

DA11F

BUS WINDOW EXERCISER
MD-11-DZDAB-A

EP-DZDAB-A-DL-A
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This microfiche card contains a grid of frames. The frames are arranged in approximately 12 rows and 6 columns. Each frame contains a different view of data, likely related to a bus window exerciser. The data is presented in various formats, including tables, diagrams, and text. Some frames show what appears to be a schematic or a flowchart, while others show lists of data points or parameters. The overall layout is organized and systematic, typical of technical documentation microfiche.

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1. ABSTRACT

THIS PROGRAM EXERCISES THE BUS WINDOW USING AN I/O DEVICE OR EXECUTING CODE THROUGHOUT THE OTHER PROCESSOR'S MEMORY. IT IS ASYNCHRONOUS AND 3/4 DUPLEX IN ITS OPERATION. IF THE WINDOW IS ABOVE 32K, KT11C/D WILL BE USED TO REACH THE WINDOW.

2. REQUIREMENTS

2.1 EQUIPMENT

TWO PDP11 STANDARD COMPUTERS WITH A MINIMUM OF 8K OF MEMORY KT11C/D FOR MEMORY EXPANSION (OPTIONAL)

2.2 STORAGE

PROGRAM STORAGE - THE ROUTINES USE MEMORY 0 - 17776

2.3 PRELIMINARY PROGRAMS

MEMORY DIAGNOSTICS
DEVICE DIAGNOSTICS
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3. LOADING PROCEDURE

- 1) LOAD THE ABS LOADER IF NOT IN MEMORY
- 2) LOAD PROGRAM WITH ABS LOADER
- 3) LOAD OTHER PROCESSOR
 - A) IF WINDOW IS NOT UP, USE ABS LOADER ON OTHER PROCESSOR
 - OR
 - B) IF THE WINDOW IS UP:
 - 1) LOAD ADDRESS 510
 - 2) START
 - 3) LOAD ADDRESS #500 IN OTHER MACHINE (* = WINDOW ADDRESS)
 - 4) START
 - 5) BOTH PROCESSORS WILL SELF START IF SWITCH 7 IS CLEAR.

4. STARTING PROCEDURE

- 1) THERE ARE TWO WAYS OF STARTING THE PROGRAM. FIRST OF ALL THE PROGRAM CAN BE LOADED INTO EACH PROCESSOR BY USING

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THE ABS LOADER. THE PROGRAMS CAN THEN BE STARTED AT THE
STARTING ADDRESS SPECIFIED IN SECTION 4.3. THE OTHER

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OPTION IS TO LOAD THE PROGRAM INTO ONE PROCESSOR USING THE ABS LOADER AND THEN HAVE THE WINDOW TRANSFER THE PROGRAM TO THE OTHER PROCESSOR AS DESCRIBED IN SECTION 3. TO USE THIS METHOD THE WINDOW MUST BE WORKING, IT MUST HAVE A SIZE OF AT LEAST 4K, AND THE WINDOW CANNOT BE LOCATED AT 32K OR ABOVE.

- 2) IF THE WINDOW IS USED TO LOAD THE PROGRAM INTO PROCESSOR "B" AND SWITCH 7 IS CLEAR, THE PROGRAMS WILL SELF START. PROCESSOR "A" WILL AUTOMATICALLY BECOME THE MASTER.
- 3) IF THE PROGRAM DOES NOT AUTOMATICALLY SELF START DUE TO LOADING PROGRAM MANUALLY INTO BOTH PROCESSORS OR SWITCH 7 BEING SET WHEN LOADING THRU THE WINDOW, THEN IT BECOMES NECESSARY TO START EACH PROCESSOR AT A DIFFERENT STARTING ADDRESS. ONE PROCESSOR MUST BE STARTED AT SA=200 AND THE OTHER PROCESSOR MUST BE STARTED FROM SA 210. BY DOING THIS A MASTER SLAVE CONFIGURATION IS ESTABLISHED TO PREVENT RACE CONDITIONS WHEN ASKING FOR THE WINDOW. AFTER THE INITIAL START, WHICH MODIFIES SOME CODE, ALL RESTARTS MUST BE DONE FROM SA 2 OR BOTH PROCESSORS.

4.1 CONTROL SWITCH SETTINGS

SEE ! 1 (ALL DOWN FOR WORST CASE TESTING)

4.2 STARTING ADDRESS

SEE 4.0.

4.3 PROGRAM AND/OR OPERATOR ACTION

- 1) START AT SA 200 FOR ONE PROCESSOR AND SA 210 FOR THE OTHER PROCESSOR OR SELF START AS IN SEC. 4.0
- 2) TYPE DEVICE (RF11, RK11, RP11, RC11, TC11, TM11, OR EXECUTE) AND RETURN.
- 3) TEST WILL START (↑C WILL RETURN TO STEP 2)
- 4) NOTE: ALL PROGRAM RESTARTS ARE FROM SA200 FOR BOTH PROCESSORS.

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

AT STARTING ADDRESS, ALL SWITCHES DOWN IS WORST CASE TESTING. THE BELL WILL RING UPON COMPLETION OF A PASS.

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5.1.1 SWITCH SETTINGS ARE:

SW<15> = 1 HALT ON ERROR
SW<14> = 1 HANG ON CURRENT SEGMENT
SW<13> = 1 INHIBIT PRINTOUT
SW<10> = 1 INHIBIT BELL ON PASS COMPLETE
SW<08> = 1 TYPE SEGMENT UNDER TEST
SW<07> = 1 INHIBIT AUTOMATIC SELF START WHEN LOADING
PROGRAM THRU THE WINDOW

5.2 SUBROUTINE ABSTRACTS

5.2.1 TRAPCATCHER

A ".+2" - "HALT" SEQUENCE IS REPEATED FROM 4 - 776 TO CATCH
ANY UNEXPECTED TRAPS. THUS ANY UNEXPECTED TRAPS OR
INTERUPTS WILL HALT AT THE VECTOR + 2.

5.2.2 TRAP HANDLER

MOST OF THE SUBROUTINE CALLS ARE DONE VIA A TRAP+N CALL. TO
FIND THE SUBROUTINE BEING CALLED, LOOK IN THE COMMENT
SECTION OF THE TRAP DEFINATION TABLE FOR THE NAME OF THE
TRAP, THEN SCAN TO THE LEFT MARGIN FOR THE STARTING ADDRESS
OF THE SUBROUTINE.

6. ERRORS

6.1 ERROR PRINTOUT

THE FORMAT IS AS FOLLOWS:

RF11 ERROR: CS = 100305 ER = 001000

RF11 = DEVICE UNDER TEST
CS = CONTROL AND STATUS REGISTER
ER = ERROR REGISTER

DATA ERROR AT 401220 TRUE = 177777 RECEIVED = 177757

401220 = ADDRESS OF BAD DATA (18 BIT)
TRUE = DATA SENT
RECEIVED = DATA FOUND

WINDOW ERROR AT 146012 WCSRA = 141022 WDARA = 000000

146012 = ADDRESS TRAPPED FROM

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WCSRA = WINDOW CONTROL AND STATUS REG.
WDARA = WINDOW DISPLACEMENT ADDRESS REGISTER

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6.2 ERROR RECOVERY

RESTART AT 200 FOR BOTH PROCESSORS

7. RESTRICTIONS

IN ORDER TO ESTABLISH A MASTER/SLAVE CONFIGURATION, THE PROGRAMMER MUST INITIALLY BE STARTED AT TWO DIFFERENT STARTING ADDRESSES. IF THE WINDOW IS USED TO LOAD THE PROGRAM AND SWITCH 7 IS CLEAR, THE MASTER/SLAVE CONFIGURATION WILL BE SETUP. IF THE PROGRAMS ARE MANUALLY STARTED REFER TO SECTION 4.0 FOR STARTING INSTRUCTIONS. ALL RESTARTS ARE FROM SA 200 FOR BOTH PROCESSORS.

8. MISCELLANEOUS

WHEN FINISHED RUNNING THE PROGRAM THE LOADER MAY BE RESTORED BY LOADING SA 562 AND HITTING START. THE PROCESSOR WILL RESTORE THE LOADER AND HALT.

8.1 EXECUTION TIME

THE EXECUTION TIME IS DEPENDANT ON THE AMOUNT OF MEMORY AND THE DEVICE USED. THE BELL SHOULD RING WITHIN 5 MINUTES (USING TC11 IN 124K.)

8.2 STACK POINTER

STACK IS INITALLY SET TO 500

8.3 POWER FAIL

N/A

9. PROGRAM DESCRIPTION

THE PROGRAM SIZES CORE AND TEST SEQUENTIALLY ALL CORE OR ANY SECTION OF CORE IN CHUNKS EQUAL TO THE WINDOW SIZE USING THE DEVICE SPECIFIED. SO A SEGMENT OF CORE IS EQUAL TO THE WINDOW SIZE. THE DEVICE ON SIDE A USES THE MEMORY ON BUS B AND THE DEVICE ON SIDE B USES MEMORY ON BUS A. WORST CASE NOISE PATTERNS ARE USED FOR EACH MEMORY TYPE ON EACH PASS. IF A DEVICE IS NOT AVAILABLE, THE EXECUTE COMMAND CAN BE USED TO EXECUTE CODE THROUGHOUT THE OTHER PROCESSOR'S MEMORY. EACH MACHINE HAS A WINDOW INTERRUPT HANDLER FOR OPENING THE WINDOW UPON REQUEST AND CODE TO REQUEST THE

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WINDOW IN A PARTICULAR MODE. BECAUSE BOTH PROCESSORS CAN
NOT READ AT THE SAME TIME, THE REQUESTING ROUTINE WAITS FOR

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THE OTHER PROCESSOR TO DROP THE READ REQUEST BEFORE
REQUESTING READ PRIVLAGES HIMSELF.

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:PROGRAM BY BOB BRAIN

	SWITCH	USE
	SW15= 100000	: HALT ON ERROR
	SW14= 40000	: HANG ON CURRENT SEGMENT
	SW13= 20000	: INHIBIT ERROR TYPEOUTS
	SW12= 10000	
	SW11= 4000	
	SW10= 2000	: 0 - BELL ON PASS COMPLETE
		: 1 - BELL ON ERROR
	SW9= 1000	: INHIBIT USE OF MEMORY EXPANSION DEVICE
	SW8= 400	: TRACE BANK UNDER TEST
	SW7= 200	: HALT ON LOAD COMPLETE

	BIT	WCSRA
	15	A ERROR
	14	B TIME OUT
	13	B ACLO
	12	B NEW DATA
	11	B DATA 3
	10	B DATA 2
	9	B DATA 1
	8	A TRANS ENABLE
	7	B TRANS ENABLE
	6	A I/E
	5	A DATA 3
	4	A DATA 2
	3	A DATA 1
	2	B WRITE ENABLE
	1	A WRITE ENABLE
	0	A NEW DATA

:FUNCTIONS (IN THE COMMUNICATION BITS)

	FUNCTION	MEANING
	CLEAR= 01	: NOP - CLOSE WINDOW
	READ= 11	: READ ONLY
	WRITE= 21	: WRITE ONLY
	R.W= 31	: READ/WRITE
	BANK= 41	: BANK SELECT

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⋮ FUTURE USE
⋮ GET READY FOR FUNCTION

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374 ;LOADING PROCEDURE:
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376 ;1) LOAD THE ABS LOADER IF NOT IN MEMORY
377 ;2) LOAD PROGRAM WITH ABS LOADER
378 ;3) LOAD ADDRESS 510
379 ;4) START
380 ;5) LOAD ADDRESS *500 IN OTHER MACHINE (* = WINDOW ADDRESS)
381 ;6) START
382
383 104400 SCOPE= TRAP
384 104000 HLT= EMT
385 000004 TYPE= IOT
386 177776 PS= 177776
387 177570 SWR= 177570
388 177570 DISPLAY=SWR
389 000007 BELL= 7
390 000000 RO= %0
391 000001 R1= %1
392 000002 R2= %2
393 000003 R3= %3
394 000004 R4= %4
395 000005 R5= %5
396 000005 TTY= %5
397 000006 SP= %6
398 000007 PC= %7
399 000000 N= 0
400
401 000000 .= 0 ;TRAP CATCHER FROM 0 - 776
402
403 000200 .= 200
404
405 000200 000137 001026 JMP @#BEGIN ;JUMP TO BEGINING ADDRESS OF PROGRAM
406
407 :STARTING ADDRESS OF MASTER
408
409 000210 .= 210
410 000210 012737 000240 006660 MOV #240,@#DOF2
411 000216 012737 000240 006362 MOV #240,@#DOF2+2
412 000224 012737 000240 007106 MOV #240,@#DOF5
413 000232 000137 001026 JMP @#BEGIN
414
415 000500 .= 500
416
417 000500 000167 000010 JMP GETCOR ;GET THE PROGRAM
418 000504 000137 000562 JMP @#LOADR ;RESTORE THE LOADER
419 000510 000137 011026 JMP @#OPEN ;OPEN THE WINDOW
420
421 ;THIS ROUTINE IS USED BY THE OTHER PROCESSOR TO LOAD THE PROGRAM
422 ;INTO ITSELF. IT IS RUN AT LOAD TIME ONLY BY LOADING THE STARTING
423 ;ADDRESS OF THE WINDOW PLUS 500 INTO THE SWITCHES. THEN DO A LOAD
424 ;ADDRESS AND HIT START. THE OTHER PROCESSOR WILL THEN EXECUTE THE
425 ;FOLLOWING CODE.
426
427 000514 010701 GETCOR: MOV PC,R1 ;SET WINDOW ADDRESS
428 000516 000005 RESET ;CLEAR THE WORLD
429 000520 162701 000516 SUB #GETCOR+2,R1 ;RELOCATE

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430	000524	005000			CLR	RO		; SETUP FOR TRANSFER
431	000526	012120			MOV	(1)+,(0)+		; GET IT
432	000530	022700	017500		CMP	#17500,RO		; END?
433	000534	001374			BNE	1\$; NO - LOOP
434	000536	032737	000200	177570	BIT	#SW7,#SWR		; CHECK FOR HALT ON LOAD COMPLETE
435	000544	001401			BEQ	+.4		; CONTINUE
436	000546	000000			HALT			; WAIT FOR CONTINUE
437	000550	012767	000240	010306	MOV	#NOP,BR.		; MAKE IT EXECUTE A JMP #BEGIN
438	000556	000137	001025		JMP	#BEGIN		; START THE TEST

; IF YOU WISH TO RESTORE THE ABSOLUTE LOADER, LOAD THE ADDRESS OF
; THE FOLLOWING ROUTINE AND HIT START. THE PROCESSOR WILL HALT WHEN
; COMPLETE.

439	000562	004767	010714		LOADR:	JSR	PC,LOORES	; RESTORE THE LOADER
440	000566	000000				HALT		

```

447      001000      . =      1000
448
449      001000      000000      ICNT:      0
450      001002      000500      ERRORS:     0
451      001004      000000      000000      PCNT:      0,0
452      001010      000000      LAD:      0
453      001012      000000      HLTADR:   0
454      001014      000000      MX:      0
455      001016      000000      MIN:     0
456      001020      000000      LIMIT:   0
457      001022      000000      OLIM:    0
458      001024      000000      OPTION:  0
459
460
461      001026      005037      000006      BEGIN:    CLR      206
462      001032      005067      010126      CLR      CFLAG
463      001036      012706      000500      MOV      #500,SP
464      001042      012737      011572      000020      MOV      #IOTS,20
465      001050      012737      000340      000022      MOV      #340,22
466      001056      012737      012346      000024      MOV      #PDOWNS,24
467      001064      012737      000340      000026      MOV      #340,26
468      001072      012737      006252      000034      MOV      #TRAPS,34
469      001100      012737      000340      000036      MOV      #340,36
470      001106      012777      000340      010264      MOV      #340,2ACTRAP+2
471      001114      012777      000340      010252      MOV      #340,2RFTRAP+2
472      001122      012777      000340      010254      MOV      #340,2RFTRAP+2
473      001130      012777      000340      010252      MOV      #340,2RKTRAP+2
474      001136      012777      000340      010250      MOV      #340,2TCTRAP+2
475      001144      012777      000340      010246      MOV      #340,2THTRAP+2
476      001152      012737      007614      000250      MOV      #MMERR,250
477      001160      012737      000340      000252      MOV      #340,252
478      001166      004767      006324      JSR      PC,BANK
479      001172      012767      011122      176660      MOV      #READR,60
480      001200      015067      177612      CLR      MIN
481      001204      012767      000000      177602      MOV      #0,MX
482      001212      005067      006226      CLR      MEMORY
483      001216      005067      010052      CLR      NOTRD
484      001222      005067      177576      CLR      OPTION
485      001226      022767      177777      010036      CMP      #-1,ONCE
486      001234      001402      BEQ      IS
487      001236      000167      001322      JMP      REDO
488      001242      032737      001000      177570      1S:      BIT      #SW9,2SWR
489      001250      001007      BNE      SIZEIT
490      001252      012737      001270      000004      MOV      #SIZEIT,204
491      001260      005767      176306      TST      SRO
492      001264      105167      177534      COMB    OPTION

```

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; LH = ITERATION COUNT ; RH = TEST NO.
; ERROR COUNT
; 2 WORD PASS COUNT
; LOOP ADDRESS FOR SCOPE
; LAST HLT INSTRUCTION ADD. EXECUTED
; SEGMENT UNDER TEST
; FIRST BANK
; LAST BANK
; OTHER MACHINE LIMIT
; OPTION - GT = KTI1

; HALT
; CLEAR CONTROL "C" FLAG
; SET STACK TO ** 500 **
; LOAD IOT VECTOR
; LOCK UP
; LOAD PF VECTOR
; LOCK UP
; SET FOR TRAP
; LOCK UP WORLD
; BR5
; BR5
; BR5
; BR5
; BR6
; BR5
; SET FOR MEMORY MANAGEMENT ERROR
; BR7
; ENABLE TRAP ON MEMORY PARITY ERRORS
; KEYBOARD VECTOR
; RESET MINIMUM BANK
; INIT
; WHICH MEMORY BEING CHECKED

