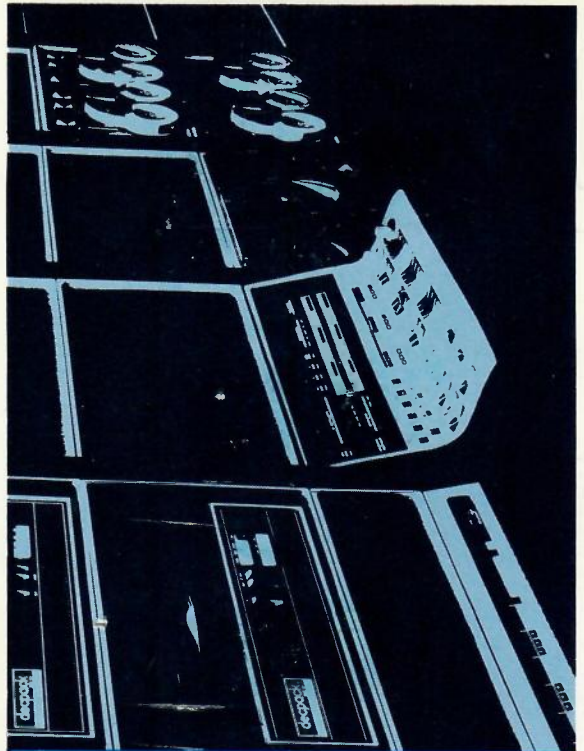


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MONITOR STARTUP PROCEDURE

The PDP-15 requires one of two startup procedures, depending upon the system configuration being used. The Unichannel-15 configuration requires that PIREX be loaded into the PDP-11 memory before loading the Bootstrap; the standard PDP-15 configuration requires only the Bootstrap.

When using the Unichannel-15 configuration, load ABSL11 into location 17700₈ by a hardware read-in. The ABSL11 program will halt until the operator starts the PDP-11 processor. The START addresses for the PDP-11 are as follows:

60000₈ — 4K systems, 100000₈ — 8K systems, 120000₈ — 12K systems

To start the PDP-11 processor, set the address switches to the desired values as shown above. Set the HALT/ENABLE switch on ENABLE, press the LOAD ADDRESS switch, and then the START switch.

Next, load a PDP-11 absolute paper tape (such as PIREX) into the PDP-15 paper tape reader and press the CONTINUE switch on the PDP-15 console. The ABSL11 program will read the absolute information into the PDP-15 memory and then into the PDP-11 memory.

When using either system configuration, place the proper Bootstrap (DECdisk, Disk Cartridge, or Disk Pack) in the paper tape reader. Set the PDP-15 ADDRESS to 37637 (or highest bank). Press STOP and RESET, then READIN. To restart the Bootstrap: set the PDP-15 ADDRESS to 37646 (or highest bank), press STOP and RESET, then START.

Set the PDP-15 address to:

For Start: 37637—16K	For Restart: 37646—16K
57637—24K	57646—24K
77636—52K	77646—32K

KEYBOARD COMMANDS

Terminate all commands, except CTRL commands, with either RETURN or ALT MODE.

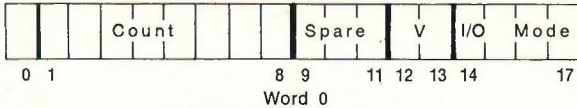
SYSTEM PROGRAM LOAD COMMANDS

CHAIN	EDIT	LOAD	SGEN
DDT	EDITVP	MACRO	SRCCOM
DDTNS	EDITVT	MAC11 *	UPDATE
DTCOPY	EXECUTE	MTDUMP	8TRAN
DUMP	F4	PATCH	89TRAN
SPOOL*	GLOAD	PIP	

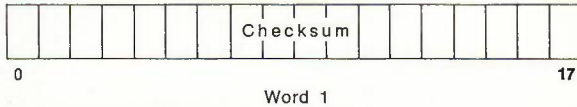
MISCELLANEOUS COMMANDS

In the following examples, square brackets [] indicate optional quantities; braces { } indicate a choice of one; and a required space is indicated by `␣`.

