=0
001234 022767 000310 001270      CMP      #310, R0      ;WAS CHARACTER H FOR 100KC
001242 001412                      BEQ      SETHI      ;SET HIGH FREQUENCY K
001244 022767 000314 001260      CMP      #314, R0      ;WAS CHARACTER L FOR 10KC
001252 001412                      BEQ      SETLO      ;SET LOW FREQUENCY K
001254 012704 003413                      MOV      #0, R4      ;PRINT A?
001260 004367 001616                      JSR      R3, PRINT
001264 000167 177724                      JMP      SETPRG
001270 012767 141520 000022      SETHI: MOV      #141520, SEC    ;SET .5 SEC AT 100KC
001276 000403                      BR      ,+10
001300 012767 011610 000012      SETLO: MOV      #011610, SEC    ;SET .5 SEC AT 10KC
001306 012767 177777 177676      MOV      #=1, PGCLK
001314 000167 000002                      JMP      MODE
001320 000000      SEC: 0

;
; ASK FOR MODE OF CONVERSION
;
001322 012704 003535      MODE:  MOV      #ASK11, R4
001326 004367 001550                      JSR      R3, PRINT    ;ASK FOR MODE OF CONVERSION
001332 004267 001156                      JSR      R2, REC
001336 004367 001172                      JSR      R3, EC=0
001342 022767 000320 001162      CMP      #322, R0      ;WAS MODE PROGRAM CONTROL "P"

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001350 001423      BEQ      PRGCNT
001352 022767 000323 001152    CMP      #323,MOLD      ;HAS MODE SINGLE CHANNEL "S"
001360 001515      BEQ      SINCH
001362 022767 000321 001142    CMP      #321,MOLD      ;HAS MODE SEQUENTIAL "Q"
001370 001571      BEQ      SEQ
001372 022767 000322 001132    CMP      #322,MOLD      ;HAS MODE RANDOM "R"
001400 001405      BEQ      S
001402 012784 003413      MCV      #0U,R4          ;TYPE A?
001406 004367 021478      JSR      R3,PRNT
001412 000743      BR       MODE
001414 000167 000474      S:      JMP      RAN
;
;
; PROGRAM CONTROL MODE
;
201420 012704 003735      PRGCNT: MOV      #PCN,R4          ;PC 6=1
201424 004367 001452      JSR      R3,PRNT        ;PRINT PROGRAM CONTROL MODE
201430 012767 177777 000744      MOV      #=-1,CLKRET    ;SET FOR CLOCK RETURN,
201436 005067 000150      PRNT:   CLR      INCC     ;CLEAR BLOCK COUNTER
201442 005067 001610      CLR      CNT           ;CLEAR INC COUNTER
201446 012767 020000 162334      MOV      #20000,CSR     ;SET CONTROL & STATUS REGISTER,
201454 000240      NOP
201456 005767 177526      TST      LECLK         ;WHAT CLK?
201462 100404      BMI      ,+12
201464 004367 000604      JSR      R3,PCY        ;START PROGRAMABLE CLK, 10 SEC
201470 000167 000002      JMP      ,+6
201474 004367 000556      JSR      R3,LCT        ;START LINE CLK, 10 SEC
201500 042767 000340 176270      BIC      #340,PS
201506 000240      NOP
201510 012767 000000 162270      LOP:   MOV      #0,CR     ;START A-D CONVERSION
201516 005267 000070      INC      INCC          ;+1 TO INCREMENT COUNTER
201522 022767 001750 000062      CMP      #1750,INCC     ;HAVE WE REACHED 1000
201530 001407      BEQ      ,+20
201532 105767 162252      TSTB    CSR           ;WAIT FOR A DONE
201536 100375      BPL      ,+4
201540 016767 162246 000042      MOV      DR,HEX        ;CLR FLAG
201546 000760      BR       LOP          ;RECYCLE CONVERSIONS
201550 105767 162234      TSTB    CSR           ;WAIT FOR LAST OF 1000
201554 100375      BPL      ,+4          ;WAIT FOR LAST IN BLOCK
201556 005267 001474      INC      CNT           ;+1 TO GROUP COUNTER
201562 005067 000024      CLR      INCC          ;CLEAR INCREMENT COUNTER
201566 000167 177716      JMP      LOP
201572 016767 162214 000010      LOPA:  MOV      DR,HEX        ;CLEAR A-D FLAG
201600 004167 000746      JSR      R1,CHPCK
201604 000167 177626      JMP      PRNT
201610 000000      HEX:   0
201612 000000      INCC:  0
;
;
; INITIATE SINGLE CHANNEL MODE-DMA-
;
001614 012767 003176 176452      SINCH: MOV      #ADCRT,9URV    ;SET UP SERVICE FOR S, CH, MODE
001622 012704 003706      MOV      #SINC,R4
001626 004367 001258      JSR      R3,PRNT
001632 012767 020000 162150      MOV      #20000,CSR