; TYPE THE OPTION
; IS THIS FIRST TIME THRU?
; BRANCH IF YES

; INHIBIT USE OF MEMORY EXTENTION DEVICE
; SKIP
; SET FOR TIMEOUT
; CHECK FOR KTI1
; OPTION IS KTI1

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493 001270 012737 000006 000004 SIZEIT: MOV      #6,2#4      ;RESET FOR MEM
494 001276 005067 007766          CLR      MMN        ;CLEAR MEMORY MANAGEMENT FLAG
495 001302 005767 177516          TST     OPTION     ;WHICH OPTION AM I
496 001306 001016          BNE     DOSEG      ;MUST HAVE MEMORY MANAGEMENT
497
498
499
500
501
502
503
504 001310 012737 001342 000004 DDCORE: MOV      #25,2#4     ;SET FOR MEM
505 001316 012701 017776          MOV     #17776,R1   ;SET UP ADDRESS
506 001322 005000          CLR     RO          ;SET UP BANK COUNT
507 001324 062701 020000 1$:  ADD     #20000,R1   ;MOVE TO NEXT BANK
508 001330 005200          INC     RO          ;INC THE BANK COUNT
509 001332 005711          TST     (1)        ;TIMEOUT?
510 001334 022701 177776 2$:  CMP     #177776,R1  ;END?
511 001340 001371          BNE     1$         ;LOOP IF NOT AT THE END
512 001342 000432          BR     TYPEIT      ;TYPE IT
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516
517
518 001344 104446          DOSEG: MAPIT       ;SETUP MEMORY MANAGEMENT REGISTERS
519 001346 005267 176220          INC     SR0        ;TURN ON MEMORY MANAGEMENT
520 001352 012767 000200 170764          MOV     #200,KIPAR2 ;INIT TO BANK 1
521 001360 012737 001410 000004          MOV     #25,2#4    ;SET TIMEOUT ADDRESS FOR CORE CALCULATIONS
522 001366 005737 057776 1$:  TST     #57776     ;TRAP ON NON EX MEM
523 001372 062767 000200 170744          ADD     #200,KIPAR2 ;GO TO NEXT BANK
524 001400 022767 007600 170736          CMP     #7600,KIPAR2 ;LAST ONE?
525 001406 003367          BGT     1$        ;TRY NEXT
526 001410 016700 170730 2$:  MOV     KIPAR2,RO   ;SAVE PAR2 IN RO
527 001414 006300          ASL     RO        ;*ASK #-7,RO*
528 001416 000300          SWAB    RO        ;KLUDGY ISN'T IT
529 001420 042700 177740          BIC     #177740,RO ;CLEAR JUNK
530 001424 005067 176142          CLR     SR0        ;TURN IT OFF
531
532
533 001430 005300          TYPEIT: DEC     RO   ;DROP BACK
534 001432 012737 000006 000004          MOV     #6,2#4     ;SET FOR MEM
535 001440 012706 000500          MOV     #500,SP    ;CLEAR STACK **500**
536 001444 005267 007622          INC     ONCE       ;TYPE THE OPTION ONLY ONCE
537 001450 004767 007752          JSR     7,LODGET   ;GET THE LOADER ONLY THE FIRST TIME
538 001454 000004 001460          TYPE     +2       ;.ASCIZ <15><12><12>"MAINDEC-11-DZDAB-A"<15><12><12>"BAN
539 001524 010005          MOV     RO,TTY     ;TYPE RO IN OCTAL
540 001526 004767 010400          JSR     PC,PRINTS ;AND SUPPRESS LEADING ZERO'S
541 001532 000004 001536          TYPE     +2       ;.ASCIZ "EXIST"
542 001546 005767 177252          TST     OPTION     ;WHICH OPTION?
543 001552 001410          BEQ     NOKT      ;GET OUT IF NONE
544 001554 000004 001560          TYPE     ,.+2     ;.ASCIZ " WITH KT11"

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SETUP, CORE, AND OPTION SCAN

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543 001574 010067 177220      NOKT:  MOV      RO,LIMIT      :SAVE SIZE
544 001600 000004 001604      TYPE      ,.+2      :.ASCIZ (15)<(12)<(12)
545 001610 012737 001624 000004 3$:  MOV      #7$ ,R4      :SET FOR TRAPPING
546 001616 005777 007414      TST      @WCSRA      :IS THE ADDRESS LEGAL
547 001622 000440      BR       FNDCSR      :YES
548 001624 022626      CMP      (6)+,(6)+   :CLEAR STACK
549 001626 012767 164000 007402 7$:  MOV      #164000,WCSRA :SET WCSRA FOR SCANNING
550 001634 012701 000010      MOV      #8 ,R1      :SET COUNT
551 001640 012737 001654 000004 6$:  MOV      #5$ ,R4      :SET FOR TIMEOUT
552 001646 005777 007364      TST      @WCSRA      :IS IT THERE?
553 001652 000424      BR       FNDCSR      :YES - GET OUT
554 001654 022626      CMP      (6)+,(6)+   :CLEAR STACK
555 001656 062767 000020 007352 5$:  ADD      #20,WCSRA    :BUMP ADDRESS
556 001654 005301      DEC      R1          :DEC COUNT
557 001656 001367      BNE      6$         :LOOP UNTIL FOUND
558 001670 000004 001674      TYPE      ,.+2      :.ASCIZ "WCSRA NOT FOUND"<(15)<(12)<(12)
559 001720 000000      HALT
560 001722 000732      BR       3$         :TRY IT AGAIN

```

```

;THIS ROUTINE WILL DETERMINE WHERE THE WINDOW'S REGISTERS ARE AND
;THEN PROCEED TO TYPE OUT ITS FUNCTIONAL PARAMETERS. IT ALSO DETERMINES
;WHETHER OR NOT MEMORY MANAGEMENT IS REQUIRED. IF SO, IT SETS UP THE
;NECESSARY MEMORY MANAGEMENT REGISTERS.

```

```

569 001724      FNDCSR:
570 001724 000004 001730      TYPE      ,.+2
571 001742 016705 007270      MOV      WCSRA,TTY   :.ASCIZ "WCSRA = "
572 001746 004767 010150      JSR      PC,PRINTR   :TYPE WCSRA IN OCTAL
573 001752 000004 001756      TYPE      ,.+2      :TYPE LEADING ZERO'S
574 001762 000402      BR       32$        :.ASCIZ "
575 001764 000000      HALT      31$:      :SKIP TRAP AREA
576 001766 022626      CMP      (6)+,(6)+   :WINDOW ADDRESS TIMED OUT
577 001770 012737 001764 000004 32$:  MOV      #31$ ,R4     :CLEAR STACK
578 001776 016700 007234      MOV      WCSRA,RO    :SET 4 FOR TIMEOUT
579 002002 012701 011240      MOV      @WDRAR,R1   :GET THE FIRST ADDR
580 002006 005720      TST      (0)+       :GET TABLE ADDRESS
581 002010 010021      MOV      RO,(1)+    :ADD 2
582 002012 022701 011256      CMP      @WVECA,R1   :GET THE DATA
583 002016 001373      BNE      50$        :END?
584 002020 012737 000006 000004 21$:  MOV      #6 ,R4      :LOOP UNTIL DONE
585 002026 012777 177777 007212 21$:  MOV      #-1,@WARRAR :RESET 4
586 002034 017700 007206      MOV      @WARRAR,RO  :FIND THE WINDOW SIZE
587 002040 010067 007222      MOV      RO,SIZE    :SAVE THE SIZE
588 002044 005400      NEG      RO         :SAVE THE SIZE FOR POSTERITY
589 002046 000300      SWAB      RO       :BUMP IT TO 1 BIT ONLY
590 002050 006200      ASR      RO         :GET UPPER BITS
591 002052 005001      CLR      R1        :MOVE IT INTO POSITION
592 002054 005700      FN01:  TST      RO        :INIT FOR OFFSET
593 002056 001404      BEQ      43$       :IS IT 0
594 002060 006200      ASR      RO        :YES - GET OUT
595 002062 062701 000002      ADD      #2,R1     :COUNT BITS
596 002066 000772      BR       FN01     :KEEP COUNT
597 002070 016167 011212 007132 43$:  MOV      WIND(1),SIZ :LOOP
598 002076 010167 007132      MOV      R1,OFFSET  :GET THE SIZE
                        :SAVE OFFSET

```

599	002102	000004	011230			TYPE	,SIZ	:TYPE THE WINDOW SIZE
600	002106	000004	002112			TYPE	.+2	:ASCIZ "K WINDOW AT "
601	002130	017700	007114			MOV	2WADRAX,RO	:GET WINDOW ADDRESS
602	002134	005067	176654			CLR		:GET READY TO TYPE
603	002140	012701	000005			MOV	#5,R1	:INIT COUNT
604	002144	006300		52\$:		ASL	RO	:MOVE IT LEFT
605	002146	006167	176642			ROL	MX	:PICK UP DROPPED BIT
606	002152	005301				DEC	R1	:COUNT IT
607	002154	001373				BNE	52\$:LOOP UNTIL 0
608	002156	017700	007066			MOV	2WADRAX,RO	:GET AGAIN
609	002162	006300				ASL	RO	:GET FOR
610	002164	006300				ASL	RO	:TYPING
611	002166	010067	007070			MOV	RO,WADRA	:SAVE THE WINDOW ADDRESS
612	002172	010005				MOV	RO,TTY	:TYPE RO WITH MX AS 18 BIT ADDRESS
613	002174	004767	007756			JSR	PC,PRINTA	:GO TO ADDRESS PRINTER
614	002200	005067	007060			CLR	EMBITS	:CLEAR EXTENDED MEMORY BITS
615	002204	017700	007040			MOV	2WADRAX,RO	:GET WINDOW ADDRESS
616	002210	006300				ASL	RO	
617	002212	103003				BCC	1\$:BRANCH IF BIT 17 CLEAR
618	002214	052767	000040	007042		BIS	#40,EMBITS	:SET MEMORY EXTENDED BIT 5
619	002222	006300			1\$:	ASL	RO	
620	002224	103003				BCC	2\$:BRANCH IF BIT 16 CLEAR
621	002226	052767	000020	007030		BIS	#20,EMBITS	:BRANCH IF BIT 16 CLEAR
622	002234	010067	007162		2\$:	MOV	RO,10WAC	
623	002240	012737	002402	000004		MOV	#F02,2#4	:SETUP TIMEOUT TRAP
624	002246	005737	177572			TST	2#SR0	:TEST FOR MM
625	002252	012767	177777	007010		MOV	#-1,MMN	:SET MEMORY MANAGEMENT FLAG
626	002250	005067	170054			CLR	KIPAR0	:MAP TO 0
627	002254	012767	077406	170006		MOV	#77406,KIPDR0	:READ/WRITE 4K
628	002272	012702	000005			MOV	#5,R2	:SET THE COUNT
629	002276	012701	172304			MOV	#KIPDR2,R1	:GET THE ADDRESS
630	002302	012721	077406		47\$:	MOV	#77406,(1)+	:SET THE DPR
631	002306	005302				DEC	R2	:CHECK COUNT
632	002310	001374				BNE	47\$:LOOP
633	002312	012767	007600	170036		MOV	#7600,KIPAR7	:MAP TO BANK 37
634	002320	012767	077406	167770		MOV	#77406,KIPDR7	:READ/WRITE 4K
635	002326	017700	006716			MOV	2WADRAX,RO	:GET ADDRESS
636	002332	006000				ROR	RO	:MAKE
637	002334	006000				ROR	RO	:IT
638	002336	006000				ROR	RO	:PAGE
639	002340	006000				ROR	RO	:ADDRESS
640	002342	042700	170000			BIC	#170000,RO	:CLEAR JUNK
641	002346	010067	167772			MOV	RO,KIPAR2	:SET IT
642	002352	012702	000004			MOV	#4,R2	:SET THE COUNT
643	002356	012701	172346			MOV	#KIPAR3,R1	:GET ADDRESS
644	002362	062700	000200		57\$:	ADD	#200,RO	:GO TO NEXT
645	002366	010021				MOV	RO,(1)+	:SET IN THE ADDRESS
646	002370	005302				DEC	R2	:COUNT
647	002372	001373				BNE	57\$:LOOP
648	002374	012767		006660		MOV	#40000,WADRA	:FUDGE ADDRESS
649	002402	012767		000004	FND2:	MOV	#6,2#4	:RESET 4
650	002410		005636			MOV	2WVARA,RO	:GET VECTOR ADDRESS
651			002420			TYPE	.+2	:ASCIZ " VECTOR = "
652			001000			CMP	#1000,RO	:CHECK FOR UNDER 1000
						BLT	25\$:GO TO ERROR ROUTINE
	002444	022700	000136			CMP	#136,RO	:CHECK FOR OVER 136

655	002450	002402				BLT	265		: SKIP IF IN RANGE
656	002452	000000			255:	HALT			: VECTOR IS NOT BETWEEN 140-776
657	002454	000411				BR	FND3		: GET OUT IF CONTINUED
658	002456	010067	006574		265:	MOV	RO,WVECA		: SAVE THE VECTOR ADDRESS
659	002462	005720				TST	(0)+		: ADD 2
660	002464	010067	006570			MOV	RO,WVECA+2		: SET UP STATUS
661	012470	017705	006556			MOV	2WVARA,TTY		: TYPE 2WVARA IN OCTAL
662	002474	004767	007432			JSR	PC,PRINTS		: AND SUPPRESS LEADING ZERO'S
663	002500	012767	170000	006716	FND3:	MOV	#-4096.,WRDCNT		: SETUP MAXIMUM WORDCOUNT
664	002506	032767	000400	006552		BIT	#400,SIZE		: IS WINDOW?
665	002514	001404				BEQ	IS		: BRANCH IF NO
666	002516	012767	177000	006700		MOV	#-512.,WRDCNT		: LIMIT WORDCOUNT TO 512
667	002524	000417				BR	REDO		
668	002526	032767	001000	006532	15:	BIT	#1000,SIZE		: 1K WINDOW?
669	002534	001404				BEQ	25		: BRANCH IF NO
670	002542	012767	176000	006660		MOV	#-1024.,WRDCNT		: LIMIT WORDCOUNT TO 1000
671	002544	000407				BR	REDO		
672	002546	000767	002000	006512	25:	BIT	#2000,SIZE		: 2K WINDOW?
673	002554	001403				BEQ	REDO		: BRANCH IF NO
674	002556	012767	174000	006640		MOV	#-2048.,WRDCNT		: LIMIT WORDCOUNT TO 2K
675	002564	012777	010404	006464	REDO:	MOV	#WINDOW,WVECA		: SET WINDOW VECTOR
676	002572	005037	177776			CLR	2#PS		: LOWER PROCESSOR STATUS
677	002576	012777	000340	006454		MOV	#340,WVECA+2		: HALT ADDRESS
678	002604	042777	100000	006424		BIC	#100000,2WCSRA		: KILL ERROR
679	002612	052777	000100	006416		BIS	#100,2WCSRA		: I/E
680	002620	012737	000340	000006		MOV	#340,2#6		: BR7
681	002626	005767	006436			TST	MMN		: MEMORY MANAGEMENT NEEDED?
682	002632	001403				BEQ	IS		: BRANCH IF NO
683	002634	012737	000001	177572		MOV	#1,2#SRO		: TURN ON MEMORY MANAGEMENT
684	002642	032767	004000	006416	15:	BIT	#4000,SIZE		: IS WINDOW OVER 4K?
685	002650	001006				BNE	TTYIN		: BRANCH IF NO
686	002652	042767	020000	006402		BIC	#20000,WADRA		
687	002660	042767	020000	006534		BIC	#20000,IOWAD		

;THE FOLLOWING CODE WILL DETERMINE WHICH TEST THE OPERATOR SELECTED
;AND TRANSFER CONTROL TO IT. IF THE COMMAND CANNOT BE INTERPRETED,
;IT WILL TYPE A LIST OF AVAILABLE COMMANDS.