Command	Function			
API <code>␣</code> { ON / OFF }	Enable or disable API			
A [SSIGN] <code>␣</code> { dev / <uic> } <code>␣</code> n [, n , ... / ... / ...]	Attach device and/or UIC to DAT/UFD slot(s). (n = DAT/UFD slot)			
BANK <code>␣</code> { ON / OFF }	Set system's direct addressing mode to Bank (8K) or Page (4K).			
BUFFS <code>␣</code> n	Set number (n) buffers in Monitor's buffer pool.			
C [HANNEL] <code>␣</code> { 7 }	Set MAGtape channel count.			
D [ATE] [<code>␣</code> mm [/] dd [/] yy]	Examine or enter current date (mm = month, dd = date, yy = year, / = optional delimiter)			
GET <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>P</td></tr> <tr><td>T</td></tr> <tr><td>S</td></tr> </table> [<code>␣</code> n] [<code>␣</code> filename <code>␣</code> ext]	P	T	S	Restore core image from QAREA or device on .DAT -14 if filename specified. Start automatically at CTRL P, T, S address if specified. (n = Disk Pack unit number.)
P				
T				
S				
H [ALT]	Set Monitor to execute unconditional halt after unrecoverable IOPS error.			



Bit 0 If 1, ignore checksum on binary output
 1 - 8 Word Pair Count (incl. header pair)
 9 - 11 Unused
 12 - 13 Validity Bits: 0 = Data correct
 1 = Parity error
 2 = Checksum error
 3 = Buffer overflow
 14 - 17 I/O Mode bits:
 0 = IOPS Binary 4 = Unused
 1 = Image Binary 5 = EOF encountered
 2 = IOPS ASCII 6 = EOM encountered
 3 = Image Alpha 7 = MAGtape label



Bits 0-17 contain checksum if computed (0's if not)

SYSTEM MACROS

.INIT [-] ds,dd,restri
 CAL+dd*100 [-] ds & 777
 1
 restri
 0

.DELETE [-] ds,namptr
 CAL+1000 [-] ds & 777
 2
 namptr

.RENAM [-] ds,namptr
 CAL+2000 [-] ds & 777
 2
 namptr

.FSTAT [-] ds,namptr
 CAL+3000 [-] ds & 777
 2
 namptr

.RTRAN [-] ds,d,relblk,bufadd,beg,cnt
 CAL+4000 [-] ds & 777
 2
 d*400000+relblk
 bufadd
 beg
 -cnt

.RAND [-] ds,namptr
 CAL+5000 [-] ds & 777
 2
 namptr
 0

.SEEK [-] ds,namptr
 CAL [-] ds & 777
 3
 namptr

.ENTER [-] ds,namptr,p
 CAL+1000*p [-] ds & 777
 4
 namptr

.WRITE [-] ds,m,bufadd,cnt
 CAL+m*1000 [-] ds & 777
 11
 bufadd
 -wdc

.WAIT [-] ds
 CAL [-] ds & 777
 12

.WAITR [-] ds,busyad
 CAL+1000 [-] ds & 777
 12
 busyad

.TRAN [-] ds,d,blk,bufadd,cnt
 CAL+d*1000 [-] ds & 777
 13
 blk
 bufadd
 -cnt

.TIMER [-] nnnnn,addres
 CAL
 14
 -nnnnn
 addres

.EXIT
 CAL
 15

.GVBUF
 CAL
 22
 0

.GTBUF
 CAL
 21
 0

.CLEAR [-] ds
 CAL [-] ds & 777
 5

.CLOSE [-] ds
 CAL [-] ds & 777
 6

.MTAPE [-] ds,nn
 CAL+nn*1000 [-] ds & 777
 7

.READ [-] ds,m,bufadd,cnt
 CAL+m*1000 [-] ds & 777
 10
 bufadd
 -wdc

.USER [-] ds,uic
 CAL [-] ds & 777
 23
 uic

.OVERLA [-] namptr
 CAL
 24
 namptr

.GET [-] f,namptr,u
 CAL+f
 25
 u*100000+namptr

.PUT [-] f,namptr,u
 CAL+f
 26
 u*100000+namptr

Abbreviations Used With System Macros

address = Address for control transfer
 beg = First physical word of block
 blk = Block number
 bufadd = Buffer address
 cnt = Number of words to transfer
 d = Direction for .TRAN
 0 = input forward
 1 = output forward
 2 = input reverse (DECtape)
 3 = output reverse (DECtape)
 dd = Direction of .INIT
 0 = input
 1 = output
 11 = output with write check
 ds = DAT/UFDT slot number
 f = Function:
 0 = start at address in LOC+3 of .PUT
 1 = start at CTRL P address
 2 = start at CTRL T address
 3 = start at CTRL S address
 4 = start at "f" specified in PUT
 mic = Master Identification Code
 busyad = address to return to if I/O is still underway
 nnnn = Time interval in ticks
 relblk = Relative Block No.
 restri = Restart address
 u = Device unit number
 uic = User Identification Code
 nn = .MTAPE subfunction*
 0 = rewind to load point
 2 = backspace record
 3 = backspace file
 4 = write end-of-file
 5 = skip record
 6 = skip file
 7 = skip to logical EOT
 10 = 7-ch, EP, 200 BPI
 11 = 7-ch, EP, 556 BPI
 12 = 7-ch, EP, 800 BPI
 13 = 9-ch, EP, 800 BPI
 14 = 7-ch, OP, 200 BPI
 15 = 7-ch, OP, 556 BPI
 16 = 7-ch, OP, 800 BPI
 17 = 9-ch, OP, 800 BPI
 *EP = even parity; OP = odd
 namptr = Pointer to 3-word block containing filename and extension in .SIXBT