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001640 005067 001412 SINCHA: CLR CNT
001644 005767 177342 TST LECLK ;WHICH CLOCK?
001650 100404 BMI .+12
001652 004367 000416 JSR R3,PCY ;START PROGRAMABLE CLOCK FOR 10 SEC.
001656 000167 000202 JMP .+6
001662 004367 000370 JSR R3,LCY ;START LINE CLOCK FOR 10 SEC.
001666 000240 NOP
001670 012767 013550 162104 MOV #DDBF,ADW ;LOAD THE ADDRESS OF DATA BUFFER INTO
001676 000240 NOP ;DATA WORD ADDRESS REG. A
001700 012767 176030 162076 MOV #176030,WCR ;SET WORD COUNT REGISTER TO 1000
001706 012767 001000 162072 MOV #001000,CR ;LOAD FINAL ADDRESS
001714 012767 110000 162264 MOV #110000,CR ;LOAD INITIAL, DMA, AND START CONVERT
001722 052767 000100 162060 BIS #100,PS ;ENABLE W.C. INT.
001730 042767 000340 176040 BIC #340,PS
001736 000001 WAIT
001740 000776 BR .-2 ;WAIT FOR W.C. INTERRUPT
001742 000240 NOP
001744 004167 000602 JSR R1,CHECK
001750 000167 177664 JMP SINCHA

```

; THE WORD COUNT REGISTER WILL BE RELOADED IN THE A-D
; INTERRUPT SERVICE ROUTINE

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001754 012767 003176 176312 SEQ: MOV #ADCRT,QUV ;SERVICE FOR SEQ. MODE
001762 012767 003765 MOV #SCH,R0 ;PRINT SEQUENTIAL CHANNEL MODE
001766 004367 001110 JSR R3,PRINT
001772 012767 020000 162210 MOV #20000,CSR
002000 005067 001252 SEGA: CLR CNT ;CLEAR BLOCK COUNTER (# OF 1000'S)
002004 005767 177200 TST LECLK ;WHICH CLOCK
002010 100404 BMI .+12
002012 004367 000256 JSR R3,PCY ;START PROGRAMABLE CLOCK FOR 10 SEC.
002016 000167 000002 JMP .+6
002022 004367 000230 JSR R3,LCY ;START LINE CLOCK FOR 10 SEC.
002026 000240 NOP
002030 012767 013550 161744 MOV #DDBF,ADW ;LOAD THE ADDRESS OF DATA BUFFER
002036 000240 NOP ;INTO DATA WORD ADDRESS REG. A
002040 012767 176030 161736 MOV #176030,WCR ;SET W.C. REG. TO 1000
002046 012767 001010 161732 MOV #001010,CR ;LOAD FINAL ADDRESS
002054 012767 110000 161724 MOV #110000,CR ;LOAD INITIAL, DMA, & START CONVERT
002062 052767 000100 161720 BIS #100,CS
002070 042767 000340 175700 BIC #340,PS
002076 000001 WAIT
002100 000776 BR .-2 ;WAIT FOR CLOCK INTERRUPTS
002102 000240 NOP
002104 004167 000442 JSR R1,CHECK
002110 000167 177664 JMP SEGA