```

688
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691
692 002666 012737 010326 000004 TTYIN: MOV #TRAP4,2#4 ;SET UP TRAP IF NO DEVICE
693 002674 000004 002700 TYPE .+2 ;ASCIZ <15><12><12>"*"
694 002706 004767 007034 JSR PC,READS ;INPUT DATA FROM TTY
695 002712 004767 006610 JSR PC,CONTC ;CHECK FOR RESTART
696 002716 012737 000340 177776 MOV #340,2#PS ;LOCK UP THE WORLD
697 002724 104450 000001 FUNCTN CLEAR ;REQUEST WINDOW IN CLEAR MODE
698 002730 005077 006304 CLR 2#D8RA ;BANK 0
699 002734 104450 000041 FUNCTN ,BANK ;REQUEST WINDOW IN BANK MODE
700 002740 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
701 002744 016700 006312 MOV #WORA,RO ;SET WINDOW ADDRESS
702 002750 016067 001020 176044 MOV LIMIT(0),OLIM ;GET THE SIZE
703 002756 032767 004000 006302 BIT #4000,SIZE ;4K WINDOW?
704 002764 001026 BNE 2$ ;BRANCH IF 4K OR LESS
705 002766 032767 010000 006272 BIT #10000,SIZE ;8K WINDOW?
706 002774 001403 BEQ 1$ ;BRANCH IF NO
707 002776 006267 176020 ASR OLIM ;CONVERT BANKS TO WINDOW SEGMENTS
708 003002 000417 BR 2$
709 003004 032767 020000 006254 1$: BIT #20000,SIZE ;16K WINDOW?
710 003012 001405 BEQ 3$ ;BRANCH IF NO
711 003014 006267 176002 ASR OLIM ;CONVERT BANKS TO WINDOW SEGMENTS
712 003020 006267 175776 ASR OLIM
713 003024 000406 BR 2$
714 003026 006267 175770 3$: ASR OLIM ;CONVERT BANKS TO WINDOW SEGMENTS
715 003032 006267 175764 ASR OLIM
716 003036 006267 175760 ASR OLIM
717 003042
718 003042 104450 000001 FUNCTN CLEAR ;REQUEST WINDOW IN CLEAR MODE
719 003046 012737 003466 000004 RTPF: MOV #MODEV,2#4 ;SET UP TRAP IF NO DEVICE
720 003054 012706 000500 MOV #500,SP ;RESET THE STACK ** 500 **
721 003060 005037 177776 CLR 2#PS ;DROP PRIORITY
722 003064 052737 000100 177560 BIS #100,2#177560 ;IE THE TTY
723 003072 042777 100000 015136 BIC #100000,2#CSRA ;KILL ERROR
724 003100 052777 000100 006130 BIS #100,2#CSRA ;I/E
725 003106 022767 041522 006736 CMP #*RC,INPUT ;CHECK FOR RC11
726 003114 001010 BNE T1 ;TRY NEXT
727 003116 012777 004164 006252 MOV #TRP.RC,2#CTRAP ;SET RC VECTOR
728 003124 052777 000100 006156 BIS #100,2#RCS ;TURN ON INTERRUPT
729 003132 000167 005154 JMP WAIT ;GO TO WAIT
730 003136 022767 050122 006706 T1: CMP #*RP,INPUT ;CHECK FOR RP11
731 003144 001010 BNE T2 ;TRY NEXT
732 003146 012777 004624 006226 MOV #TRP.RP,2#RPTRAP ;SET RP VECTOR
733 003154 052777 000100 006140 BIS #100,2#RCS ;TURN ON INTERRUPT
734 003162 000167 005124 JMP WAIT ;GO TO WAIT
735 003166 022767 043122 006656 T2: CMP #*RF,INPUT ;CHECK FOR RF11
736 003174 001010 BNE T3 ;TRY NEXT
737 003176 012777 003676 006166 MOV #TRP.RF,2#RFTRAP ;SET RF VECTOR
738 003204 052777 000100 006064 BIS #100,2#RCS ;TURN ON INTERRUPT
739 003212 000167 005074 JMP WAIT ;GO TO WAIT
740 003216 022767 043522 006626 T3: CMP #*RK,INPUT ;CHECK FOR RK11
741 003224 001010 BNE T4 ;TRY NEXT
742 003226 012777 005004 006152 MOV #TRP.RK,2#RKTRAP ;SET RK VECTOR
743 003234 052777 000100 006074 BIS #100,2#RCS ;TURN ON INTERRUPT

```

MAINDEC-11-DZDAB-A
DZDABA.P11

BUS WINDOW EXERCISER
TTY INPUT AREA

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744	003242	000167	005044			JMP	WAIT	:GO TO WAIT
745	003246	022767	046524	006576	T4:	CMP	#TM, INPUT	:CHECK FOR TM11
746	003254	001010				BNE	T5	:TRY NEXT
747	003256	012777	005772	006132		MOV	#TRP.TM, @TMTRAP	:SET TM VECTOR
748	003264	052777	000100	006070		BIS	#100, @TMCS	:TURN ON INTERRUPT
749	003272	000167	005014			JMP	WAIT	:GO TO WAIT
750	003276	022767	041524	006546	T5:	CMP	#TC, INPUT	:CHECK FOR TC11
751	003304	001013				BNE	T6	:TRY NEXT
752	003306	012777	005314	006076		MOV	#TRP.TC, @TCRAP	:SET TC VECTOR
753	003314	012767	000010	002436		MOV	#10, TC.TA	:INITIALIZE STARTING BLOCK
754	003322	052777	000100	006020		BIS	#100, @TCCS	:TURN ON INTERRUPT
755	003330	000167	004756			JMP	WAIT	:GO TO WAIT
756	003334	022767	054105	006510	T6:	CMP	#EX, INPUT	:CHECK FOR EXECUTE CODE
757	003342	001005				BNE	T9	:GO TO NEXT
758	003344	012737	010326	000004		MOV	#TRAP4, @#4	:RESET 4
759	003352	000167	000162			JMP	EXCODE	:EXECUTE THE CODE
760	003356				T9:			
761	003356	000004	003362			TYPE	A.+2	:ASCIZ <15><12><12>"PC11, RP11, RF11, RK11, TM11, TC11,
762	003456	005037	177560			CLR	@#177560	:ID THE TTY
763	003462	000167	177200			JMP	TTYIN	:LOOP AND TRY AGAIN

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773

003466 005037 177776
003472 000004 003476
003502 000004 012052
003506 000004 003512
003534 000137 002564

; THIS ROUTINE IS ENTERED IF THE OPERATOR SELECTS A DEVICE WHICH
; DOES NOT EXIST.

NODEV: CLR @#PS ; LOWER PROCESSOR STATUS
TYPE ,+2 ; .ASCIZ <15><12><12>
TYPE ,INPUT ; TYPE DEVICE NAME
TYPE ,+2 ; .ASCIZ " DOES NOT EXIST" <15><12>
JMP @#REDO ; RETURN TO TTY INPUT MODE

```

774      ; THE FOLLOWING CODE PERFORMS THE EXECUTE COMMAND. IT WILL MOVE
775      ; THE LITTLE PROGRAM STARTING AT "CODE" THRU THE WINDOW TO THE OTHER
776      ; PROCESSOR AND THEN EXECUTE THE CODE IN THE OTHER PROCESSOR'S MEMORY.
777      ; IT WILL EXECUTE THE CODE IN ALL AVAILABLE BANKS OF THE OTHER PROCESSOR.
778
779

```

```

780 003540 012737 000340 177776 EXCODE: MOV      #340, @#PS      ; LOCK UP THE WORLD
791 003546 104444          NEXT          ; GET THE NEXT BANK
782 003550 104450 000031  FUNCTN    , R.W      ; REQUEST WINDOW IN R.W MODE
783 003554 016700 005502  MOV      @ADRA, R0    ; GET ADDRESS OF WINDOW
784 003560 012701 003626  MOV      @CODE, R1    ; GET ADDRESS OF CODE
785 003564 012120          IS:      MOV      (1)+, (0)+    ; MOVE THE WORLD
786 003566 022701 003672  CMP      @ENDC+2, R1  ; END?
787 003572 001374          BNE      IS          ; LOOP UNTIL DONE
788 003574 016701 005462  MOV      @ADRA, R1    ; GET ADDRESS OF WINDOW
789 003600 062701 000043  ADD      @ENDC-CODE+1, R1 ; GET ENDC ADDRESS AND ODD
790 003604 004777 005452  JSR      PC, @ADRA    ; EXECUTE THE CODE
791 003610 104450 000001  FUNCTN    CLEAR      ; REQUEST WINDOW IN CLEAR MODE
792 003614 005037 177776  CLR      @#PS        ; DROP THE Prio TO 0
793 003620 004767 005702  JSR      PC, @CONTC   ; CHECK FOR RESTART
794 003624 000745          BR       EXCODE      ; LOOP FOR EVER
795
796
797

```

```

798 003626 105421 CODE:  NEG8   (1)+    ; THIS
799 003630 106041  RORB   -(1)      ; CODE
800 003632 105421  NEG8   (1)+    ; IS
801 003634 106141  RORB   -(1)      ; WORST
802 003636 106121  RORB   (1)+    ; CASE
803 003640 105441  NEG8   -(1)      ; BUS
804 003642 106021  RORB   (1)+    ; NOISE
805 003644 105441  NEG8   -(1)      ; TO
806 003646 105421  NEG8   (1)+    ; CAUSE
807 003650 106041  RORB   -(1)      ; HAVIC
808 003652 105421  NEG8   (1)+    ; ON
809 003654 106141  RORB   -(1)      ; THE
810 003656 106121  RORB   (1)+    ; U
811 003660 105441  NEG8   -(1)      ; NI
812 003662 106021  RORB   (1)+    ; BUS
813 003664 105441  NEG8   -(1)      ; !!!!!
814 003666 000207  RTS      PC      ; RETURN
815

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816 003670 000000 ENDC:  0          ; DATA BUFFER AREA
817
818

```

```

819 ;ENTERED WHEN INTERRUPTED BY A READ COMMAND IT WILL THEN
820 ;ISSUE A WRITE COMMAND.
821
822 003672 104410 W.RF: CHK.RF ;CHECK FOR ERRORS
823 003674 104430 CKDATA ;CHECK CORE
824
825 ;ENTERED HERE INITIALLY BY THE COMMAND INTERPRETER.
826
827 003676 005077 005374 TRP.RF: CLR 2RFCS ;CLEAR INT ENB
828 003702 004767 005620 JSR PC,CONTC ;CHECK FOR RESTART
829 003706 104404 CORE ;LOAD CORE WITH DATA
830 003710 012777 003746 005454 MOV #C.RF,2RFTRAP ;'CHECK' TRAP ADDRESS
831 003716 016777 005502 005356 MOV WRCNT,2RFWC ;WORD COUNT
832 003724 005077 005356 CLR 2RFDA ;DSK ADDRESS
833 003730 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
834 003734 104440 .START ;LOAD CURRENT ADDRESS & IE!3 AND GO
835 003736 011304 000103 011276 RFCA,100!3,RFCS
836 003744 000002 RTI
837
838 ;ENTERED WHEN INTERRUPTED BY A WRITE COMMAND. IT WILL THEN
839 ;ISSUE A WRITECHECK COMMAND.
840
841 003746 104410 C RF: CHK.RF ;CHECK FOR ERRORS
842 003750 012777 004006 005414 MOV #R.RF,2RFTRAP ;'READ' TRAP ADDRESS
843 003756 016777 005442 005316 MOV WRCNT,2RFWC ;WORD COUNT
844 003764 005077 005316 CLR 2RFDA ;DSK ADDRESS
845 003770 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
846 003774 104440 .START ;LOAD CURRENT ADDRESS & IE!7 AND GO
847 003776 011304 000107 011276 RFCA,100!7,RFCS
848 004004 000002 RTI
849
850 ;ENTERED WHEN INTERRUPTED BY A WRITECHECK COMMAND. IT WILL
851 ;THEN ISSUE A READ COMMAND.
852
853 004006 104410 R.RF: CHK.RF ;CHECK FOR ERRORS
854 004010 104406 COMCOR ;COMPLIMENT CORE
855 004012 012777 003672 005352 MOV #W.RF,2RFTRAP ;'WRITE' TRAP ADDRESS
856 004020 016777 005400 005254 MOV WRCNT,2RFWC ;WORD COUNT
857 004026 005077 005254 CLR 2RFDA ;DSK ADDRESS
858 004032 104450 000021 FUNCTN ,WRITE ;REQUEST WINDOW IN WRITE MODE
859 004036 104440 .START ;LOAD CURRENT ADDRESS & IE!5 AND GO
860 004040 011304 000105 011276 RFCA,100!5,RFCS
861 004046 000002 RTI
862
863 ;CHECK THE STATUS OF THE PREVIOUS OPERATION.
864
865 004050 005067 005114 CH.RF: CLR EX ;CLEAR ERROR FLAG
866 004054 104450 000001 FUNCTN ,CLEAR ;REQUEST WINDOW IN CLEAR MODE
867 004060 005777 005212 TST 2RFCS ;ANY ERRORS?
868 004064 100034 BPL IS ;BRANCH IF NO ERRORS
869 004066 005267 005076 INC EX ;SET ERROR FLAG
870 004072 032737 020000 177570 BIT #SW13,2#SWR ;INHIBIT ERROR TYPEOUT
871 004100 001026 BNE IS ;INHIBIT TYPEOUTS
872 004102 017705 005170 MOV 2RFCS,TTY ;SET TTY FOR TYPING
873 004106 000004 004112 TYPE ,+2 ;ASCIZ <15><12>"RF11 ERROR:"
874 004130 000004 011172 TYPE ,M3 ;TYPE CS

```

875	004134	004767	005762
876	004140	000004	011202
877	004144	017705	005130
878	004150	004767	005746
879	004154	104434	
880	004156	000002	

1S:

JSR	PC,PRINTR
TYPE	M4
MOV	ORFER,TTY
JSR	PC,PRINTR
STOP	
RTI	

:	TYPE	RFC5 IN OCTAL
:	TYPE	ER
:	TYPE	ORFER IN OCTAL
:	TYPE	LEADING ZERO'S
:	HALT	ON ERROR
:	RETURN	

```

881                                     ;ENTERED WHEN INTERRUPTED BY A READ COMMAND. IT WILL THEN
882                                     ;ISSUE A WRITE COMMAND.
883
884 004160 104412 W.RC: CHK.RC ;CHECK FOR ERRORS
885 004162 104430 CKDATA ;CHECK CORE
886
887                                     ;ENTERED HERE INITIALLY FROM THE COMMAND INTERPRETE.
888
889 004164 005077 005120 TRP.RC: CLR ;RCSS ;CLEAR INT ENB
890 004170 004767 00533' JSR PC,CONTC ;CHECK FOR RESTART
891 004174 104404 CORE ;LOAD CORE WITH DATA
892 004176 012777 004'34 005172 MOV ;RC,RC,RCCTRAP ;'CHECK' TRAP ADDRESS
893 004204 016777 00'214 005102 ;V ;WORDCNT,RCWC ;WORD COUNT
894 004212 005077 0'5102 CLR ;RCDA ;DSK ADDRESS
895 004216 104450 'J0011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
896 004222 104440 .START ;LOAD CURRENT ADDRESS & IE!3 AND GO
897 004224 011316 000103 011310 RCCA,100!3,RCCS
898 004232 000002 RTI
899
900                                     ;ENTERED WHEN INTERRUPTED BY A WRITE COMMAND. IT WILL THEN
901                                     ;ISSUE A WRITECHECK COMMAND.
902
903 004234 104412 C.RC: CHK.RC ;CHECK FOR ERRORS
904 004236 012'77 004274 005132 MOV ;RC,RC,RCCTRAP ;'READ' TRAP ADDRESS
905 004244 01'777 005154 005042 MOV ;WORDCNT,RCWC ;WORD COUNT
906 004252 00'077 005042 CLR ;RCDA ;DSK ADDRESS
907 004256 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
908 004262 1'4440 .START ;LOAD CURRENT ADDRESS & IE!7 AND GO
909 004264 01316 000107 011310 RCCA,100!7,RCCS
910 004272 010002 RTI
911
912                                     ;ENTERED WHEN INTERRUPTED BY A WRITECHECK COMMAND. IT WILL THEN
913                                     ;ISSUE A READ COMMAND.
914
915 004274 104412 R.RC: CHK.RC ;CHECK FOR ERRORS
916 004276 104406 COMCOR ;COMPLIMENT CORE
917 004300 012777 004160 005070 MOV ;W.RC,RCCTRAP ;'WRITE' TRAP ADDRESS
918 004306 016777 005112 005030 MOV ;WORDCNT,RCWC ;WORD COUNT
919 004314 005077 005000 CLR ;RCDA ;DSK ADDRESS
920 004320 104450 000021 FUNCTN ,WRITE ;REQUEST WINDOW IN WRITE MODE
921 004324 104440 .START ;LOAD CURRENT ADDRESS & IE!5 AND GO
922 004326 011316 000105 011310 RCCA,100!5,RCCS
923 004334 000002 RTI
924
925                                     ;CHECK THE STATUS OF THE PREVIOUS OPERATION.
926
927 004336 105067 104426 CH.RC: CLR EX ;CLEAR ERROR FLAG
928 004342 04450 000001 FUNCTN ,CLEAR ;REQUEST WINDOW IN CLEAR MODE
929 004346 105777 104736 TST ;RCSS ;ANY ERRORS?
930 004352 110034 BPL IS ;BRANCH IF NO ERRORS
931 004354 015267 004610 INC EX ;SET ERROR FLAG
932 004360 012737 020000 177570 BIT ;SW13,SWR ;INHIBIT ERROR TYPEOUT
933 004366 00'026 BNE IS ;INHIBIT TYPEOUTS
934 004370 01.705 004714 MOV ;RCSS,TTY ;SET TTY FOR TYPING
935 004374 000304 004400 TYPE ,+2 ;ASCIZ <15><12>"RC11 ERROR:"
936 004416 000004 011172 TYPE ,M3 ;TYPE CS

```

MAINDEC-11-DZDAB-A
DZDABA.P11

BJ5 WINDOW EXERCISER
ERROR ROUTINE FOR RC11

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937	004422	004767	005474
938	004426	000004	011202
939	004432	017705	004654
940	004436	004767	005460
941	004442	104434	
942	004444	000002	

IS:

JSR	PC,PRINTR
TYPE	M4
MOV	ORCER,TTY
JSR	PC,PRINTR
STOP	
RTI	

:	TYPE	RCCS IN OCTAL
:	TYPE	ER
:	TYPE	ORCER IN OCTAL
:	TYPE	LEADING ZERO'S
:	HALT	ON ERROR
:	RETURN	

```

943                                     ;ENTERED WHEN INTERRUPTED BY A READ COMMAND. IT WILL THEN
944                                     ;ISSUE A WRITE COMMAND.
945
946 004446 104414 W.RP: CHK.RP ;CHECK FOR ERRORS
947 004450 104430 CKDATA ;CHECK CORE
948 004452 005077 004644 TP.RP: CLR ;RPCS ;CLEAR INT ENB
949 004456 004767 005044 JSR PC,CONTC ;CHECK FOR RESTART
950 004462 104404 CORE ;LOAD CORE WITH DATA
951 004464 012777 004522 004710 MOV ;BC.RP ;RPCTRAP ;'CHECK' TRAP ADDRESS
952 004472 016777 004726 004624 MOV ;WORDCNT,;RPWC ;WORD COUNT
953 004500 005077 004624 CLR ;RPDA ;DSK ADDRESS
954 004504 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
955 004510 104440 .START ;LOAD CURRENT ADDRESS & IE!3 AND GO
956 004512 011326 000103 011322 RPCA,100!3,RPCS
957 004520 000002 RTI
958
959                                     ;ENTERED WHEN INTERRUPTED BY A WRITE COMMAND. IT WILL THEN
960                                     ;ISSUE A WRITECHECK COMMAND.
961
962 004522 104414 C.RP: CHK.RP ;CHECK FOR ERRORS
963 004524 012777 004562 004550 MOV ;R.RP ;RPCTRAP ;'READ' TRAP ADDRESS
964 004532 016777 004666 004564 MOV ;WORDCNT,;RPWC ;WORD COUNT
965 004540 005077 004564 CLR ;RPDA ;DSK ADDRESS
966 004544 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
967 004550 104440 .START ;LOAD CURRENT ADDRESS & IE!7 AND GO
968 004552 011326 000107 011322 RPCA,100!7,RPCS
969 004560 000002 RTI
970
971                                     ;ENTERED WHEN INTERRUPTED BY A WRITECHECK COMMAND. IT WILL THEN
972                                     ;ISSUE A READ COMMAND.
973
974 004562 104414 R.RP: CHK.RP ;CHECK FOR ERRORS
975 004564 104406 CONCOR ;COMPLIMENT CORE
976 004566 012777 004446 004606 MOV ;W.RP ;RPCTRAP ;'WRITE' TRAP ADDRESS
977 004574 016777 004624 004522 MOV ;WORDCNT,;RPWC ;WORD COUNT
978 004602 005077 004522 CLR ;RPDA ;DSK ADDRESS
979 004606 104450 000021 FUNCTN ,WRITE ;REQUEST WINDOW IN WRITE MODE
980 004612 104440 .START ;LOAD CURRENT ADDRESS & IE!5 AND GO
981 004614 011326 000105 011322 RPCA,100!5,RPCS
982 004622 000002 RTI
983
984                                     ;ENTERED HERE INITIALLY FROM THE COMMAND INTERPRETER.
985
986 004624 012777 000011 004470 TRP.RP: MOV ;11,;RPCS ;INITIALIZE
987 004632 105777 004464 TSTB ;RPCS ;ROUTINE
988 004636 100375 BPL ;-4 ;FOR
989 004640 005777 004470 TST ;RPCDS ;THE
990 004644 100375 BPL ;-4 ;RP11
991 004646 005077 004450 CLR ;RPCS ;DISK
992 004652 000677 BR TP.RP ;PACK

```