p = disk file protection code
 1 = file is unprotected
 2 = file is WRITE protected
 3 = file is READ/WRITE protected

m = I/O mode
 0 = IOPS Binary
 1 = Image Binary
 2 = IOPS ASCII
 3 = Image Alphanumeric
 4 = Dump Mode
 wdc = word count

.SCOM TABLE ENTRIES

.SCOM = location 100s

.SCOM	First free register below Bootstrap
.SCOM+1	First free register above Resident Monitor
.SCOM+2	Lowest free register
.SCOM+3	Highest free register
.SCOM+4	Hardware options available: (Bits 4,5,10,15-17 reserved)
.SCOM+5	Core Image System Program Starting Address
.SCOM+6	
Bit	Function
0	DDT in Core
1	GLoad
2	DDTNS
3-17	USER Program Starting Address

Bit	Function	Bit	Function
0	1 = API	8	1 = No CTRL Q area
1	1 = EAE	9	1 = Parity Err. (.TRAN in Dump Mode)
2	1 = TTY is Mod 35/37	11	1 = Bank Mode System
3	1 = Nonresident Monitor	12-13	Line Printer Type
6	1 = 9-channel MAGtape	00=None	10=120 lines
7	1 = Page Mode operation	01=80 lines	11=132 lines

.SCOM+7 - 11	Handler addresses for Linking Loader or filename for Execute and QFILE operation
.SCOM+12 - 15	Transfer Vectors for API Channel Registers 40s-43s
.SCOM+16	PC on keyboard interrupts
.SCOM+17	AC on keyboard interrupts
.SCOM+20	Bit 0 = 1 = Extra 4K (12K, 20K, etc.) 1 = 1 = UC15, RK05 based system 2 = 1 = 30 cps LA30 console device
.SCOM+21	Bits 3 - 17 = 1st free location in extra 4K
.SCOM+22	MAGtape status register
.SCOM+23	Reserved for MAGtape handler
.SCOM+24	Bits 3 - 17 = Address of .DAT
.SCOM+25	Number of positive .DAT slots
.SCOM+26	Pointer to UFDT slot 0
.SCOM+27	Number of buffers
.SCOM+28	Number of words per buffer
.SCOM+29	Pointer to buffer transfer vector table
.SCOM+30	Pointer to first entry in overlay table
.SCOM+31	Bad block number on IOPS 72
.SCOM+32	CTRL X status register
.SCOM+33	Bit 1 = 1 Half-size buffer for VT15 1 = 1 VT15 buffer setup already 2 = 1 VT ON issued 17 = 1 Display Mode on (CTRL X)

.SCOM+34	Reserved
.SCOM+35	Instruction to clear TT busy switch
.SCOM+36	Number of entries in mass storage
.SCOM+37	Entry point for expanded errors
.SCOM+40	JMP to expanded error handler
.SCOM+41	Current UIC (default "SCR")
.SCOM+42	Bit Register:

Bit	Function
0	1 = MIC login successful
1	1 = Nonresident Monitor .EXIT
2	1 = Nonresident Monitor .OVERLA
3	0 = TTA on .DAT -12 for NRM load 1 = LPA on .DAT -12 for NRM load
4	1 = QDUMP issued
5	1 = HALT issued
15	1 = Load Syst. Dev handler for .DAT -7
16	1 = KEEP issued

.SCOM+43,44	Name of system program to be loaded (.SIXBT)
.SCOM+45,46	Name of Non-Resident Monitor (.SIXBT)
.SCOM+47	Date (mmddyy)

.SCOM TABLE ENTRIES (Cont.)