```

; THE WORD COUNT REGISTER WILL BE RELOADED IN THE
; CLOCK INTERRUPT SERVICE ROUTINES

; INITIATE RANDOM CHANNEL & GAIN MODE -DMA-

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002114 012767 003272 176152 RAND: MOV #SERVIR,80HV ;SET SERVICE ROUTINE FOR RANDOM
002122 012764 004020 MCV #RCH,84 ;MODE
002126 004367 002750 JSR R3,PRINT ;PRINT RANDOM CHANNEL MODE
002132 012767 020000 161650 MOV #2000?,CSR
002140 004167 001212 JSR R1,WRITP ;WRIGHT 100K STATUS WORDS
002144 005067 001106 RAND: CLR CNT ;CLEAR CLOCK COUNTER
002150 012767 013550 161624 MCV #DBF,ADM ;LOAD ADDRESS OF DATA BUFFER
002156 012767 007626 161614 MOV #STA,9MAR ;LOAD ADDRESS OF STATUS WORDS
002164 005767 177020 TST LECLK
002170 100404 BMI ,+12
002172 004367 000076 JSR R3,PC? ;START PROGRAMABLE CLOCK FOR 10 SEC.
002176 000167 000002 JMP ,+6
002202 004367 000050 JSR R3,LC? ;START LINE CLOCK FOR 10 SEC.
002206 000240 NOP
002210 012767 176030 161566 MCV #176030,PCR ;SET M.C. FOR 1000 DEC.
002216 012767 010000 161562 MOV #0100?,CR ;SET FOR RANDOM MODE
002224 052767 000100 161556 BIS #100,?S?
002232 042767 000340 175536 BIC #340,?S
002240 000001 WAIT
002242 000776 BP ,+2
002244 000240 NOP
002246 004167 000300 JSR R1,CMPCLK
002252 000167 177666 JMP RAND ;RECYCLE TEST
;
;
;
;
; START LINE FREQUENCY REAL TIME CLOCK
;
002256 016767 176724 000114 LCT: MOV COUNT,LCNT ;SET LINE CLOCK FOR 10 SEC.
002264 012767 000100 175254 MOV #100,LK? ;ENABLE INT.
002272 000203 RTS R3
;
; START PROGRAMABLE REAL TIME CLOCK (MODE 1)
;
002274 016767 177020 170240 PCT: MOV SEC,K-PR ;SET PRECOUNT IN BUFFER
002302 100404 BMI ,+12 ;SET HIGH SPEED
002304 012767 000113 170226 MOV #000113,KMPS ;100KHZ DOWN COUNT & RUN TO STATUS
002312 000403 BR ,+10
002314 012767 000111 170216 MOV #000111,KMPS ;100KHZ, INT. EN, DOWN & RUN TO STATUS
002322 012767 000024 000130 MOV #24,PCNT ;SET FOR 20 TRIPS @ .5 SEC EACH
002330 000203 RTS R3
; SERVICE LINE FREQUENCY CLOCK INTERRUPTS
;
002332 005367 000042 TIMA: DEC LCNT ;CHECK FOR LAST CLOCK TICK
002336 001401 BEQ ,+4
002340 000002 RTI
002342 004567 000126 JSR R5,REPT
002346 012767 020000 161434 MOV #2000?,CSR ;CLR LAST M.C.
002354 005767 000022 TST CLKREY ;CHECK FOR P.C. MODE ON LAST TICK
002360 100403 BMI ,+10
002362 062716 000004 ADD #4,0SP
002366 000002 RTI
002370 012766 000600 MOV #STACK,9P ;REINITIAL THE STACK
002374 000167 177172 JMP LOPA ;RETURN TO P.C. TEST
002400 000000 LCNT: 0