```

993                                     ;CHECK THE STATUS OF THE PREVIOUS OPERATION.
994
995 004654 005067 004310 CH.RP: CLR EX ;CLEAR ERROR FLAG
996 004660 104450 000001 FUNCTN .CLEAR ;REQUEST WINDOW IN CLEAR MODE
997 004664 005777 004432 TST 2RPCS ;ANY ERRORS?
998 004670 100042 BPL IS ;BRANCH IF NO ERRORS
999 004672 005267 004272 INC EX ;SET ERROR FLAG
1000 004676 032737 020000 177570 BIT #SW13,2#SWR ;INHIBIT ERROR TYPEOUT
1001 004704 001034 BNE IS ;INHIBIT TYPEOUTS
1002 004706 017705 004410 MOV 2RPCS,TTY ;SET TTY FOR TYPING
1003 004712 000004 004716 TYPE ,.+2 ;ASCIZ (15)(12)"RP11 ERROR:"
1004 004734 000004 011172 TYPE M3 ;TYPE CS
1005 004740 004767 005156 JSR PC,PRINTR ;TYPE RPCS IN OCTAL
1006 004744 000004 011202 TYPE M1 ;TYPE ER
1007 004750 017705 004356 MOV 2RPER,TTY ;TYPE 2RPER IN OCTAL
1008 004754 004767 005142 JSR PC,PRINTR ;TYPE LEADING ZERO'S
1009 004760 104434 STOP ;HALT ON ERROR
1010 004762 012777 000001 004332 MOV #1,2RPCS ;LOAD A CLEAR
1011 004770 105777 004326 TSTB 2RPCS ;WAIT FOR
1012 004774 100375 BPL .-4 ;DONE
1013 004776 000002 IS: RTI ;RETURN

```

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BUS WINDOW EXERCISER
RK11 DISK HANDLER

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```

1014 ;ENTERED WHEN INTERRUPTED BY A READ COMMAND. IT WILL THEN
1015 ;ISSUE A WRITE COMMAND.
1016
1017 005000 104416 W.RK: CHK.RK ;CHECK FOR ERRORS
1018 005002 104430 CKDATA ;CHECK CORE
1019
1020 ;ENTERED HERE INITIALLY FROM THE COMMAND INTERPRETER.
1021
1022 005004 005077 004326 TRP.RK: CLR @RKCS ;CLEAR INT ENB
1023 005010 004767 004512 JSR PC,CONTC ;CHECK FOR RESTART
1024 005014 104404 CORE ;LOAD CORE WITH DATA
1025 005016 012777 005054 004362 MOV @C.RK,@RKTRAP ;CHECK TRAP ADDRESS
1026 005024 016777 004374 004310 MOV @RDCNT,@RKWC ;WORD COUNT
1027 005032 005077 004310 CLR @RKDA ;DSK ADDRESS
1028 005036 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
1029 005042 104440 .START ;LOAD CURRENT ADDRESS & IE!3 AND GO
1030 005044 011344 000103 011336 RKCA,100!3,RKCS
1031 005052 000002 RTI
1032
1033 ;ENTERED WHEN INTERRUPTED BY A WRITE COMMAND. IT WILL
1034 ;THEN ISSUE A WRITE CHECK COMMAND.
1035
1036 005054 104416 C.RK: CHK.RK ;CHECK FOR ERRORS
1037 005056 012777 005114 004322 MOV @R.RK,@RKTRAP ;'READ' TRAP ADDRESS
1038 005064 016777 004334 004250 MOV @RDCNT,@RKWC ;WORD COUNT
1039 005072 005077 004250 CLR @RKDA ;DSK ADDRESS
1040 005076 104450 000011 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
1041 005102 104440 .START ;LOAD CURRENT ADDRESS & IE!7 AND GO
1042 005104 011344 000107 011336 RKCA,100!7,RKCS
1043 005112 000002 RTI
1044
1045 ;ENTERED WHEN INTERRUPTED BY A WRITECHECK COMMAND. IT WILL THEN
1046 ;ISSUE A READ COMMAND.
1047
1048 005114 104416 R.RK: CHK.RK ;CHECK FOR ERRORS
1049 005116 104406 COMCOR ;COMPLIMENT CORE
1050 005120 012777 005000 004260 MOV @W.RK,@RKTRAP ;'WRITE' TRAP ADDRESS
1051 005126 016777 004272 004206 MOV @RDCNT,@RKWC ;WORD COUNT
1052 005134 005077 004206 CLR @RKDA ;DSK ADDRESS
1053 005140 104450 000021 FUNCTN ,WRITE ;REQUEST WINDOW IN WRITE MODE
1054 005144 104440 .START ;LOAD CURRENT ADDRESS & IE!5 AND GO
1055 005146 011344 000105 011336 RKCA,100!5,RKCS
1056 005154 000002 RTI
1057
1058 ;CHECK THE STATUS OF THE PREVIOUS OPERATION.
1059
1060 005156 005067 004006 CH.RK: CLR EX ;CLEAR ERROR FLAG
1061 005162 104450 000001 FUNCTN ,CLEAR ;REQUEST WINDOW IN CLEAR MODE
1062 005166 005777 004144 TST @RKCS ;ANY ERRORS?
1063 005172 100042 BPL IS ;BRANCH IF NO ERRORS
1064 005174 005267 003770 INC EX ;SET ERROR FLAG
1065 005200 002737 020000 177570 BIT @SW13,@SWR ;INHIBIT ERROR TYPEOUT
1066 005206 001034 BNE IS ;INHIBIT TYPEOUTS
1067 005210 017705 004122 MOV @RKCS,TTY ;SET TTY FOR TYPING
1068 005214 003004 005220 TYPE ,+2 ;ASCIZ <15><12>"RK11 ERROR:"
1069 005236 003004 011172 TYPE ,M3 ;TYPE CS

```

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DZDABA.P11

BUS WINDOW EXERCISER
ERROR ROUTINE FOR RK11

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1070	015242	004767	004654	JSR	PC, PRINTR	: TYPE RKCS IN OCTAL
1071	015246	000004	011202	TYPE	M4	: TYPE ER
1072	015252	017705	004062	MOV	MARKER, TTY	: TYPE MARKER IN OCTAL
1073	015256	004767	004640	JSR	PC, PRINTR	: TYPE LEADING ZERO'S
1074	015262	104434		STOP		: HALT ON ERROR
1075	015264	012777	000001 004044	MOV	#1, RKCS	: LOAD A CLEAR
1076	015272	105777	004040	TSTB	MARKCS	: WAIT FOR
1077	015276	100375		BPL	.-4	: DONE
1078	015300	000002		RTI		: RETURN

15:

```

1079 ;ENTERED WHEN INTERRUPTED BY A READ COMMAND. IT WILL THEN
1080 ;ISSUE A WRITE COMMAND.
1081
1082 W.TC: CHK.TC ;CHECK FOR ERRORS
1083 CKDATA ;CHECK CORE
1084 005102 104420 000001 004034 MOV #1,@TCCS ;STOP ALL TRANSPORTS
1085
1086 ;ENTERED HERE INITIALLY FROM THE COMMAND INTERPRETER.
1087
1088 TRP.TC: JSR PC,CONTC ;CHECK FOR RESTART
1089 ADD #1,TC.TA ;UPDATE BLOCK
1090 005320 062767 000001 000432
1091 005326 022767 000400 000424 CMP #400,TC.TA
1092 005334 003003 BGT IS
1093 005339 012767 000010 000414 MOV #10,TC.TA
1094 005344 104404 IS: CORE ;LOAD WORST CASE NOISE
1095 005349 104450 FUNCTN ,READ ;REQUEST WINDOW IN READ MODE
1096 005354 104424 SEARCH ,10 ;SEARCH FOR BLOCK
1097 005359 012777 005404 004026 MOV #R.TC,@TCTRAP ;TRAP ADDRESS
1098 005364 016777 004034 003762 MOV #RDCNT,@TCWC ;WORD COUNT
1099 005372 104440 .START
1100 005374 011356 000115 011350 TCCA,115,TCCS
1101 RTI
1102
1103 ;ENTERED WHEN INTERRUPTED BY A WRITE COMMAND. IT WILL THEN
1104 ;ISSUE A READ COMMAND.
1105
1106 R.TC: CHK.TC ;CHECK FOR ERROR
1107 CONCOR ;COMPLIMENT CORE
1108 005410 104450 000021 FUNCTN ,WRITE ;REQUEST WINDOW IN WRITE MODE
1109 005414 104424 000010 SEARCH ,10 ;SEARCH FOR BLOCK
1110 005420 012777 005302 003764 MOV #W.TC,@TCTRAP ;TRAP ADDRESS
1111 005426 016777 003772 003720 MOV #RDCNT,@TCWC ;WORD COUNT
1112 005434 104440 .START
1113 005436 011356 000105 011350 TCCA,105,TCCS
1114 RTI
1115
1116 ;CHECK THE STATUS OF THE PREVIOUS OPERATION.
1117
1118 CH.TC: CLR EX ;CLEAR ERROR FLAG
1119 FUNCTN ,CLEAR ;REQUEST WINDOW IN CLEAR MODE
1120 TST @TCCS ;ANY ERRORS?
1121 BPL IS ;BRANCH IF NO ERRORS
1122 INC EX ;SET ERROR FLAG
1123 BIT #SW13,@SWR ;INHIBIT ERROR TYPEOUT
1124 BNE IS ;INHIBIT TYPEOUTS
1125 005500 011705 003644 MOV @TCCS,TTY ;SET TTY FOR TYPING
1126 005504 000004 005510 TYPE ,+2 ;ASCIZ <15><12>"TC11 ERROR:"
1127 005526 000004 011172 TYPE ,M3 ;TYPE CS
1128 005532 004767 004364 JSR PC,PRINTR ;TYPE TCCS IN OCTAL
1129 005536 000004 011202 TYPE ,M4 ;TYPE ER
1130 005542 011705 003604 MOV @TCER,TTY ;TYPE @TCER IN OCTAL
1131 005546 004767 004350 JSR PC,PRINTR ;TYPE LEADING ZERO'S
1132 005552 104434 STOP ;HALT ON ERROR
1133 005554 012777 000001 003566 MOV #1,@TCCS ;LOAD A CLEAR
1134 005562 016777 003562 TSTB @TCCS ;WAIT FOR
1135 BPL .-4 ;DONE

```

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MAINDEC-11-DZDAB-A
DZDABA.P11

BUS WINDOW EXERCISER
ERROR ROUTINE FOR TC11

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1135 005570 000002

15: RTI

;RETURN

```

1136                                     ;THE FOLLOWING ROUTINE WILL SEARCH FOR THE DESIGNATED
1137                                     ;DEC-TAPE BLOCK. THE DESIRED BLOCK IS STORED IN "TC.TA".
1138
1139 005572 062716 000002 S.TC: ADD #2,(6)
1140 005576 012777 005636 003606 MOV #SC1,@TCRAMP ;TRAP ADDRESS
1141 005604 016767 000150 000144 MOV TC.TA,WANT
1142 005612 162767 000002 000136 SUB #2,WANT ;2 PAST BLOCK
1143 005620 012667 000140 MOV (6)+,RETURN ;SAVE RETURN ADDRESS
1144 005624 005726 TST (6)+
1145 005626 012777 004103 003514 RET11: MOV #4103,@TCCS ;SEARCH REVERSE
1146 005634 000002 RTI
1147
1148 005636 005777 003506 SC1: TST @TCCS ;CHECK FOR ERROR
1149 005642 100010 BPL SC1A ;NO ERRORS
1150 005644 005777 003502 TST @TCER ;CHECK FOR END OF TAPE
1151 005650 100404 BMI IS
1152 005652 104436 ERR3
1153 005654 005767 003304 TST CFLAG ;IS IC TYPED?
1154 005660 001034 BNE SCQ1 ;BRANCH IF TYPED
1155 005662 000405 IS: BR SCF1
1156
1157 005664 026777 100066 003466 SC1A: CMP WANT,@TCDB ;ON BLOCK?
1158 005672 003001 BGT SCF1 ;GO REVERSE
1159 005674 000754 BR RET11 ;CONTINUE AS YOU WERE
1160
1161 005676 012777 005714 003506 SCF1: MOV #SCF2,@TCRAMP ;TRAP ADDRESS
1162 005704 012777 000103 003436 RETR1: MOV #103,@TCCS ;SEARCH FORWARD
1163 005712 000002 RTI
1164
1165 005714 005777 003437 SCF2: TST @TCCS ;ERROR?
1166 005720 100110 BPL SCF1A ;NO ERRORS
1167 005722 005777 003424 TST @TCER ;END OF TAPE?
1168 005726 100414 BMI IS
1169 005730 104432 ERR2
1170 005732 005767 003226 TST CFLAG ;NO
1171 005736 001005 BNE SCQ1 ;IS IC TYPED?
1172 005740 000732 IS: BR RET11 ;BRANCH IF SET
1173 ;SWITCH DIRECTIONS
1174 005742 026777 000012 003410 SCF1A: CMP TC.TA,@TCDB ;RIGHT BLOCK?
1175 005750 001355 BNE RETR1 ;NO
1176 005752 000177 000006 SCQ1: JMP @RETURN
1177
1178 005756 000000 WANT: 0
1179 005760 000000 TC.TA: 0
1180 005762 000000 TC.WC: 0
1181 005764 000000 RETURN: 0

```

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MAINDEC-11-DZDAB-A
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BUS WINDOW EXERCISER
TM11 MAGTAPE HANDLER

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```

1182                                     ;ENTERED WHEN INTERRUPTED BY A READ COMMAND. IT WILL THEN
1183                                     ;ISSUE A WRITE COMMAND.
1184
1185 005766 104422                          W.TM:  CHK.TM                               ;CHECK FOR ERROR
1186 005770 104430                          CKDATA
1187
1188                                     ;ENTERED HERE INITIALLY FROM THE COMMAND INTERPRETER.
1189
1190 005772 005077 003364                    TRP.TM: CLR      @TMCS                      ;CLEAR INT ENB
1191 005776 004767 003524                    JSR      PC,CONTC                          ;CHECK FOR RESTART
1192 006002 104404                          CORE                                       ;SET UP CORE
1193 006004 104426                          REWIND
1194 006006 012777 006074 003402              MOV      @R.TM,@TMTRAP                    ;TRAP ADDRESS
1195 006014 016777 003404 003344              MOV      @WRCNT,@TMBC                     ;BYTE COUNT
1196 006022 006377 003340                    ASL      @TMBC                             ;MAKE BYTE COUNT
1197 006026 104450 000011                    FUNCTN   ,READ                             ;REQUEST WINDOW IN READ MODE
1198 006032 104440                          .START                                     ;LOAD CURRENT ADDRESS & IE!60005 AND GO
1199 006034 011370 060105 011362              TMCA,100!60005,TMCS
1200 006042 000002                          RTI
1201
1202                                     ;REWIND THE TAPE
1203
1204 006044 012777 006070 003344              RW.TM:  MOV      @X.TM,@TMTRAP             ;TRAP ADDRESS
1205 006052 012667 000062                          MOV      (6)+,TMRET                       ;SAVE ADDRESS
1206 006056 005726                          TST      (6)+                              ;RESTORE STACK
1207 006060 012777 060117 003274              MOV      @60117,@TMCS                     ;REWIND
1208 006066 000002                          RTI
1209
1210 006070 000177 000044                    X.TM:   JMP      @TMRET
1211
1212                                     ;ENTERED WHEN INTERRUPTED BY A WRITE COMMAND. IT WILL THEN
1213                                     ;ISSUE A READ COMMAND.
1214
1215 006074 104422                          R.TM:   CHK.TM                               ;ANY ERRORS?
1216 006076 104406                          CONCOR                                       ;COMPLIMENT CORE
1217 006100 104426                          REWIND
1218 006102 012777 005766 003306              MOV      @W.TM,@TMTRAP                    ;TRAP ADDRESS
1219 006110 016777 003310 003250              MOV      @WRCNT,@TMBC                     ;BYTE COUNT
1220 006116 006377 003244                    ASL      @TMBC                             ;MAKE BYTE COUNT
1221 006122 104450 000021                    FUNCTN   ,WRITE                             ;REQUEST WINDOW IN WRITE MODE
1222 006126 104440                          .START                                     ;LOAD CURRENT ADDRESS & IE!60003 AND GO
1223 006130 011370 060103 011362              TMCA,100!60003,TMCS
1224 006136 000002                          RTI
1225
1226 006140 000000                          TMRET:  0
1227
1228                                     ;COME HERE TO CHECK THE STATUS OF THE PREVIOUS OPERATION.
1229
1230 006142 005067 003022                    CH.TM:  CLR      EX                          ;CLEAR ERROR FLAG
1231 006146 104450 000001                    FUNCTN   ,CLEAR                             ;REQUEST WINDOW IN CLEAR MODE
1232 006152 005777 003204                    TST      @TMCS                             ;ANY ERRORS?
1233 006156 100034                          BPL     IS                                 ;BRANCH IF NO ERRORS
1234 006160 005267 003004                    INC     EX                                 ;SET ERROR FLAG
1235 006164 032737 020000 177570              BIT     @SW13,@SWR                         ;INHIBIT ERROR TYPEOUT
1236 006172 001026                          BNE     IS                                 ;INHIBIT TYPEOUTS
1237 006174 017705 003162                    MOV     @TMCS,TTY                          ;SET TTY FOR TYPING

```

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BUS WINDOW EXERCISER
ERROR ROUTINE FOR TM11

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1238	006200	000004	006204
1239	006222	000004	011172
1240	006226	004767	003670
1241	006232	000004	011202
1242	006236	017705	003122
1243	006242	004767	003654
1244	006246	104434	
1245	006250	000002	

15:

TYPE	,+2
TYPE	M3
JSR	PC,PRINTR
TYPE	M4
MOV	JTMR,TTY
JSR	PC,PRINTR
STOP	
RTI	

:	ASCIZ <15><12>"TM11 ERROR:"
:	TYPE CS
:	TYPE TMCS IN OCTAL
:	TYPE ER
:	TYPE JTMR IN OCTAL
:	TYPE LEADING ZERO'S
:	HALT ON ERROR
:	RETURN