.SCOM+50	Time (hhmmss)
.SCOM+51	Elapsed time in ticks
.SCOM+52	Reserved
.SCOM+53	Reserved for CTRL X
.SCOM+54	Default Protection Code
.SCOM+55	JMP to routine for using the Bootstrap for .TRAN to system device
.SCOM+56	2's complement of time limit in seconds (0 if no limit)
.SCOM+57	System device code for use by Linking Loader
.SCOM+60	2's complement of number of ticks until clock interrupt specified in last .TIMER
.SCOM+61	Entry point for user clock interrupt routine specified in last .TIMER
.SCOM+62	Address of first word of mass storage busy table
.SCOM+63	Number of words/mass storage active entry (busy table)
.SCOM+64	Contains JMP to CTRL Q/GET routine
.SCOM+65	QFILE communication register
.SCOM+66	First block of CTRL Q area
.SCOM+67	First address -1 of CTRL Q area
.SCOM+70	Size of CTRL Q area
.SCOM+71	Starting address after DUMP or GET
.SCOM+72	Address to go to after CTRL Q
.SCOM+73	2's comp. of number of ticks left for next second
.SCOM+74	2's comp. of number of ticks in a second
.SCOM+75	Reserved
.SCOM+76*	Bit 0 = 1 = Spooling enabled 1 = 1 = Spooling active 3 = MAC 11 communication 5-17 = Spool area last block #
.SCOM+77*	Bits 6-17 = Spool area size in blocks
.SCOM+100*	Pointer to TCB address table
.SCOM+101 through .SCOM+105	Unused

.DAT TABLE ENTRIES

.DAT = C(.SCOM+23)

If handler is in core, Bits 0-2 = Unit number
3-17 = Entry address

If handler is not in core, Bits 0-2 = Unit number
3-17 = IOBLK index number

IOPS ERRORS

0 Illegal CAL function code
 1 CAL* illegal
 2 .DAT slot error
 3 Illegal interrupt
 4 I/O device not ready
 5 Setup CAL issued with no skip chain entry
 6 Illegal handler function
 7 Illegal Data Mode
 10 File still active
 11 .SEEK/.ENTER/.RAND not executed
 12 Terminal Device Error
 13 File not found
 14 Directory full
 15 Device full
 17 Too many files for handler
 20 Disk hardware failure
 21 Illegal disk address
 22 Two output files on one tape unit
 23 Illegal Word Pair Count
 25 Negative or 0 character count (IOPS ASCII write)
 X or Y increment too large (>2**14) (Binary write)
 27 Illegal write type
 30 API software level not serviced
 31 Nonexistent memory reference
 32 Memory Protect violation
 33 Memory Parity error
 34 Power fail with no user-defined save routine
 37 Print line overflow
 40 Header label error (MAGtape)
 41 Directory Format error (MAGtape)
 42 Accessibility Map overflow (MAGtape)
 43 Directory recording error (MAGtape)
 44 Logical EOT found (MAGtape)
 45 Long input record (MAGtape)
 46 Attempt to delete system (SYS) file
 47 Illegal Horizontal TAB (line printer)
 51 Illegal User File Directory
 55 No buffers available
 61 Parity error in Directory, Bit Map, or RIB
 63 Protected User File Directory
 64 Protected File
 65 Unrecoverable MAGtape error
 66 Relative Block not within file
 67 Illegal DEC/Disk word transfer starting
 address or count
 70 Buffer size too small
 71 Empty UFD
 72 Input Parity or Write Check error
 73 Null File Name
 74 Disk System file structure degradation
 75 Disk System file structure degradation
 76 Disk System file structure degradation
 77 Undersized or nonexistent CTRL Q Area

UC15 SYSTEM ERROR MESSAGES

The Error Messages from tasks running under PIREX have the following format:

IOPSUC YYY XXXX

Where YYY denotes one of the following:

EST	Stop all I/O	task
ESD	Software Driver	task
RKU	Disk Cartridge	task
DTU	DEctape	task
LPU	Line Printer	task
ODU	Card Reader	task
PLU	Plotter	task
ESP	Spooler	task
EMA	MACII	task

XXXX denotes one of the following:

3—Illegal interrupt to driver
 4—Device not ready
 12—Device failure
 15—Spooler full—warning message
 45—Greater than 80 columns in card
 55—No spooler buffers available
 72—Illegal punch combinations
 74—Timing error—card column lost—retry card
 75—Hardware busy—driver not
 76—Hardware error between cards
 77—Unrecognized task request—device not present
 400—Spooler empty—PDP15 input request pending

Additional IOPS error messages:

Error Code	Meaning
200	Non-existent task referenced.
300	Illegal API level given (illegal values are changed to level 3 and processed).
400	Illegal directive code given.
500	No free core in the PDP-11 local memory.
600	ATL node for this TCN missing.
777	Request node was not available from the POOL: i.e., the POOL was empty and the referenced task was currently busy or the task did not have an ATL node in the Active Task List.