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002402 000000      CLKRET: 0
;
; SERVICE PROGRAMMABLE REAL TIME CLOCK INTERRUPTS
002404 005767 170130      TIMB: TST      K&PS      ;TEST STATUS OF CLOCK INT.
002410 100424      BMI      ERR      ;REINITIALIZE TEST
002412 005367 000042      DEC      PCNT     ;20 TRIPS
002416 001401      BEQ      ,+4     ;BRANCH WHEN DONE
002420 0000F2      RTI
002422 004567 000046      JSR      R5,REPT  ;REPORT FINDINGS
002426 012767 020000 101354      MOV      #2000*,CBR ;CLR LAST N.
002434 005767 177742      TST      CLKRET   ;TEST FOR PROGRAM CONTROL MODE
002440 100407      BMI      ,+20
002442 062716 000004      ADD      #4,05P
002446 000002      RTI      ;RECYCLE TEST
002450 012706 000600      MOV      #STACK*,9P ;REINITIALIZE THE STACK
002454 000167 177112      JMP      LOPA     ;RETURN TO P.C. TEST
002460 000000      PCNT: 0
;
; REPORT CLOCK STATUS ERROR
002462 012704 004047      ERR:  MOV      #CLKST,R4
002466 004367 000410      JSR      R3,PRINT
002472 000000      MLT
; REAL TIME CLOCK STATUS SHOWS ERROR
;
;
; REPORT RESULTS OF CONVERSIONS TAKEN IN 10 SEC.
; AND SCALE FOR RESULTS OF ONE SEC.
;
002474 012767 000340 175274      REPT: MOV      #340,PS
002502 004267 000100      JSR      R2,OCTDEC ;CONVERT OCTAL VALUE CONV. TO DEC.
002506 004267 000264      JSR      R2,OUTC'D ;PRINT
002512 000205      RTS      R5
;
; RECEIVE ONE CHARACTER FROM KEYBOARD AND
; STORE IN LOCATION HOLD
;
002514 105767 175040      REC:  TSTB   TKB      ;WAIT FOR KEYBOARD
002520 100375      BPL      ,=4
002522 016767 175034 000002      MOV      TKB,HOLD
002530 000202      RTS      R2
002532 000000      HOLD: 0
; ECHO CHARACTER IN TELETYPE BUFFER REGISTER
002534 016767 175022 175024      ECHO: MOV      TKB,TPB  ;READER BUFFER TO PRINTER BUFFER
002542 105767 175016      TSTB   TPS
002546 100375      BPL      ,=4
002550 000203      RTS      R3
;
;
002552 105767 175002      CHECK: TSTB   TKB
002556 100401      BMI      ,+4
002560 000201      RTS      R1
002562 022767 000203 174772      CMP      #203,TKR
002570 001401      BEQ      ,+4

```

002572 000201
002574 052767 020000 161206
002602 000167 176172

RTS R1
BIS #2000?,PSH
JMP PRIME

;
;
; CONVERT VALUE IN LOCATION "CNT" TO DECIMAL AND
; STORE RESULTS IN ASCII CODE FOR OUTPUT

002606 005767 000444
002612 001001
002614 000000
002616 012700 002746
002622 012701 002762
002626 012767 000260 000126
002634 012767 000260 000122
002642 012767 000260 000116
002650 012767 000260 000112
002656 012767 000260 000106
002664 016767 000366 000050
002672 016767 000044 000044
002700 061067 000040
002704 100004
002706 005720
002710 005721
002712 000167 177754
002716 016767 000022 000016
002724 005211
002726 005767 000012
002732 001402
002734 000167 177740
002740 000202

OCTDEC: TST CNT
BNE .+4
HLT
MOV #NEG,R0 ;NO VALUE TO CONVERT
MOV #DEC,R1 ;R0 POINTS TO NEG. #5 FOR SUB.
MOV #260,DEP ;R1 POINTS TO LOCS FOR DEC. VALUES
MOV #260,DEC+2 ;LOAD ASCII BASE VALUES
MOV #260,DEC+4
MOV #260,DEC+6
MOV #260,DEC+10
MOV CNT,SAVE
MOV SAVE,SUMS
SIDE: ADD (R0),SUMS
BPL .+12
TST (R0)+
TST (R1)+
JMP BIDE-6
MOV SUMS,SAVE
INC (R1)
TST SUMS
BEQ .+6
JMP BIDE
RTS R2

;
;SUBTRACT DECIMAL EQUIVALENTS
;UPDATE SUB.VALUE
;UPDATE DEC. LOCATOR
;SAVE REMAINDER FOR WHEN #GOES, NEG.
;PLUS 1 TO ASCII VALUE
;RETURN WHEN DONE

002742 000000
002744 000000
002746 154360
002750 176030
002752 177634
002754 177766
002756 177777

SAVE: 0
SUMS: 0
NEG: 154360
176030
177634
177766
177777

101000 OCT=
1001000 OCT=
1000100 OCT=
1000010 OCT=
1000001 OCT=

002760 000000
002762 000000
002764 000000
002766 000000
002770 000000
002772 000000
002774 177777

DEC: 0
0
0
0
0
0
177777

;
; PRINT CONVERTED VALUE OF KMZ.
;

002776 012700 002762
003032 022710 000260
003006 001007

OUTCOD: MOV #DEC,R0
CMP #260,OR
BNE .+20

;CHECK FOR FIRST NON-ZERO CHAR.
;PRINT