```

1246
1247
1248
1249
1250
1251
1252
1253 006252 011605
1254 006254 162705 000002
1255 006260 111505
1256 006262 062705 006304
1257 006266 022705 006354
1258 006272 100401
1259 006274 000175 000000
1260 006300 000000
1261 006302 000776
1262
1263 006304
1264 006304 012506
1265 006306 012526
1266 006310 007446
1267 006312 007724
1268 006314 004050
1269 006316 004336
1270 006320 004654
1271 006322 005156
1272 006324 005446
1273 006326 006142
1274 006330 005572
1275 006332 006044
1276 006334 007140
1277 006336 005446
1278 006340 007336
1279 006342 007754
1280 006344 007354
1281 006346 010122
1282 006350 006356
1283 006352 010244
1284 006354 006602
1285

```

```

; STRAP ;TRAP HANDLER
; THIS ROUTINE DECODES A TRAP CALL AND JUMPS TO THE APROPRATE
; SUBROUTINE. THE CALL IS A "TRAP+N" WHERE N IS A MULTIPLE OF 2.
; THE "SET" MACRO WILL CREATE THE TABLE NEEDED. IT HAS TO
; FOLLOW THIS MACRO.

```

```

TRAPS:  MOV      (6) RS      ;GET TRAP INSTRUCTION
        SUB      #2,RS      ;BACK UP BY 2
        MOV      (5) RS      ;GET THE RIGHT BYTE OF TRAP
        ADD      #ADRTAB,RS  ;INDEX TO TABLE
        CMP      #ENDTAB,RS  ;CHECK FOR END OF TABLE
        BMI      .+4        ;OUT OF BOUNDS
        JMP      @2(5)       ;GO TO ROUTINE
        HALT
        BR       .-2        ;HANG UP

```

```

ADRTAB:  PATCH1      ;DUM1      = TRAP+0      (104400)
        PATCH2     ;DUM2      = TRAP+2      (104402)
        WRAOR      ;CORE      = TRAP+4      (104404)
        WRCADR     ;COMCOR     = TRAP+6      (104406)
        CH.RF      ;CHK.RF     = TRAP+10     (104410)
        CH.RC      ;CHK.RC     = TRAP+12     (104412)
        CH.RP      ;CHK.RP     = TRAP+14     (104414)
        CH.RK      ;CHK.RK     = TRAP+16     (104416)
        CH.TC      ;CHK.TC     = TRAP+20     (104420)
        CH.TM      ;CHK.TM     = TRAP+22     (104422)
        S.TC       ;SEARCH     = TRAP+24     (104424)
        RW.TM      ;REWIND     = TRAP+26     (104426)
        CDATA      ;CKDATA     = TRAP+30     (104430)
        CH.TC      ;ERR2      = TRAP+32     (104432)
        POTS       ;STOP      = TRAP+34     (104434)
        ER3        ;ERR3      = TRAP+36     (104436)
        .BEGIN     ;.START     = TRAP+40     (104440)
        SETBAK     ;SETBAN     = TRAP+42     (104442)
        NXT        ;NEXT      = TRAP+44     (104444)
        MAP        ;MAPIT     = TRAP+46     (104446)
        DOFUN      ;FUNCTN    = TRAP+50     (104450)
ENDTAB=-2

```

M03

MAINDEC-11-DZDAB-A
DZDABA.P11

BUS WINDOW EXERCISER
SUBROUTINES

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```

1286                                     ; THIS ROUTINE WILL DETERMINE WHICH WINDOW SEGMENT WILL BE TESTED
1287                                     ; NEXT. LOCATION "OLIM" CONTAINS THE NUMBER OF WINDOW SEGMENTS
1288                                     ; AVAILABLE IN THE OTHER PROCESSOR. WHEN EXITED, LOCATION "MX"
1289                                     ; WILL CONTAIN THE NUMBER OF THE SEGMENT TO BE TESTED.
1290
1291 006356 032737 040000 177570 NXT:  BIT    #SW14,@#SWR    ; LOOP ON BANK?
1292 006364 001104                BNE    2$          ; SKIP IF LOOP
1293 006366 026767 172422 172426    CMP    MX,OLIM    ; LAST PAGE?
1294 006374 002453                BLT    1$          ; SKIP IF NOT LAST PAGE
1295 006376 032737 002000 177570    BIT    #SW10,@#SWR ; INHIBIT BELL
1296 006404 001002                BNE    5$          ; YES!
1297 006406 000004 000007                TYPE  ,BELL      ; RING THE BELL
1298 006412 016767 172400 172374 5$:  MOV    MIN,MX     ; RESET MX
1299 006420 032767 004000 002640    BIT    #4000,SIZE ; 4K WINDOW OR LESS?
1300 006426 001402                BEQ    8$          ; BRANCH IF GREATER
1301 006430 005267 172360                INC    MX
1302 006434 016737 172354 177570 8$:  MOV    MX,@#DISPLAY ; DISPLAY IT
1303 006442 032737 000400 177570    BIT    #SW8,@#SWR ; TYPE BANK NUMBER??
1304 006450 001410                BEQ    6$          ; NO!
1305 006452 000004 006456                TYPE  ,.+2      ; .ASCIZ <15><12>" "
1306 006462 016705 172326                MOV    MX,TTY    ; TYPE MX IN OCTAL
1307 006466 004767 003440                JSR   PC,PRINTS  ; AND SUPPRESS LEADING ZERO'S
1308 006472 005767 000746                TST   MEMORY     ; CHECK STATE OF FLAG
1309 006476 100407                BMI   4$          ; SWAB IT
1310 006500 001403                BEQ   3$          ; COM IT
1311 006502 005067 000736                CLR  MEMORY     ; INIT IT
1312 006506 000433                BR   2$          ; CONTINUE
1313 006510 105167 000731                3$:  COMB  MEMORY+1 ; MAKE IT 177400
1314 006514 000430                BR   2$          ; SKIP
1315 006516 000367 000722                4$:  SWAB  MEMORY  ; MAKE IT 377
1316 006522 000425                BR   2$          ;
1317 006524 005267 172264                1$:  INC    MX      ; GO TO NEXT BANK
1318 006530 016737 172260 177570    MOV    MX,@#DISPLAY ; DISPLAY THE BANK IN USE
1319 006536 032737 000400 177570    BIT    #SW8,@#SWR ; TYPE BANK NUMBER??
1320 006544 001414                BEQ   2$          ; NO!
1321 006546 000004 006552                TYPE  ,.+2      ; .ASCIZ " "
1322 006554 016705 172234                MOV    MX,TTY    ; SET FOR TYPING
1323 006560 032705 000007                BIT    #7,TTY    ; MULTIPLE OF 10?
1324 006564 001402                BEQ   7$          ; YES
1325 006566 042705 177770                BIC   #177770,TTY ; CLEAR OUT UPPER BITS
1326 006572 004767 003334                7$:  JSR   PC,PRINTS ; TYPE MX AND SUPPRESS LEADING ZERES
1327 006576 104442                2$:  SETBANK ; SET MXC
1328 006600 000002                RTI

```

```

1329 ; THIS ROUTINE WILL REQUEST THE OTHER PROCESSOR TO SETUP THE WINDOW
1330 ; IN RESPONSE TO A CODE IN THE COMMUNICATION BITS OF THE CSR. THE
1331 ; RESPONSE OF THE OTHER WINDOW IS THEN VERIFIED; AND IF IT IS WRONG
1332 ; AN ERROR IS REPORTED. OPERATIONS THROUGH THE WINDOW ARE RESTRICTED
1333 ; SO THAT EACH PROCESSOR CAN'T HAVE READ PRIVELGES AT THE SAME TIME.
1334 ; ONE OF THE PROCESSORS IS CONSIDERED A SLAVE TO THE OTHER. THIS IS
1335 ; NECESSARY TO AVOID RACE CONDITIONS WHEN REQUESTING THE WINDOW.
1336 ; WHEN THE SLAVE PROCESSOR IS IN THIS ROUTINE IT WILL LOWER ITS
1337 ; PRIORITY LEVEL TO 0 TO GIVE THE OTHER PROCESSOR THE RIGHT OF WAY.
1338 ; WHEN THE MASTER PROCESSOR IS IN THIS ROUTINE, HIS PRIORITY LEVEL
1339 ; IS KEPT AT 7. THE STARTING PROCEDURE DETERMINES WHICH PROCESSOR
1340 ; IS THE MASTER.
1341
1342 006602 005037 177776 DOFUN: CLR 2#PS ; DROP PRIORITY
1343 006606 005767 002462 TST NOTRD ; IS THE READ FLAG SET?
1344 006612 001410 BEQ 3$ ; DO IT IF NO READ
1345 006614 032776 00C010 000000 BIT #10,2(6) ; IS IT A READ REQUEST?
1346 006622 001404 BEQ 3$ ; NO - DO IT
1347 006624 032777 00C400 002404 2$: BIT #400,2WCSRA ; R/W?
1348 006632 001374 BNE 2$ ; HANG UNTIL DONE
1349 006634 012737 000340 177776 3$: MOV #340,2#PS ; LOCK UP THE WORLD
1350 006642 152777 000371 002366 BISB #71,2WCSRA ; SEND FUNCTION GET READY
1351 006650 032777 000301 002360 DOF1: BIT #1,2WCSRA ; WAIT FOR NEW DATA TO GO AWAY
1352 006656 001403 BEQ DOF7 ; BRANCH IF GONE
1353 006660 005037 177776 DOF2: CLR 2#PS ; LOWER STATUS IF SLAVE
1354 006664 000771 BR DOF1 ; WAIT
1355 006666 142777 000170 002342 DOF7: BICB #70,2WCSRA ; CLEAR THE FUNCTION BITS
1356 006671 157677 000100 002334 BISB 2(6),2WCSRA ; SET NEW FUNCTION BITS
1357 006702 032777 000C01 002326 1$: BIT #1,2WCSRA ; WAIT FOR NEW DATA
1358 006710 001374 BNE 1$ ; HANG
1359 006712 017604 000000 MOV 2(6),R4 ; GET THE FUNCTION BITS
1360 006716 010467 000214 MOV R4,SAV1 ; REMEMBER OLD FUNCTION
1361 006722 006204 ASR R4 ; SHIFT
1362 006724 006204 ASR R4 ; TWICE
1363 006726 017705 002314 MOV 2WCSRA,R5 ; GET WCSRA
1364 006732 042705 177573 BIC #17573,R5 ; CLEAR JUNK
1365 006736 026405 007116 CMP CSRTAB(R4),R5 ; RIGHT RESPONSE?
1366 006742 001452 BEQ DOF3 ; SKIP IF OK
1367 006744 012737 000340 177776 MOV #340,2#PS
1368 006752 010401 MOV R4,R1
1369 006754 010500 MOV R5,R0
1370 006756 000004 006762 TYPE #12 ; .ASCIZ <15><12><12>"FUNCTION IS WRONG: SENT = "
1371 007022 006301 ASL R1 ; GET
1372 007024 000261 SEC ; IT
1373 007026 006101 ROL R1 ; BACK
1374 007030 010105 MOV R1,TTY ; TYPE R1 IN OCTAL
1375 007032 004767 003074 JSR PC,PRINTS ; AND SUPPRESS LEADING ZERO'S
1376 007036 000004 007042 TYPE #12 ; .ASCIZ " WCSRA = "
1377 007056 017705 002154 MOV 2WCSRA,TTY ; TYPE 2WCSRA IN OCTAL
1378 007062 004767 003034 JSR PC,PRINTR ; TYPE LEADING ZERO'S
1379 007066 000000 HALT ; FUNCTION NOT RIGHT!
1380 007070 005767 002201 DOF3: TST NOTRD ; IS THE MASTER READING?
1381 007074 001405 BEQ DOF4 ; BRANCH IF NO
1382 007076 032776 000011 000000 BIT #10,2(6) ; IS SLAVE TRYING TO READ?
1383 007104 001401 BEQ DOF4 ; BRANCH IF NO
1384 007106 000770 DOF5: BR DOF3 ; WAIT IF SLAVE

```

1385	007110	062716	000002	DOF4:	A00	#2,(6)	: UPDATE THE RETURN ADDRESS
1386	007114	000002			RTI		: RETURN
1387							
1388	007116	000000		CSRTAB:	0		: CLEAR
1389	007120	000200			200		: READ
1390	007122	000204			204		: WRITE
1391	007124	000204			204		: READ/WRITE
1392	007126	000000	000000 000000		0,0,0		: N/A
1393	007134	000000			C		: GET READY
1394							
1395	007136	000000		SAVTMP:	0		

```

1396
1397
1398
1399
1400 007140 005767 002024
1401 007144 001401
1402 007146 000002
1403 007150 104450 000031
1404 007154 005067 000260
1405 007160 005067 000256
1406 007164 016702 002072
1407 007170 016705 002230
1408 007174 004767 000032
1409 007200 026712 000234
1410 007204 001401
1411 007206 104436
1412 007210 005722
1413 007212 005767 001746
1414 007216 001002
1415 007220 005205
1416 007222 001364
1417 007224
1418 007224 104450 000001
1419 007230 000002
1420
1421
1422
1423 007232 005767 000206
1424 007236 100430
1425 007240 003016
1426
1427 007242 010203
1428 007244 000303
1429 007246 006103
1430 007250 060203
1431 007252 006003
1432 007254 066703 000162
1433 007260 006203
1434 007262 103404
1435 007264 005167 000152
1436 007270 005167 000144
1437 007274 000207
1438 007276 010203
1439 007300 010201
1440 007302 000303
1441 007304 006101
1442 007306 006101
1443 007310 006101
1444 007312 006101
1445 007314 060103
1446 007316 000756
1447 007320 010203
1448 007322 006003
1449 007324 010301
1450 007326 000301
1451 007330 006003
    
```

```

;THIS ROUTINE WILL COMPARE THE DATA READ FROM A DEVICE AGAINST THE
;KNOWN PATTERN. ANY ERRORS ARE REPORTED AND THE ROUTINE WILL CONTINUE
;TO SCAN THE BUFFER.
    
```

```

CDATA: TST      EX
        BEQ     .+4
        RTI
        FUNCTN  ,R.W
        CLR     DATA
        CLR     BIT
        MOV     WADRA,R2
        MOV     WRDCNT,TTY
15:     JSR     PC,GOATA
        CMP     DATA,(2)
        BEQ     .+4
        ERR3
        TST     (2)+
        TST     CFLAG
        BNE     25
        INC     TTY
        BNE     15
25:     FUNCTN  ,CLEAR
        RTI
    
```

```

;CHECK DATA
;SKIP IF NO ERROR
;RETURN IF ERROR EXISTS
;REQUEST WINDOW IN R.W MODE
;SET UP DATA
;CLEAR FLAG
;SET UP BEGINNING OF BUFFER
;SET UP COUNT
;GET THE DATA
;SAME?
;SKIP IF OK
;DATA IS WRONG - TYPE IT
;ADD 2
;IS IC TYPED?
;BRANCH IF TYPED
;DEC THE COUNT
;LOOP IF NOT END
;REQUEST WINDOW IN CLEAR MODE
;RETURN
    
```

```

;THIS ROUTINE WILL GENERATE THE REQUESTED PATTERN.
    
```

```

GOATA: TST      MEMORY
        BMI     T3XOR9
        BGT     T8XOR13
T1XOR8: MOV     R2,R3
        SWAB   R3
        ROL   R3
        ADD   R2,R3
        ROR   R3
ALLOR:  ADD     BIT,R3
        ROR   R3
        BCS   15
        COM   BIT
        COM   DATA
15:     RTS     PC
T8XOR13:MOV    R2,R3
        MOV   R2,R1
        SWAB R3
        ROL  R1
        ROL  R1
        ROL  R1
        ROL  R1
T3X9:  ADD     R1,R3
        BR    ALLOR
T3XOR9:MOV    R2,R3
        ROR   R3
        MOV   R3,R1
        SWAB R1
        ROR   R3
    
```

```

;CHECK FLAG
;MM11G
;MM11F
;MM11E MEMORY
;MM11F MEMORY
;MM11G MEMORY
    
```

004

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DZDABA.F11

BUS WINDOW EXERCISER
SUBROUTINES

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1452 007332 006003
1453 007334 000767

ROR R3
BR T3X9

```

1454                                     ;CHECK TO SEE IF HALT ON ERROR HAS BEEN SELECTED BY SWITCH 15.
1455                                     ;IF NOT CONTINUE TESTING.
1456
1457 007336 005037 177776 POTS: CLR      @#PS      ;DROP PRIORITY
1458 007342 005737 177570      TST      @#SWR      ;HALT ON ERROR?
1459 007346 100001      BPL      .+4         ;NO - SKIP
1460 007350 000000      HALT                       ;WAIT FOR CONTINUE
1461 007352 000002      RTI                          ;RETURN
1462
1463                                     ;ISSUE THE START COMMAND TO THE DEVICE UNDER TEST. THE WORDCOUNT
1464                                     ;REGISTER, THE BUS ADDRESS REGISTER, AND THE COMMAND REGISTER ARE
1465                                     ;LOADED. THE "MEX" BITS OF THE COMMAND REGISTER ARE ALSO LOADED
1466                                     ;AT THIS TIME FROM LOCATION "EMBITS".
1467
1468 007354 017646 000000 .BEGIN: MOV     @ (6), -(6)      ;GET ADDRESS
1469 007360 017646 000000      MOV     @ (6), -(6)      ;GET ADDRESS
1470 007364 016776 002032 000000      MOV     IOWAD, @ (6)      ;LOAD MEMORY ADDRESS
1471 007372 022626      CMP     (6)+, (6)+      ;RESTORE STACK
1472 007374 062716 000002      ADD     #2, (6)         ;INCREMENT STACK
1473 007400 016705 001660      MOV     EMBITS, TTY      ;CLEAR JUNK
1474 007404 057605 000000      BIS     @ (6), TTY      ;GET REST OF COMMAND
1475 007410 062716 000002      ADD     #2, (6)         ;INCREMENT STACK
1476 007414 017646 000000      MOV     @ (6), -(6)      ;GET ADDRESS
1477 007420 017646 000000      MOV     @ (6), -(6)      ;GET ADDRESS
1478 007424 010576 000000      MOV     TTY, @ (6)      ;LOAD MEMORY ADDRESS
1479 007430 022626      CMP     (6)+, (6)+      ;RESTORE STACK
1480 007432 062716 000002      ADD     #2, (6)         ;INCREMENT STACK
1481 007436 000002      RTI
1482
1483 007440 000000 DATA: 0      ;DATA FOR MEMORY
1484 007442 000000 BIT: 0      ;FLAG
1485 007444 000000 MEMORY: 0    ;WHAT TYPE OF MEMORY
1486
1487
1488                                     ;REQUEST THE NEXT MEMORY SEGMENT FOR TESTING AND LOAD THE
1489                                     ;APPROPRIATE DATA PATTERN.
1490
1491 007446 104444 WRADR: NEXT      ;GET NEXT BANK
1492 007450 104450      FUNCTN   R.W      ;REQUEST WINDOW IN R.W MODE
1493 007454 005067      CLR     DATA    ;CLEAR
1494 007460 005067      CLR     BIT      ;FLAGS
1495 007464 016705      MOV     WRCNT, TTY ;SET THE COUNTER
1496 007470 016702      MOV     WADRA, R2  ;SET THE STARTING ADDRESS
1497 007474 004767      JSR     PC, GDATA ;GET WORST CASE NOISE
1498 007500 016722      MOV     DATA, (2)+ ;PUT INTO MEMORY
1499 007504 005205      INC     TTY       ;DEC THE COUNTER
1500 007506 001372      BNE     IS        ;NO - LOOP
1501 007510 104450      FUNCTN   , CLEAR   ;REQUEST WINDOW IN CLEAR MODE
1502 007514 000002      RTI                          ;RETURN
1503
1504                                     PARCSR= 172100
1505                                     PARVEC= 114
1506
1507 007516 012737 007610 000114 .MARK: MOV     @#PARSR, @#PARVEC ;SET PARITY INTERRUPT VECTOR
1508 007524 012737 000340 003116      MOV     @340, @#PARVEC+2 ;SET PRIORITY LEVEL TO 7
1509 007532 013746 000004      MOV     @#4, -(SP)      ;SAVE CURRENT ERROR VECTOR

```

```

1510 007536 013746 000006          MOV      206, -(SP)          ;SAVE PRIORITY LEVEL
1511 007542 012737 000006 000004  MOV      206, 204
1512 007550 012737 000002 000006  MOV      206, 206
1513 007556 012700 172100          MOV      @PARCSR, R0        ;GET FIRST CSR ADDR
1514 007562 012702 000001          MOV      R1, R2
1515 007566 012720 000001 15:    MOV      R1, (R0)+          ;SET ACTION ENABLE IF AVAILABLE
1516 007572 006302          ASL      R2                ;SHIFT AVAILABILITY INDICATOR
1517 007574 103374          BCC      15
1518 007576 012637 000006          MOV      (SP)+, 206        ;RESTORE ERROR VECTOR PRIORITY
1519 007602 012637 000004          MOV      (SP)+, 204        ;AND INTERRUPT VECTOR
1520 007606 000207          RTS      PC
1521
1522 007610 000000          .PARSRV:HALT              ;MEMORY PARITY ERROR TRAP
1523 007612 000002          RTI
1524
1525          ;COME HERE IF A MEMORY MANAGEMENT VIOLATION OCCURS.
1526
1527          MMERR:
1528 007614 000004 007620          TYPE    .+2
1529 007660 016705 167712          MOV     SRO+4, TTY          ;.ASCIZ <15><12><12>"MEMORY MANAGEMENT ERROR AT "
1530 007664 004767 002232          JSR     PC, PRINTR         ;TYPE SRO+4 IN OCTAL
1531 007670 000004 007674          TYPE    .+2               ;TYPE LEADING ZERO'S
1532 007710 016705 167656          MOV     SRO, TTY           ;.ASCIZ " SRO = "
1533 007714 004767 002202          JSR     PC, PRINTR         ;TYPE SRO IN OCTAL
1534 007720 000000          HALT
1535 007722 000002          RTI                       ;MM ERROR
                                ;RETURN

```

```

1536                                     ;COMPLEMENT THE DATA BUFFER.
1537
1538 007724 016702 001332 WRCADR: MOV      WADRA,R2      ;SET UP BEGINNING OF BUFFER
1539 007730 104450 000031      FUNCTN  ,R.W      ;REQUEST WINDOW IN R.W MODE
1540 007734 016705 001464      MOV      WROCNT,TTY    ;SET COUNTER
1541 007740 005122      15:  COM      (2)+      ;COMPLIMENT IT
1542 007742 005205      INC      TTY      ;COUNT IT
1543 007744 001375      BNE     15      ;LOOP TIL END OF CORE
1544 007746 104450 000001      FUNCTN  ,CLEAR    ;REQUEST WINDOW IN CLEAR MODE
1545 007752 000002      RTI
1546
1547                                     ;REPORT A DATA COMPARE ERROR.
1548
1549 007754 032737 020000 177570 ER3:  BIT      #SW13,@#SWR    ;INHIBIT TYPEOUTS
1550 007762 001401      SEQ      .+4      ;SKIP IF TYPEOUTS WANTED
1551 007764 000002      RTI
1552 007766 022767 041524 002056      CMF     #TC,INPUT  ;IS IT A TC11
1553 007774 001003      BNE     .+10     ;SKIP IF NOT
1554 007776 012777 000001 001344      MOV     #1,@TCCS   ;STOP THE TC11
1555 010004 000004 010010      TYPE   .+2      ;ASCIZ <15><12>"DATA ERROR AT "
1556 010032 010205      MOV     R2,TTY     ;TYPE R2 WITH MX AS 18 BIT ADDRESS
1557 010034 004767 002116      JSR    PC,PRINTA  ;GO TO ADDRESS PRINTER
1558 010040 000004 010044      TYPE   .+2      ;ASCIZ " TRUE = "
1559 010056 016705 177356      MOV     DATA,TTY  ;TYPE DATA IN OCTAL
1560 010062 004767 002034      JSR    PC,PRINTR  ;TYPE LEADING ZERO'S
1561 010066 000004 010072      TYPE   .+2      ;ASCIZ " RECEIVED = "
1562 010110 011205      MOV     (2),TTY    ;TYPE (2) IN OCTAL
1563 010112 004767 002034      JSR    PC,PRINTR  ;TYPE LEADING ZERO'S
1564 010116 104434      STOP
1565 010120 000002      RTI
1566
1567                                     ;THIS ROUTINE WILL TAKE THE CONTENTS OF LOCATION "MX" WHICH WAS
1568                                     ;SETUP BY SUBROUTINE "NXT" AND DETERMINE WHAT THE CONTENTS
1569                                     ;OF THE OTHER PROCESSOR'S RELOCATION REGISTER SHOULD BE. THIS INFORMATION
1570                                     ;IS PASSED TO THE OTHER PROCESSOR THROUGH THE WINDOW'S DATA BUFFER.
1571                                     ;IF DATA IS BEING TRANSFERRED TO SEGMENT 0 OF THE OTHER PROCESSOR
1572                                     ;THE STARTING ADDRESS OF THE WINDOW IS OFFSET BY 4K TO AVOID
1573                                     ;DESTROYING THE OTHER PROGRAM.
1574
1575 010122                                     SET2AK:
1576 010122 104450 000001      FUNCTN  CLEAR      ;REQUEST WINDOW IN CLEAR MODE
1577 010126 032767 004300 001132      BIT     #4000,SIZE ;4K WINDOW OR LESS?
1578 010134 001006      BNE     3$        ;BRANCH IF YES
1579 010136 042767 020000 001116      BIC     #20000,WADRA
1580 010144 042767 020300 001250      BIC     #20000,IOWAD
1581 010152 016705 170636      3$:  MOV     MX,TTY    ;GET THE MX
1582 010156 016700 001104      MOV     SIZE,R0    ;GET THE SIZE OF THE WINDOW
1583 010162 032767 004000 001076      BIT     #4000,SIZE ;4K OR LESS?
1584 010170 001402      BEQ     5$        ;BRANCH IF GREATER
1585 010172 012700 174000      MOV     #174000,R0 ;MAKE WINDOW LOOK LIKE 4K
1586 010176 005400      5$:  NEG     R0        ;MAKE IT A BIT
1587 010200 006000      1$:  ROR     R0        ;SHIFT IT
1588 010202 103402      BCS     2$        ;GET OUT IF SET
1589 010204 006305      ASL     TTY       ;MOVE INTO POSITION
1590 010206 000774      BR     1$        ;LOOP
1591 010210 010577 001024      2$:  MOV     TTY,@WOBRA ;PUT INTO DATA BUFFER

```

H04

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DZDABA.P11

BUS WINDOW EXERCISER
SUBROUTINES

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1592	010214	005767	170574		TST	MX	
1593	010220	001006			BNE	4S	
1594	010222	052767	020000	001032	BIS	#20000, WADRA	
1595	010230	052767	020000	001164	BIS	#20000, IOWAD	
1596	010236						
1597	010236	104450	000041	4S:	FUNCTN	, BANK	; REQUEST WINDOW IN BANK MODE
1598	010242	000002			RTI		; RETURN
1599							
1600							
1601	010244	012767	000000	162066	MAP:	MOV #0, KIPAR0	; MAP BANK 0 INTO SELF
1602	010252	012767	077406	162020		MOV #77406, KIPDR0	; 4K - R/W
1603	010260	012767	077406	162016		MOV #77406, KIPDR2	; 4K - R/W
1604	010266	012767	077406	162012		MOV #77406, KIPDR3	; 4K - R/W
1605	010274	012767	007600	162054		MOV #7600, KIPAR7	; MAP BANK 7 INTO 37
1606	010302	012767	077406	162006		MOV #77406, KIPDR7	; 4K - R/W
1607	010310	000002				RTI	; RETURN

```

1608 ;ALL OPERATIONS TO A DEVICE ARE UNDER INTERRUPT CONTROL AND WHEN A
1609 ;DEVICE IS BUSY PERFORMING AN OPERATION, CONTROL COMES HERE TO WAIT
1610 ;UNTIL AN INTERRUPT OCCURS.
1611
1612 010312 012737 010326 000004 WAIT: MOV #TRAP4,2#4 ;SET TRAP VECTOR
1613 010320 005037 177776 CLR #2#PS ;BRO
1614 010324 000777 BR . ;WAIT
1615
1616 ;COME HERE FOR A MEMORY TIMEOUT.
1617
1618 010326 005777 000704 TRAP4: TST @WCSRA ;CHECK FOR ERROR
1619 010332 100424 BMI WINDOW ;SKIP IF WINDOW ERROR
1620 010334 000004 010340 TYPE .+2 ;ASCIZ (15)(12)(12)"TRAP TO 4 FROM "
1621 010364 011600 MOV (6),RO ;GET RETURN ADDRESS
1622 010366 162700 000002 SUB #2,RO ;MAKE IT REAL ADDRESS
1623 010372 010005 MOV RO,TTY ;TYPE RO IN OCTAL
1624 010374 004767 001522 JSR PC,PRINTR ;TYPE LEADING ZERO'S
1625 010400 000000 HALT ;TRAPPED TO 4
1626 010402 000002 RTI ;RETURN
1627
1628 ;THIS IS THE WINDOW INTERRUPT HANDLER. IF THE INTERRUPT IS
1629 ;CAUSED BY THE SETTING OF NEW DATA, CONTROL IS TRANSFERRED TO "NOERR".
1630 ;IF IT IS AN ERROR, IT IS REPORTED TO THE OPERATOR.
1631
1632 010404 017700 000626 WINDOW: MOV @WCSRA,RO ;SAVE WCSRA
1633 010410 100054 BPL NOERR ;SKIP IF NO ERROR FLAG
1634 010412 000004 010416 TYPE .+2 ;ASCIZ (15)(12)(12)"WINDOW ERROR AT "
1635 010442 011600 MOV (6),RO ;GET THE RETURN ADDRESS
1636 010444 162700 000002 SUB #2,RO ;MAKE IT REAL ADDRESS
1637 010450 010005 MOV RO,TTY ;TYPE RO IN OCTAL
1638 010452 004767 001444 JSR PC,PRINTR ;TYPE LEADING ZERO'S
1639 010456 000004 010462 TYPE .+2 ;ASCIZ " WCSRA = "
1640 010476 017705 000534 MOV @WCSRA,TTY ;TYPE @WCSRA IN OCTAL
1641 010502 004767 001414 JSR PC,PRINTR ;TYPE LEADING ZERO'S
1642 010506 000004 010512 TYPE .+2 ;ASCIZ " WDARA = "
1643 010526 017705 000512 MOV @WDARA,TTY ;TYPE @WDARA IN OCTAL
1644 010532 004767 001364 JSR PC,PRINTR ;TYPE LEADING ZERO'S
1645 010536 000000 HALT ;WINDOW ERROR!
1646 010540 000002 RTI ;RETURN
1647
1648 ;CONTROL COMES HERE WHEN THE OTHER PROCESSOR SETS NEW DATA. THE
1649 ;DATA BITS ARE EXAMINED TO DETERMINE WHICH FUNCTION IS BEING REQUESTED
1650 ;AND CONTROL IS TRANSFERRED TO THE PROPER ROUTINE.
1651
1652 010542 000300 NOERR: SWAB RO ;GET THE
1653 010544 042700 177761 BIC #177761,RO ;DATA BITS
1654 010550 000170 010554 JMP @WINTAB(0) ;GO TO ROUTINE
1655
1656
1657 010554 010576 WINTAB: W.NOP ;NOP - CLOSE WINDOW
1658 010556 010626 W.READ ;READ ONLY
1659 010560 010660 W.WRIT ;WRITE ONLY
1660 010562 010660 W.R.W ;READ/WRITE
1661 010564 010712 W.BANK ;BANK SELECT
1662 010566 010574 W.FUTR ;FUTURE USE
1663 010570 010574 W.FUTR ;FUTURE USE

```

JO4

MAINDEC-11-DZDAB-A
DZDABA.P11

BUS WINDOW EXERCISER
WINDOW INTERRUPT HANDLER AND SCDULER

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1664 010572 010744

W.ZAP

;GET READY

```

1665 ;RESERVED FOR FUTURE USE.
1666
1667 010574 000000 W.FUTR: HALT ;RESERVED FOR FUTURE USE
1668
1669 ;WINDOW REQUESTED TO BE CLOSED.
1670
1671 010576 042777 000402 000432 W.NOP: BIC #402,2WCSRA ;CLOSE WINDOW
1672 010604 152777 000100 000424 BISR #100,2WCSRA ;I/E
1673 010612 005067 000456 CLR NOTRD ;NOT A READ
1674 010616 042777 017000 000412 BIC #17000,2WCSRA ;CLEAR NEW DAT
1675 010624 000002 RTI ;RETURN
1676
1677 ;WINDOW REQUESTED IN THE READ MODE.
1678
1679 010626 052777 000400 000402 W.READ: BIS #400,2WCSRA ;READ ONLY
1680 010634 152777 000100 000374 BISR #100,2WCSRA ;I/E
1681 010642 012767 177777 000424 MOV #-1,NOTRD ;SET READ FLAG
1682 010650 042777 017000 000360 BIC #17000,2WCSRA ;CLEAR NEW DATA
1683 010656 000002 RTI ;RETURN
1684
1685 ;WINDOW REQUESTED IN THE READ/WRITE OR WRITE MODE.
1686
1687 010660 W.R.W:
1688 010660 012767 177777 000406 W.WRIT: MOV #-1,NOTRD ;NOT A READ
1689 010666 052777 000402 000342 IS: BIS #402,2WCSRA ;READ/WRITE
1690 010674 152777 000100 000334 BISR #100,2WCSRA ;I/E
1691 010702 042777 017000 000326 BIC #17000,2WCSRA ;CLEAR NEW DATA
1692 010710 000002 RTI ;RETURN
1693
1694 ;LOAD THE CONTENTS OF THE DATA BUFFER INTO THE RELOCATION
1695 ;REGISTER.
1696
1697 010712 017777 000324 000326 W.BANK: MOV 2WDBPB,2WRARA ;BANK SELECT
1698 010720 042777 000402 000310 BIC #402,2WCSRA ;CLEAR NEW DATA
1699 010726 152777 000100 000302 BISR #100,2WCSRA ;I/E
1700 010734 042777 017000 000274 BIC #17000,2WCSRA ;CLEAR NEW DATA
1701 010742 000002 RTI ;RETURN
1702
1703 ;WARNING TO THIS PROCESSOR TO GET READY TO GET
1704 ;THE REQUESTED FUNCTION.
1705
1706 010744 042777 010502 000264 W.ZAP: BIC #10502,2WCSRA
1707 010752 032777 010000 000256 IS: BIT #10000,2WCSRA ;WAIT FOR NEW DATA
1708 010760 001774 BEQ IS ;TO GO AWAY
1709 010762 000167 177416 JMP WINDOW ;NOW GET FUNCTION
1710
1711
1712 ;DETERMINE WHERE THE WINDOW'S CSR REGISTER IS LOCATED.
1713
1714 010766 012700 164000 REGSCN: MOV #164000,R0 ;SET WCSRA FOR SCANNING
1715 010772 012702 000010 MOV #8,R2 ;SET COUNT
1716 010776 012737 011010 000004 MOV #55,2R4 ;SET FOR TIMEOUT
1717 011004 005710 6S: TST (0) ;IS IT THERE?
1718 011006 000207 RTS PC ;RETURN
1719 011010 022626 5S: CMP (6)+,(6)+ ;CLEAR STACK
1720 011012 062700 000020 ADD #20,R0 ;BUMP ADDRESS

```

```

1721 011016 005302
1722 011020 001371
1723 011022 000000
1724 011024 000760
1725
1726
1727
1728
1729
1730
1731 011026 000005
1732 011030 012706 000500
1733 011034 012767 177777 000230
1734 011042 012767 000777 000014
1735 011050 004767 177712
1736 011054 010067 000040
1737 011060 012710 000402
1738 011064 000777
1739 011066 005077 000026
1740 011072 012737 000240 006650
1741 011100 012737 000240 006662
1742 011106 012737 000240 007106
1743 011114 000137 001026
1744
1745 011120 000000

```

```

DEC R2 ;DEC COUNT
BNE 65 ;LOOP UNTIL FOUND
HALT ;NO WCSRA
BR REGSCN ;TRY IT AGAIN

```

```

;OPEN THE WINDOW TO ALLOW THE OTHER PROCESSOR TO LOAD THE PROGRAM
;INTO ITSELF. THIS PROCESSOR WILL LOOP AT LOCATION "BR." WHILE THE
;OTHER PROCESSOR GETS THE PROGRAM. THE OTHER PROCESSOR WILL REPLACE THE
;THE BRANCH TO SELF INSTRUCTION WITH A NOP WHEN THE PROGRAM IS LOADED.