```

003010 005720          TST      (R0)+      ;SKIP OVER LEADING ZERO'S
003012 012704 004074  MOV      #SPACE,R4  ;PRINT A SPACE
003016 004367 000062  JSR      R3,PRINT
003022 000167 177754  JMP      OUTCON+4
003026 112067 174534  MOVB    (R0)+,TPB
003032 105767 174526  TSTB    TPS
003036 100375          BPL     ,=4
003040 022700 002772  CMP     #DEC+10,R0
003044 001370          BNE     ,=16
003046 012704 004076  MOV     #PT,R4      ;PRINT.
003052 004367 000024  JSR      R3,PRINT
003056 011067 174504  MOV     (R0),TPB
003062 105767 174476  TSTB    TPS
003066 100375          BPL     ,=4
003070 012704 004100  MOV     #KHZ,R4
003074 004367 000022  JSR      R3,PRINT  ;PRINT "KHZ."
003100 000202          RTS      R2      ;ALL DONE
;
;
;
;PRINT DATA SPECIFIED BY REGISTER 4 UNTIL TERMINATED BY
; (0)
003102 112467 000066          PRINT: MOVB    (R4)+,DRUF
003106 122767 000100 000060  CMPB    #100,DRUF
003114 001426          BEQ     DONE
003116 122767 000045 000050  CMPB    #45,DRUF
003124 001010          BNE     OUT
003126 112767 000015 000040  MOVB    #15,DRUF
003134 004567 000014          JSR      R5,PRT
003140 112767 000012 000026  MOVB    #12,DRUF
003146 004567 000002          OUT:   JSR      R5,PRT
003152 000753          BR      PRINT
;
003154 116767 000014 174404  PRT:   MOVB    DBUF,TPB
003162 105767 174376          TSTB    TPS
003166 100375          BPL     ,=4
003170 000205          RTS      R5
003172 000203          DONE:  RTS      R3
003174 000000          OBUF: 0
;
; SERVICE THE A-D CONVERTER ON EVERY WORD COUNT
; OVER FLOW AND CHECK FOR ANY ERROR CONDITIONS
; THIS ROUTINE USED FOR SINGLE CHANNEL & SEQUENTIAL MODE
;
003176 005767 160606          ADCRT: TST      CSR      ;TEST FOR INT. FROM ERROR
003202 100002          BPL     ,=6
003204 000167 000050          JMP      SERR      ;REPORT A STATUS ERROR
003210 000240          NOP
003212 042767 000200 160570  BIC     #200,CSR    ;CLEAR THE READY BIT
003220 005267 000032          INC     CNT      ;PLUS 1 TO BLOCK COUNTER
003224 062716 177740          ADD     #177740,ESP ;SUBTRACT 40 FROM STACK
003230 005726          TST     (SP)+
003232 012716 000340          MOV     #340,ESP
003236 005746          TST     =(SP)
003240 052767 020000 160542  BIS     #2000?,CSR

```



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003246  012767  013550  160526      MOV      #DBF,AD4
003254  000002                      RTI
003256  000002      CNT:      0          ;GROUPS OF 1000'S
                                ; REPORT STAT 8 ERROR
003260  012704  004107      SERR:    MOV      #STATJS,R4
003264  004367  177612      JSR      R3,PRINT
003270  000000      HLT          ;STATUS REG. CONTAINS ERROR
                                ;
                                ;
                                ;
                                ; SERVICE WORD COUNT OVERFLOW & ERROR INTERRUPTS
                                ; FROM THE RANDOM MODE
                                ;
003272  005767  160512      SERVIR:  TST      CSR          ;TEST FOR ERRORS
003276  100002      BPL      ,+6
003300  000167  177754      JMP      SERR          ;REPORT A STATUS ERROR
003304  052767  020000  160476      BIS      #2000?,PSR
003312  012767  013550  160462      MOV      #DBF,AD4      ;LOAD DATA WORD ADDRESS REG. A,
003320  012767  007626  160452      MOV      #STA,SWAR     ;LOAD STATUS WORD ADDRESS REG A
003326  042767  000200  160454      BIC      #200,CSR     ;CLEAR THE READY BIT
003334  005267  177716      INC      CNT          ;+1 TO BLOCK COUNTER
003340  062716  177746      ADD      #177746,0SP  ;SUBTRACT 32 FROM STACK
003344  005726      TST      (SP)+
003346  012716  000340      MOV      #340,0SP
003352  005746      TST      -(SP)
003354  000002      RTI
                                ;
                                ; WRITE 1000 STATUS WORDS FOR RANDOM MODE
                                ;
003356  012705  007626      WRITE:  MOV      #STA,R5
003362  012725  010000      MOV      #1000?,(R5)+
003366  020527  013550      CMP      R5,#DBF
003372  001373      BNE      ,=10
003374  000201      RTS      R1
                                ;
                                ; BUS TIME OUT ERROR HANDLER
                                ;
003376  012704  004134      BERR:   MOV      #BUSEP,R4          ;REPORT BUS ERROR
003402  004367  177474      JSR      R3,PRINT
003406  000167  175306      JMP      PRIME
                                ;
                                ;
                                ; MESSAGES
003412      000      .BYTE
003413      077      QUI      ,ASCII /?/?
003414      100
                                ;
003415      045      TEXT:   ,ASCII /X TYPE (L) FOR LINE OR (P) FOR PROG, CLK #/
003416      040