```

```

OPEN: RESET ;ZAP THE WORLD
MOV #500, SP ;INITIALIZE THE STACK
MOV #-1, ONCE ;RESET ONCE
MOV #777, BR. ;RESTORE THE BR.
TSR PC, REGSCN ;GET THE REGISTER
MOV RO, BR.1 ;SAVE WCSRA
MOV #402, (0) ;OPEN THE WINDOW
BR. ;WAIT
CLR BR.1 ;CLEAR WCSRA
MOV #240, @#DOF2
MOV #240, @#DOF2+2
MOV #240, @#DOF5
JMP @#BEGIN ;SELF START

BR.1: 0

```

```

1746 011122 116767 166434 000722 READR: MOVB 177562,INPUT ;READ THE CHARACTER
1747 011130 142767 000200 000714 BICB #200,INPUT ;CLEAR JUNK
1748 011136 122767 000003 000706 IS: CMPB #'C'-100,INPUT ;IS IT A 'C'?
1749 011144 001401 BEQ .+4 ;SKIP IF 'C'
1750 011146 000002 RTI ;RETURN IF NOT
1751 011150 010667 000010 MOV SP,CFLAG ;SET CONTROL "C" FLAG
1752 011154 042737 000100 177560 BIC #100,#177560 ;DISABLE TTY INTERRUPT
1753 011162 000002 ST.
1754
1755 011164 000000 CFLAG: 0
1756
1757
1758 011166 000000 CHK: 0
1759 011170 000000 EX: 0
1760 011172 020040 051503 036440 M3: .ASCIZ " CS = "
1761 011200 000040 M4: .ASCIZ " ER = "
1762 011202 020040 051105 036440 .EVEN
1763 011210 000040 WIND: .ASCII ".5 1 2 4 81632"
1764
1765 011212 032456 030440 031040
1766 011220 032040 034040 033061
1767 011226 031063
1768 011230 000000 000000 SIZ: 0,0
1769 011234 000000 OFFSET: 0
1770
1771 177572 SR0= 177572 ;KT11 - MEMORY MANAGEMENT
1772 172340 KIPAR0= 172340
1773 172300 KIPDR0= 172300
1774 172344 KIPAR2= 172344
1775 172304 KIPDR2= 172304
1776 172346 KIPAR3= 172346
1777 172306 KIPDR3= 172306
1778 172356 KIPAR7= 172356
1779 172316 KIPDR7= 172316
1780
1781 011236 164000 WCSRA: 164000 ;CONTROL & STATUS REG. (R/W) - WINDOW A
1782 011240 164002 WDBRA: 164002 ;OUTPUT DATA BUFFER (R/W)
1783 011242 164004 WDBRB: 164004 ;INPUT DATA BUFFER (R)
1784 011244 164006 WDARA: 164006 ;DISPLACEMENT ADDRESS REG. (R)
1785 011246 164010 WRARA: 164010 ;RELOCATION ADDRESS REGISTER (R/W)
1786 011250 164012 WADRAX: 164012 ;WINDOW ADDRESS REGISTER (R)
1787 011252 164014 WVARA: 164014 ;VECTOR ADDRESS REGISTER (R)
1788 011254 000000 0
1789
1790 011256 000300 000302 WVECA: 300,302 ;VECTOR ADDRESS
1791
1792 011262 020000 WADRA: 20000 ;WINDOW ADDRESS
1793 011264 000000 EMBITS: 0 ;EXTENDED MEMORY BITS
1794
1795 011266 000000 SIZE: 0 ;WINDOW SIZE
1796 011270 000000 MMN: 0 ;MEMORY MANAGEMENT REQUIRED FLAG
1797 011272 177777 ONCE: -1 ;ONCE ONLY FLAG
1798 011274 000000 NOTRD: 0 ;READ FLAG - 0=NO READ

```

1799	011276	177460		RFCS:	177460		
1800	011300	177470		RFER:	177470		;RF11 DISK (256K)
1801	011302	177462		RFC:	177462		
1802	011304	177464		RFCA:	177464		
1803	011306	177466		RFDA:	177466		
1804	011310	177446		RCCS:	177446		;RC11 DISK (64K)
1805	011312	177444		RCER:	177444		
1806	011314	177450		RCWC:	177450		
1807	011316	177452		RCCA:	177452		
1808	011320	177442		RCD:	177442		
1809	011322	176714		RPCS:	176714		;RP11 DISK (PACK)
1810	011324	176716		RPWC:	176716		
1811	011326	176720		RPCA:	176720		
1812	011330	176724		RPDA:	176724		
1813	011332	176712		RPER:	176712		
1814	011334	176710		RPOS:	176710		
1815	011336	177404		RKCS:	177404		;RK11 DISK (CARTRIDGE)
1816	011340	177402		RKER:	177402		
1817	011342	177406		RKWC:	177406		
1818	011344	177410		RKCA:	177410		
1819	011346	177412		RKDA:	177412		
1820	011350	177342		TCCS:	177342		;TC11 DECTAPE
1821	011352	177340		TCER:	177340		
1822	011354	177344		TCWC:	177344		
1823	011356	177346		TCCA:	177346		
1824	011360	177350		TCD:	177350		
1825	011362	172522		TMCS:	172522		;TM11 MAGTAPE
1826	011364	172520		TMER:	172520		
1827	011366	172524		TMBC:	172524		
1828	011370	172526		TMCA:	172526		
1829							
1830	011372	000204	000206	RFTRAP:	204, 206		
1831	011376	000210	000212	RCTRAP:	210, 212		
1832	011402	000254	000256	RPTRAP:	254, 256		
1833	011406	000220	000222	RKTRAP:	220, 222		
1834	011412	000214	000216	TCTRAP:	214, 216		
1835	011416	000224	000226	TMTRAP:	224, 226		
1836							
1837	011422	000000		IOWAD:	0		
1838	011424	177400		WROCNT:	-400		;WORD COUNT

```

1839
1840
1841
1842
1843
1844
1845
1846
1847
1848 011426 010001
1849 011430 022701 000006
1850 011434 100002
1851 011436 012701 000006
1852 011442 006001
1853 011444 006001
1854 011446 006001
1855 011450 006001
1856 011452 042701 017777
1857 011456 012702 017200
1858 011462 060201
1859 011464 010167 000034
1860 011470 012122
1861 011472 022702 020000
1862 011476 001374
1863 011500 000207
1864
1865 011502 012702 017200
1866 011506 016701 000012
1867 011512 012221
1868 011514 022702 020000
1869 011520 001374
1870 011522 000207
1871
1872 011524 000000
1873
1874
1875
1876
1877
1878 011526 005767 177432
1879 011532 001001
1880 011534 000207
1891 011536 012706 000500
1892 011542 000004 011546
1893 011552 005067 177406
1894 011556 104450 000001
1895 011562 005037 177776
1896 011566 000137 022564
    
```

```

; SLOADR GET AND RESTORE THE LOADER
; THESE ROUTINES FIRST FIND THE LOADER (TOP OF HIGHEST
; 4K BANK IN 2BK) AND SAVE IT AT TAG "ENDP:". ENTRY FOR
; THIS ROUTINE IS "JSR PC,LODGET".
; "JSR PC,LODRES" WILL RESTORE THE LOADER IN ITS ORIGINAL
; LOCATION. ".LOD:" CONTAINS THE ADDRESS OF THE LOADER.
LODGET: MOV R0,R1 ;GET THE BANK
        CMP #6,R1 ;IS IT > 6?
        BPL IS ;SKIP IF LES THAN 6
        MOV #6,R1 ;IF > 7 MAKE 7
1S: ROR R1 ;GET THE
     ROR R1 ;UPPER
     ROR R1 ;THREE
     ROR R1 ;BITS
     BIC #17777,R1 ;CLEAR JUNK
     MOV #ENDP,R2 ;GET SAVE ADDRESS
     ADD R2,R1 ;MAKE OTHER ONE
     MOV R1,.LOD ;SAVE ADDRESS
2S: MOV (1)+(2)+ ;MOVE WORD
     CMP #20000,R2 ;END?
     BNE 2S ;NO!
     RTS PC ;RETURN

LODRES: MOV #ENDP,R2 ;GET END OF PROGRAM
        MOV .LOD,R1 ;GET SAVE ADDRESS
1S: MOV (2)+(1)+ ;RESTORE WORD
     CMP #20000,R2 ;END?
     BNE 1S ;LOOP
     RTS PC ;RETURN

.LOD: 0 ;STARTING ADDRESS OF LOADER

; THIS ROUTINE TESTS THE FLAG TO SEE IF CONTROL "C" HAS BEEN TYPED.
; IF TYPED THE PROGRAM RESTARTS, OTHERWISE IT CONTINUES.
CONTC: TST CFLAG ;CONTROL "C" TYPED?
        BNE IS ;BRANCH IF YES
        RTS PC ;CONTINUE
1S: MOV #500,SP ;RESTORE THE STACK
     TYPE A,+2 ;ASCIZ "C"(177)
     CLR CFLAG ;CLEAR RESTART FLAG
     FUNCTN CLEAR ;REQUEST WINDOW IN CLEAR MODE
     CLR #PS
     JMP #AREDO ;GO RESTART
    
```

```

1887 ; STYPE MESSAGE TIMEOUT ROUTINE
1888
1889 ; THIS ROUTINE IS USE TO TYPE ASCII MESSAGES ON THE TTY. THE
1890 ; CALL CAN BE IN ONE OF 3 FORMS: 1) "TYPE ADR" - TYPES THE
1891 ; MESSAGE STARTING IN LOCATION "ADR:" 2) "TYPE CHAR" - TYPES
1892 ; THE ASCII "CHAR", AND 3) "PRINT <<15><12>"MESSAGE">" - TYPES
1893 ; THE MESSAGE WHICH IS IN LINE ASCII.
1894
1895 011572 010467 000146 IOTS: MOV R4,IOTS ;SAVE R4
1896 011576 010546 MOV TTY,-(6) ;SAVE TTY RS=TTY
1897 011600 017605 000002 MOV @2(6),TTY ;GET ADDRESS TO BE TYPED
1898 011604 032705 177400 BIT @177400,TTY ;IS IT A TYPEN?
1899 011610 001004 BNE IS ;NO
1900 011612 010567 000124 MOV TTY,TYPE ;GET THE CHARACTER
1901 011616 012705 011742 MOV @,TYPE,TTY ;FLUDGE THE ADDRESS
1902 011622 105715 1S: TSTB (TTY) ;TERMINATOR?
1903 011624 001423 BEQ 2S ;GET OUT IF SO
1904 011626 122715 000012 CMPB @12,(TTY) ;IS THE CHAR A LINE FEED?
1905 011632 001012 BNE 4S ;BRANCH IF NO
1906 011634 116704 000101 MOVB FILCHR+1,R4 ;GET FILLER COUNT
1907 011640 116737 000074 177566 5S: MOVB FILCHR,@177566 ;OUTPUT FILLER CHAR
1908 011646 105737 177564 TSTB @177564 ;WAIT FOR DONE
1909 011652 100375 BPL -4
1910 011654 005304 DEC R4 ;DECREMENT FILLER COUNT
1911 011656 001370 BNE 5S
1912 011660 112537 177566 4S: MOVB (TTY)+,@177566 ;LOAD AND TYPE THE CHARACTER
1913 011664 105737 177564 TSTB @177564 ;IS THE PRINTER READY
1914 011670 100375 BPL -4 ;WAIT UNTIL IT IS
1915 011672 000753 BR IS ;GET THE NEXT CHARACTER
1916 011674 017646 000002 000004 2S: MOV @2(6),-(6) ;GET ADDRESS TO BE TYPED
1917 011700 062766 000002 ADD @2,4(6) ;ADD 2 TO THE ADDRESS
1918 011706 022666 000002 CMP (6)+,2(6) ;IS IT .+2?
1919 011712 001006 BNE 3S ;NO
1920 011714 062705 000002 ADD @2,TTY ;ADD 2 TO THE ADDRESS
1921 011720 042705 000001 BIC @1,TTY ;BACK UP TO AN EVEN BYTE
1922 011724 010566 000002 MOV TTY,2(6) ;RESTORE ADDRESS
1923 011730 012605 3S: MOV (6)+,TTY ;RESTORE TTY
1924 011732 016704 000006 MOV IOTS,R4 ;RESTORE R4
1925 011736 000002 RTI ;RETURN
1926 011740 001000 FILCHR: 1000 ;FILCHR=0 (CHAR) FILCHR+1=2 (COUNT)
1927 011742 000000 .TYPE: 0 ;CHARACTER TYPE LOCATION
1928 011744 000000 IOTS: 0
1929
1930 011746 010346 READS: MOV R3,-(6) ;SAVE R3
1931 011750 012703 012052 1S: MOV @INPUT,R3 ;GET ADDRESS
1932 011754 022703 012072 CMP @INPUT+20,R3 ;BUFFER FULL?
1933 011760 001412 BEQ 4S ;YES - TYPE ""
1934 011762 105737 177560 2S: TSTB @177560 ;WAIT FOR
1935 011766 100375 BPL -4 ;A CHARACTER
1936 011770 113713 177562 MOVB @177562,(3) ;GET CHARACTER
1937 011774 142713 000200 BICB @200,(3) ;GET RID OF JUNK
1938 012000 122713 000177 CMPB @177,(3) ;IS IT A RUBOUT
1939 012004 001005 BNE 3S ;SKIP IF NOT
1940
1941 012006 000004 012012 4S: TYPE @,+2 ;ASCIZ ""(15)<12>
1942 012016 000754 BR 1S ;ZAP THE BUFFER AND LOOP

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BUS WINDOW EXERCISER
TTY INPUT ROUTINE

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1943	012020	111367	177716	38:	MOVB	(3),.TYPE	:SET UP FOR TYPING
1944	012024	000004	011742		TYPE	.TYPE	:ECHO IT
1945	012030	122723	000015		CMPB	015,(3)+	:CHECK FOR RETURN
1946	012034	001352			BNE	28	:LOOP IF NOT RETURN
1947	012036	105063	177777		CLRB	-1(3)	:ZAP RETURN (THE 15)
1948	012042	000004	000012		TYPE	.i2	:TYPE A LINE FEED
1949	012046	012603			MOV	(6)+,R3	:RESTORE R3
1950	012050	000207			RTS	PC	:RETURN
1951	012052	000020		INPUT:.	BLKW	20	:TTY INPUT AREA

E05

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BUS WINDOW EXERCISER MACY11 27(732) 05-OCT-76 11:05 PAGE 57
OCTAL DUMP OF A WORD & 18 BIT ADDRESS TYPER

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1952 ;          SOCIAL          OCTAL TYPEOUT ROUTINE
1953
1954 ; THIS ROUTINE IS USED TO TYPE AN OCTAL NUMBER ON THE TTY. IT WILL TYPE
1955 ; ALL 6 CHARACTERS. SUPPRESS LEADING ZEROES, TYPE AN 18 BIT ADDRESS, OR TYPE
1956 ; THE 16 BITS. IT IS CALLED VIA THE DUMP, SOUNP, DUMP18, OR BITYPE MACRO'S.
1957
1958 012112 012767 170101 000202 BITYPS: MOV      #170101,.PR      ;SET BIT FLAG ANS 16. CHARACTER COUNT
1959 012120 000411                BR          .PTIT        ;NOW TYPE IT IN BIT FORM
1960 012122 112767 000001 000172 PRINTR: MOVB   #1,.PR          ;SET ZERO FILL SWITCH
1961 012130 000402                BR          .+6          ;SKIP
1962 012132 005067 000164                PRINTS: CLR     .PR          ;SUPPRESS LEADING ZERO'S
1963 012136 112767 177772 000157          MOVB   #-6,.PR+1      ;SET COUNT
1964 012144 010446                .PTIT:  MOV     R4,-(6)      ;SAVE R4
1965 012146 012704 012324                MOV     #.PR+2,R4    ;SET POINTER TO FIRST ASCII CHAR.
1966 012152 105014                CLRB   (4)           ;CLEAR FIRST BYTE
1967 012154 000432                BR      .PRF         ;ROTATE FIRST BIT
1968 012156 010446                PRINTA: MOV    R4,-(6) ;SAVE R4
1969 012160 012704 012324                MOV     #.PR+2,R4    ;SET UP POINTER TO OUTPUT AREA
1970 012164 116714 166624                MOVB   MX,(4)        ;MX CONTAINS UPPER 5 BITS
1971 012170 006305                RSL    TTY           ;GET RID
1972 012172 006305                RSL    TTY           ;OF 3
1973 012174 006305                RSL    TTY           ;JUNK BITS
1974 012176 106214                ASRB   (4)           ;GET BIT13
1975 012200 006005                ROR    TTY           ;PACK IT
1976 012202 106214                ASRB   (4)           ;GET BIT14
1977 012204 006005                ROR    TTY           ;PACK IT
1978 012206 152724 000060                BISB   #'0,(4)+     ;MAKE IT ASCII
1979 012212 012767 175401 000102          MOV     #175401,.PR  ;-5, 1 - 5 BYTES AND FILL
1980 012220 105014                .PRL:  CLRB   (4)     ;CLEAR BYTE OF CHARACTER
1981 012222 032767 000100 000072          BIT     #100,.PR     ;BIT TYPING MODE?
1982 012230 001004                BNE    .PRF         ;YES - SKIP 2 ROTATES
1983 012232 006105                ROL    TTY           ;ROTATE BIT INTO C
1984 012234 106114                ROLB   (4)           ;PACK IT
1985 012236 006105                ROL    TTY           ;ROTATE BIT INTO C
1986 012240 106114                ROLB   (4)           ;PACK IT
1987 012242 006105                .PRF:  ROL    TTY           ;ROTATE BIT INTO C
1988 012244 106114                ROLB   (4)           ;PACK IT
1989 012246 105714                TSTB   (4)           ;IS IT ZERO?
1990 012250 001402                BEQ    .+6          ;SKIP INC
1991 012252 105267 000044                INCB   .PR          ;SET FILL SWITCH
1992 012256 105767 000040                TSTB   .PR          ;CHECK FILL SWITCH
1993 012262 001402                BEQ    .+6          ;SKIP BITSET
1994 012264 152724 000060                BISB   #'0,(4)+     ;MAKE INTO ASCII CHAR
1995 012270 105267 000027                INCB   .PR+1        ;INC COUNT
1996 012274 001351                BNE    .PRL         ;REPEAT
1997 012276 022704 012324                CMP    #.PR+2,R4    ;EMPTY BUFFER?
1998 012302 001002                BNE    .+6          ;SKIP IF NOT
1999 012304 112724 000060                MOVB   #'0,(4)+     ;LOAD 1 ZERO
2000 012310 105014                CLRB   (4)           ;NULL TERMINATOR
2001 012312 000004 012324                TYPE   .PR+2        ;TYPE IT
2002 012316 012604                MOV     (6)+,R4      ;RESTORE R4
2003 012320 000207                RTS     PC           ;RETURN
2004 012322 000012                .PR:   .BLKW   12    ;COUNT, SWITCH, AND OUTPUT BUFFER

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2005 012346 012777 012474 000126 PDOWN: MOV      ILLUP, @PUVECS ; SET FOR FAST UP
2006 012354 012777 000340 000122      MOV      @340, @PUVECS+2 ; PRIO:7
2007 012362 010046      MOV      R0, -(6) ; PUSH R0 ON STACK
2008 012364 010146      MOV      R1, -(6) ; PUSH R1 ON STACK
2009 012366 010246      MOV      R2, -(6) ; PUSH R2 ON STACK
2010 012370 010346      MOV      R3, -(6) ; PUSH R3 ON STACK
2011 012372 010446      MOV      R4, -(6) ; PUSH R4 ON STACK
2012 012374 010546      MOV      R5, -(6) ; PUSH R5 ON STACK
2013 012376 010667 000076      MOV      SP, SAVR6 ; SAVE SP
2014 012402 012777 012412 000072      MOV      @PUPS, @PUVECS ; SET UP VECTOR
2015 012412 000000      HALT ; WAIT FOR PF
2016
2017 012412 016706 000062      PUPS:  MOV      SAVR6, SP ; GET SP
2018 012416 005001      CLR      R1 ; WAIT LOOP FOR THE TTY
2019 012420 005201      IS:    INC      R1 ; WAIT FOR THE INC
2020 012422 001376      BNE     $ ; OF WORD
2021 012424 012605      MOV      (6)+, R5 ; POP STACK INTO R5
2022 012426 012604      MOV      (6)+, R4 ; POP STACK INTO R4
2023 012428 012603      MOV      (6)+, R3 ; POP STACK INTO R3
2024 012430 012602      MOV      (6)+, R2 ; POP STACK INTO R2
2025 012432 012601      MOV      (6)+, R1 ; POP STACK INTO R1
2026 012434 012600      MOV      (6)+, R0 ; POP STACK INTO R0
2027 012440 012737 012346 000024      MOV      @PDOWN, @24 ; SET UP THE POWER DOWN VECTOR
2028 012446 012737 000340 000026      MOV      @340, @26 ; PRIO:7
2029 012454 000004 012460      TYPE    +2 ; ASCIZ <15><12>"POWER"
2030 012470 000167 170360      JMP     RTPF ; JMP TO USER ADDRESS
2031
2032 012474 000000      ILLUP: HALT ; THE POWER UP SEQUENCE WAS STARTED
2033 012476 011062      BR. -2 ; BEFORE THE POWER DOWN WAS COMPLETE
2034
2035 012500 000070      SAVR6: 0 ; PUT THE SP HERE
2036 012502 000024 000026      PUVECS: 24, 26 ; POWER UP VECTOR
2037 012506 000010      PATCH1: .BLKW 10 ; PATCH AREA #1
2038 012526 000010      PATCH2: .BLKW 10 ; PATCH AREA #2
2039
2040      . = 17200
2041
2042 017200 000300      ENDP:  .BLKB 300
2043
2044      000001      .END

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H05

MAINDEC-11-DZDAB-A BUS WINDOW EXERCISER MACY11 27(732) 05-OCT-76 11:05 PAGE 61
 DZDABA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

ER3	007754	1279	1549#												
EX	011170	865*	869*	927*	931*	995*	999*	1060*	1064*	1117*	1121*	1230*	1234*	1400	
		1759#													
EXCODE	G03540	759	780#	794											
FILCHR	011740	1906	1907	1926#											
FNDCSR	001724	547	553	569#											
FND1	002054	592#	596												
FND2	002402	623	649#												
FND3	002500	657	663#												
FUNCTN=	104450	697	699	700	718	782	791	833	845	858	866	895	907	920	
		928	954	966	979	996	1028	1040	1053	1061	1094	1107	1118	1197	
		1221	1231	1284#	1403	1418	1492	1501	1539	1544	1576	1597	1884		
GDATA	007232	1408	1423#	1497											
GETCOR	000514	417	427#	429											
HLT	= 104000	384#													
HLTADR	001012	453#													
ICNT	001000	449#													
ILLUP	012474	2005	2032#												
INPUT	012052	725	730	735	740	745	750	756	771	1552	1746*	1747*	1748	1931	
		1932	1951#												
IOTS	011572	464	1895#												
ICTIS	011744	1895*	1924	1928#											
IOWAD	011422	622*	687*	1470	1580*	1595*	1837#								
KIPAR0=	172340	626*	1601*	1772#											
KIPAR2=	172344	519*	522*	523	525	641*	1774#								
KIPAR3=	172346	643	1776#												
KIPAR7=	172356	633*	1605*	1778#											
KIPDR0=	172300	627*	1602*	1773#											
KIPDR2=	172304	629	1603*	1775#											
KIPDR3=	172306	1604*	1777#												
KIPDR7=	172316	634*	1606*	1779#											
LAO	001010	452#													
LIMIT	001020	456#	543*	702											
LOADR	000562	418	445#												
LOOGET	011426	535	1848#												
LOORES	011502	445	1865#												
MAP	010244	1283	1601#												
MAPIT =	104446	517	1283#												
MEMORY	007444	482*	1308	1311*	1313*	1315*	1423	1485#							
MIN	001016	455#	480*	1298											
MMERR	007614	476	1527#												
MMN	011270	494*	625*	681	1796#										
MX	001014	454#	481*	602*	605*	1293	1298*	1301*	1302	1306	1317*	1318	1322	1581	
		1592	1970	2005											
M3	011172	874	936	1034	1069	1126	1239	1760#							
M4	011202	876	938	1006	1071	1128	1241	1762#							
N	= 000052	399#	1264	1265#	1266#	1267#	1268#	1269#	1270#	1271#	1272#	1273#	1274#	1275#	
		1276#	1277#	1278#	1279#	1280#	1281#	1282#	1283#	1284#	1285#				
NEXT	= 104444	781	1282#	1491											
NODEV	003466	719	769#												
NOERR	010542	1633	1652#												
NOXT	001574	541	543#												
NOTRO	011274	483*	1343	1380	1673*	1681*	1688*	1798#							
NXT	006356	1282	1291#												
OFFSET	011234	598*	1769#												
OLIM	001022	457#	702*	707*	711*	712*	714*	715*	716*	1293					

ADD	506	522	555	595	644	789	1089	1139	1256	1385	1430	1432	1445	1472	1475
	1480	1720	1858	1917	1920										
ASL	526	604	609	610	616	619	1196	1220	1371	1516	1589	1971	1972	1973	
ASR	590	594	707	711	712	714	715	716	1361	1362					
ASRB	1974	1976													
BCC	617	620	1517												
BOS	1434	1588													
BEQ	435	486	541	593	665	669	673	682	706	710	1300	1304	1310	1320	1324
	1344	1346	1352	1366	1381	1383	1401	1410	1550	1584	1708	1749	1903	1933	1990
	1993														
BGT	524	1091	1158	1425											
BIC	528	640	678	686	687	723	1325	1364	1579	1580	1653	1671	1674	1682	1691
	1698	1700	1706	1752	1856	1921									
BICB	1355	1747	1937												
BIS	618	621	679	722	724	728	733	738	743	748	754	1474	1594	1595	1679
	1689														
BISB	1350	1356	1672	1680	1690	1699	1978	1994							
BIT	434	488	664	668	672	684	703	705	709	870	932	1000	1065	1122	1235
	1291	1295	1299	1303	1319	1323	1345	1347	1351	1357	1382	1549	1577	1583	1707
	1898	1981													
BLT	653	655	1294												
BMI	1151	1168	1258	1309	1424	1619									
BNE	433	489	496	510	557	583	607	632	647	685	704	726	731	736	741
	746	751	757	787	871	933	1001	1066	1123	1154	1171	1175	1236	1292	1296
	1348	1358	1414	1416	1500	1543	1553	1578	1593	1722	1862	1869	1879	1899	1905
	1911	1919	1939	1946	1982	1996	1998	2020							
BPL	868	930	988	990	998	1012	1063	1077	1120	1134	1149	1166	1233	1459	1633
	1850	1909	1914	1935											
BR	511	547	553	560	574	596	657	667	671	708	713	794	992	1155	1159
	1172	1261	1312	1314	1316	1354	1384	1446	1453	1590	1614	1724	1738	1915	1942
	1959	1961	1967												
CLR	430	461	462	480	482	483	484	494	505	529	591	602	614	626	676
	698	721	762	769	792	827	832	844	857	865	889	894	906	919	927
	948	953	965	978	991	995	1022	1027	1039	1052	1060	1117	1190	1230	1311
	1342	1353	1404	1405	1457	1493	1494	1613	1673	1739	1883	1885	1962	2018	
CLRB	1947	1966	1980	2000											
CMP	432	485	509	523	548	554	576	582	652	654	725	730	735	740	745
	750	756	786	1090	1157	1174	1257	1293	1365	1409	1471	1479	1552	1719	1849
	1861	1868	1918	1932	1997										
CMPB	1748	1904	1938	1945											
COM	1435	1436	1541												
COMB	492	1313													
DEC	531	556	606	631	646	1721	1910								
EMT	384														
HALT	402	436	446	559	575	656	1260	1379	1460	1522	1534	1625	1645	1667	1723
	2015	2032													
INC	507	518	534	869	931	999	1064	1121	1234	1301	1317	1415	1499	1542	2019
INCB	1991	1995													
IOY	385														
JMP	405	413	417	418	419	438	487	729	734	739	744	749	755	759	763
	773	1176	1210	1259	1654	1709	1743	1886	2030						
JSR	445	478	535	538	572	613	662	694	695	790	793	828	875	878	890
	937	940	949	1005	1008	1023	1070	1073	1088	1127	1130	1191	1240	1243	1307
	1326	1375	1378	1408	1497	1530	1533	1557	1560	1563	1624	1638	1641	1644	1735
MOV	410	411	412	427	431	437	463	464	465	466	467	468	469	470	471
	472	473	474	475	476	477	479	481	490	493	503	504	519	520	525

	532	533	537	543	545	549	550	551	571	577	578	579	581	584	585
	586	587	597	598	601	603	608	611	612	615	622	623	625	627	628
	629	630	633	634	635	641	642	643	645	648	649	650	658	660	661
	663	666	670	674	675	677	680	683	692	696	701	702	719	720	727
	722	737	742	747	757	753	758	780	783	784	785	788	830	831	842
	843	855	856	872	877	892	893	904	905	917	918	934	939	951	952
	963	964	976	977	986	1002	1007	1010	1025	1026	1037	1038	1050	1051	1067
	1072	1075	1084	1092	1096	1097	1109	1110	1124	1129	1132	1140	1141	1143	1145
	1161	1162	1194	1195	1204	1205	1207	1218	1219	1237	1242	1253	1298	1302	1306
	1318	1322	1349	1359	1360	1363	1367	1368	1369	1374	1377	1406	1407	1427	1438
	1439	1447	1449	1468	1469	1470	1473	1476	1477	1478	1495	1496	1498	1507	1508
	1509	1510	1511	1512	1513	1514	1515	1518	1519	1529	1532	1538	1540	1554	1556
	1559	1562	1581	1582	1585	1591	1601	1602	1603	1604	1605	1606	1612	1621	1623
	1632	1635	1637	1640	1643	1681	1688	1697	1714	1715	1716	1732	1733	1734	1736
	1737	1740	1741	1742	1751	1748	1851	1857	1859	1860	1865	1866	1867	1881	1895
	1896	1897	1900	1901	1916	1922	1923	1924	1930	1931	1949	1958	1964	1965	1967
	1969	1979	2002	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2017	2017
	2022	2023	2024	2025	2026	2027	2029								
	2255	1746	1906	1907	1912	1936	1943	1960	1973	1970	1999				
MOV8	583	1586													
NEG	798	800	803	805	806	808	811	813							
NEG8	437														
NOP	428	1731													
RESET	605	1373	1429	1441	1442	1443	1444	1983	1985	1987					
ROL	801	802	809	810	1984	1986	1988								
ROLB	636	637	638	639	1431	1433	1448	1451	1452	1587	1852	1853	1854	1855	1975
ROR	1977														
RORB	799	804	807	812											
RTI	655	848	861	880	898	910	923	942	957	969	982	1013	1031	1043	1056
	1078	1100	1113	1135	1146	1163	1200	1208	1224	1245	1328	1386	1402	1419	1461
	1481	1502	1512	1523	1535	1545	1551	1565	1598	1607	1626	1646	1675	1683	1692
	1701	1750	1753	1925											
RTS	814	1437	1520	1718	1863	1870	1880	1950	2003						
SEC	1372														
SUB	429	1142	1254	1622	1636										
SUB8	527	589	1315	1428	1440	1450	1652								
TRAP	383	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277
	1278	1279	1280	1281	1282	1283	1284								
TST	491	495	508	521	540	546	552	580	592	624	659	681	867	929	989
	997	1062	1119	1144	1148	1150	1153	1165	1167	1170	1206	1232	1308	1343	1380
	1400	1412	1413	1423	1458	1592	1618	1717	1878						
TST8	987	1011	1075	1133	1902	1908	1913	1934	1989	1992					
.ASCII	1765														
.ASCII2	537	540	543	545	559	571	574	601	652	694	762	771	773	874	936
	1004	1069	1126	1239	1306	1322	1371	1377	1529	1532	1556	1559	1562	1621	1635
	1640	1643	1760	1762	1883	1942	2030								
.BLKB	2042														
.BLKW	1951	2004	2037	2038											
.ENABL	1	323													
.END	2044														
.ENDC	399	873	880	935	942	1003	1013	1068	1078	1125	1135	1238	1245	1849	1866
	1870	1902	1926	1933	1952	1980	2005	2013	2021	2030	2031				
.EVEN	537	540	543	545	559	571	574	601	652	694	762	771	773	874	936
	1004	1069	1126	1239	1306	1322	1371	1377	1529	1532	1556	1559	1562	1621	1635
	1640	1643	1764	1883	1942	2030									
.IF	399	873	880	935	942	1003	1010	1068	1075	1125	1132	1238	1245	1848	1865

	1870	1898	1916	1932	1951	1952	1968	2005	2013	2021	2029	2030			
.IFF	1848	1865	1926	1933	1952	2030									
.IIF	331	332	333	334	335	336	337	338	339	1951	2005				
.IRP	2007	2021													
.LIST	1	323	399	402	447	537	540	543	545	559	571	574	601	652	688
	694	762	771	773	774	819	865	874	881	927	936	943	995	1004	1014
	1060	1069	1079	1117	1126	1182	1230	1239	1246	1264	1265	1266	1267	1268	1269
	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284
	1285	1286	1306	1322	1371	1377	1529	1532	1556	1559	1562	1608	1621	1635	1640
	1643	1799	1839	1883	1887	1930	1942	1952	2005	2030					
.MACRO	1	447	1246												
.MCALL	323	399													
.MLIST	1	323	399	402	447	537	540	543	545	559	571	574	601	652	688
	694	762	771	773	774	819	865	874	881	927	936	943	995	1004	1014
	1060	1069	1079	1117	1126	1182	1230	1239	1246	1264	1265	1266	1267	1268	1269
	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284
	1285	1286	1306	1322	1371	1377	1529	1532	1556	1559	1562	1608	1621	1635	1640
	1643	1799	1839	1883	1887	1930	1942	1952	2005	2030					
.PAGE	993	1246	1887	1952	2005										
.REM	1														
.REPT	402														
.SBTTL	447	688	774	819	865	881	927	943	995	1014	1060	1079	1117	1182	1230
.TITLE	1246	1286	1608	1799	1839	1887	1930	1952	2005						
	323														

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

*, DZDABA. SEQ/SOL/CRF/PAGNUM/NL: TOC=STEVE.SML, DZDABA.P11
RUN-TIME: 22 28 3 SECONDS
RUN-TIME RATIO: 369/54=6.7
CORE USED: 26K (51 PAGES)