```

023417	124
003420	131
003421	129
003422	105
003423	040
003424	050
003425	114
003426	051
003427	040
003430	106
003431	117
003432	122
003433	040
003434	114
003435	111
003436	116
003437	105
003440	040
003441	117
003442	122
003443	040
003444	050
003445	120
003446	051
003447	040
003450	106
003451	117
003452	122
003453	040
003454	122
003455	122
003456	117
003457	107
003460	050
003461	040
003462	103
003463	114
003464	113
003465	040
003466	100

003467	045
003470	040
003471	124
003472	131
003473	120
003474	105
003475	040
003476	050
003477	065
003500	051
003501	040
003502	106
003503	117

ASK56: ,ASCII /X TYPE (5) FOR 50 OR (6) FOR 60 HZ. 0/

003504	122
003505	040
003506	065
003507	060
003510	040
003511	117
003512	122
003513	040
003514	050
003515	066
003516	051
003517	040
003520	106
003521	117
003522	122
003523	040
003524	066
003525	060
003526	040
003527	110
003530	132
003531	056
003532	040
003533	040
003534	100

003535	045
003536	050
003537	120
003540	051
003541	075
003542	120
003543	122
003544	117
003545	107
003546	122
003547	101
003550	115
003551	040
003552	103
003553	117
003554	116
003555	124
003556	122
003557	117
003560	114
003561	040
003562	045
003563	050
003564	123
003565	051
003566	075
003567	123
003570	111

ASK111 ,ASCII /X(P)=PROGRAM CONTROL X(S)=SINGLE CHANNEL/

003571	116
003572	107
003573	114
003574	105
003575	040
003576	103
003577	110
003600	101
003601	116
003602	116
003603	105
003604	114
003605	045

003606	050
003607	121
003610	051
003611	075
003612	123
003613	105
003614	121
003615	125
003616	105
003617	116
003620	124
003621	111
003622	101
003623	114
003624	040
003625	045
003626	050
003627	122
003630	051
003631	075
003632	122
003633	101
003634	116
003635	104
003636	117
003637	116
003640	040
003641	045
003642	100

003643	045
003644	124
003645	131
003646	120
003647	105
003650	050
003651	114
003652	051
003653	106

.ASCII /(Q)=SEQUENTIAL X(R)=RANDOM X0/

ASK121 .ASCII /XTYPE(L)FOR 10KHZ.(M)FOR 100KHZ. 0/

003654	117
003655	122
003656	040
003657	061
003660	060
003661	113
003662	110
003663	132
003664	056
003665	050
003666	110
003667	051
003670	106
003671	117
003672	122
003673	040
003674	061
003675	060
003676	060
003677	113
003700	110
003701	132
003702	056
003703	040
003704	040
003705	100

003706	045
003707	123
003710	111
003711	116
003712	107
003713	114
003714	105
003715	040
003716	103
003717	110
003720	101
003721	116
003722	116
003723	105
003724	114
003725	040
003726	115
003727	117
003730	104
003731	105
003732	045
003733	045
003734	100

SINC: .ASCII /%SINGLE CHANNEL MODE%0/

003735	045
003736	120

PCM: .ASCII /%PROGRAM CONTROL MODE%0/

003737 122
003740 117
003741 107
003742 122
003743 101
003744 115
003745 040
003746 103
003747 117
003750 110
003751 124
003752 122
003753 117
003754 114
003755 040
003756 115
003757 117
003760 104
003761 105
003762 045
003763 045
003764 100

003765 045
003766 123
003767 105
003770 121
003771 125
003772 105
003773 116
003774 124
003775 111
003776 101
003777 114
004000 040
004001 103
004002 110
004003 101
004004 116
004005 116
004006 105
004007 114
004010 040
004011 115
004012 117
004013 104
004014 105
004015 045
004016 045
004017 100

SCM: ,ASCII /XSEQUENTIAL CHANNEL MODEXX/

004020 045
004021 122

RCH: ,ASCII /XRANDOM CHANNEL MODEXX/

004022 101
 004023 116
 004024 104
 004025 117
 004026 116
 004027 040
 004030 103
 004031 110
 004032 101
 004033 116
 004034 116
 004035 105
 004036 114
 004037 040
 004040 115
 004041 117
 004042 104
 004043 105
 004044 045
 004045 045
 004046 100

004047 045
 004050 103
 004051 114
 004052 117
 004053 103
 004054 113
 004055 040
 004056 123
 004057 124
 004060 101
 004061 124
 004062 125
 004063 123
 004064 040
 004065 105
 004066 122
 004067 122
 004070 117
 004071 122
 004072 040
 004073 100

004074 040
 004075 100

004076 056
 004077 100

004100 040

CLKST: .ASCII /XCLOCK STATUS ERROR 0/

SPACE: .ASCII / 0/

PT: .ASCII / .0/

KHZ: .ASCII / KHZ.00/

004101	113
004102	110
004103	132
004104	050
004105	045
004106	100

004107	045
004110	101
004111	104
004112	106
004113	061
004114	061
004115	040
004116	123
004117	124
004120	101
004121	124
004122	125
004123	123
004124	040
004125	105
004126	122
004127	122
004130	117
004131	122
004132	045
004133	100

STATUS: ,ASCII /%ADF11 STATUS ERROR%/

004134	102
004135	125
004136	123
004137	040
004140	124
004141	111
004142	115
004143	105
004144	040
004145	117
004146	125
004147	124
004150	040
004151	105
004152	122
004153	122
004154	117
004155	122
004156	045
004157	100

BUSER: ,ASCII /BUS TIME OUT ERROR%/

004160
007626

,EVEN
,#7626

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007626 000000
013550
013550 000000
000001

STA: 0
 ,=13550
DBF: 0
 .END

!BEGIN 1000 WORD STATUS BUF.

!BEGIN 1000 WORD DATA BUF.

ADCR7	003176	PRINT	003102
ADW	164002	PRNT	001436
ASK11	003535	PHT	003154
ASK12	003643	PS	177776
ASK56	003467	PT	004076
BDW	164014	QU	003413
BERR	003376	RB	000002R
BIDE	002700	R1	000001R
BUSER	004134	R2	000002R
CHECK	002552	R3	000003R
CLKRET	002402	R4	000004R
CLKST	004047	R5	000005R
CNT	003256	RAN	002114
COUNT	001206	RAND	002144
CR	164006	RCH	004020
CSR	164010	REC	002514
DBF	013550	REPT	002474
DBUF	003174	SAVE	002742
DEC	002762	SCM	003765
DONE	003172	SEC	001320
DR	164012	SEQ	001754
ECHO	002534	SEQA	002000
ERR	002462	SERR	003260
HEX	001610	SERVIR	003272
HLT	000000	SETS	001156
HOLD	002532	SET6	001166
INCC	001612	SETHI	001270
IOR	164016	SETLNE	001102
KHZ	004100	SETLO	001300
KWPB	172542	SETPRG	001214
KWPC	172544	SINC	003706
KWPS	172540	SINCH	001614
KWPXX	172546	SINCHA	001640
LCNT	002400	SP	000006R
LCT	002256	SPACE	004074
LECLK	001210	SR	177570
LKS	177546	STA	007626
LOP	001510	STACK	000600
LOPA	001572	STATUS	004107
MODE	001322	SUMS	002744
NEG	002746	SURV	000274
NOP	000240	SWAR	164000
OCTDEC	002606	TEXT	003415
OUT	003146	TIMA	002332
OUTCOD	002776	TIMB	002404
PC	000007R	TKB	177562
PCM	003735	TKS	177560
PCNT	002460	TPB	177566
PCT	002274	TPB	177564
PGCLK	001212	WCR	164004
PRGENT	001420	WRITE	003356
PRIME	001000	S	001414

ERRORS DETECTED: 0

RUN-TIME: 3 SECONDS

5K CORE USED