QUICK REFERENCE

Exemplar OpenBoot

Order No. DSW-854
Part No. 710-029430-001
OBP Version 3.0 Field Trial Edition
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Syntax

Commands entered at the OpenBoot `ok` prompt are executed left-to-right after pressing <RETURN>. Enter multiple commands on a single line separated by one or more spaces.

Help Commands

`help`	Lists main help categories.

Emergency Keyboard Commands

<ESC>	Hold down during boot sequence. Interrupts auto-boot sequence when *auto-boot?* parameter is `true`.

System Information Display Commands

`banner`	Displays the power-on banner.
`date` *[datestring]*	Displays or set the clock/calendar chip date. (Syntax like HP-UX `date(8)` command.
`lifls` */flash@1,0*	Lists Firmware directory in Flash RAM.
`list`	Verifies boot files intact in a directory.
`.memory`	Displays the current hypernode memory configuration.
`.obp`	Displays the OBP loader release and build version.
.post	Displays POST release number.

Alias Commands

`devalias`	Displays all current device aliases.
`devalias` *alias*	Displays the device path for corresponding *alias*.
`devalias` *alias device-path*	Defines a temporary alias representing the device path. If an alias with the same name already exists, the new value supersedes the old. Use `nvalias` to permanently change alias in NVRAM.
`nvalias` *alias device-path*	Stores `devalias` *alias device-path* in NVRAMRC. (Alias persists until `nvunalias` or `set-defaults` command executes.)
`nvunalias` *alias*	Deletes the named alias from NVRAMRC. Run `reset` to clear aliases.

Device Tree Commands

`.attributes`	Displays the current node properties.
`.properties`	Alias for .attributes.
`cd` *device-path*	Selects the indicated device node, making it the current node.
`cd` *node-name*	Selects the first node with the given name in the subtree below the current node.
`cd ..`	Selects the device node that is the parent of the current node.
`cd /`	Selects the root machine node.
`device-end`	Deselects the current device node, leaving no node selected.
`go`	Begins execution or a loaded program or resumes execution of a halted program.
`ls`	Lists device paths.
`pwd`	Displays the device path name that names the current node.
`show-devs` *[device-path]*	Displays all the devices known to the system directly beneath a given level in the device hierarchy.
`words`	Displays the names of the current node's methods.

Boot Commands

`boot` *[device] [boot-directory] [boot-arguments]*

[device]	Full device path name or alias. Examples: `sd0a` (alias for default SCSI disk root partition) `rmt0` (alias for default SCSI DAT install tape drive) `/pci@fe,10000/qlisp@0,0/scl@2,0:afddi0` (alias for FDDI network controller)
[boot-directory]	HFS full directory pathname in the boot partition contacting the three boot files (`mach`, `server`, `tunables`).
[boot-arguments]	*-s* Boots SPP-UX in single-user mode. (if boot-file=mach) *-mk_debug* Microkernel waits for `kgdb` to attach. *-halt* Halt after loading (e.g., to set breakpoints). *-noheader* boot-file is not `a.out`. (`.fth` or CODE files).
load	Loads SPP-UX or a stand-alone program and returns to the ok prompt without starting the program. Use `go` to start the loaded program. Command arguments same as `boot`.
reset	Resets system. Similar to invoking `do_reset` from the test station.
soft-reset	Resets system forcing core mode reboot. (Debug mode.)

Viewing and Changing Configuration Parameters

`mkmap` *[-n] unit device*	Defines an SPP-UX logical-unit to physical-unit mapping, a label for tape and network devices unlike disk labels. The *-n* switch creates a logical-unit property with no physical unit information; use with network adaptors only.
`password`	Sets the security mode password. Prompts for an 8 character password and verification.
`printenv` *[parameter]*	Displays all current and default values (usually shown as decimals). `printenv` *parameter* displays the named parameter current value.
`rmmap` *device*	Undefines a mapping created with `mkmap`.
`show-map` *[device / unit]*	Displays the logical unit mapping for named device or all entries with same logical unit number. Used alone, displays all logical-unit mappings for the current hypernode.
`setenv` *[+g / -g] parameter value*	Sets the parameter to named decimal or text value. *+g* sets the global attribute, *-g* clears it. The global attribute causes Exemplar OBP to automatically update the designated parameter on every hypernode. (To set a numeric parameter using a hexadecimal number, use the OBP word `to`, e.g.: `h# 30 screen-#rows`
`set-default` *parameter*	Resets the named parameter value to factory default.
`set-defaults`	Resets all parameter values to factory defaults. (Note: This function takes about 60 seconds to complete).

Restricted Monitor Commands

`b` *[-s]*	Same as `boot`.
`c`	Same as `go`.

NVRAMRC Editor Commands

`nvedit`	Invokes the NVRAMRC editor. Edit either temporary buffer data present from a previous `nvedit` session or current NVRAMRC contents.
`nvquit`	Discards temporary buffer contents without writing to NVRAMRC. Prompts for confirmation.
`nvrecover`	Enters the editor and recovers NVRAMRC contents lost by `set-defaults` execution if `nvedit` was not executed since the NVRAMRC contents loss and `nvrecover` execution.
`nvrun`	Executes temporary buffer contents.
`nvstore`	Copies temporary buffer contents to NVRAMRC.

NVRAMRC Editor Navigation Commands

	Prev. Line	Beg. Line	Prev. Word	Prev. Char	Next Char	Next Word	End Line	Next Line
Move	`^-P`	`^-A`	`!B`	`^-B`	`^-F`	`!F`	`^-E`	`^-N`
Delete		`^-U`	`^-W`	`Del`	`^-D`	`!D`	`^-K`	
	Retype line			`^-R`				
	Show all lines			`^-L`				
	Paste after			`^-K`	`^-Y`	`^-?`	`^-}`	
	Complete command			`^-space`				
	Show all matches			`^-/`				

! = Press and release Escape key first; ^ = Press and hold Control key

Using the NVRAMRC Editor

ok `nvedit`	
:	
(*use editor commands*)	
:	:
`^-C`	(*get back to* ok *prompt*)
ok `nvstore`	(*save changes*)
ok `setenv` *use-nvramrc?* `true`	(*enable NVRAMRC*)

NVRAM Variables

NVRAM Variable **Default Value** **Type**	**Description**
input-device `/core@f0,f0000000/tty:a`	Console input, output and error output devices. The RS232 port A on the node. Not accessible from UNIX.
output-device `/core@f0,f0000000/tty:a`	
stdcon-device `/core@f0,f0000000/tty:a`	
screen-#columns `80`	Line wrap and page screen settings. Set *screen-#rows* to 0 to disable paging. Use when terminal has scrollbar
screen-#rows `24`	
pciprobe? `true`	When false, prevents OBP from probing PCI I/O system. For debugging only.

pci[0]-fcode-enable 0	Enable booting up to three SCSI controllers for designated PCI bus. Values are a comma delimited list of PCI slot numbers (0,1,2).
pci[1]-fcode-enable	
pci[2]-fcode-enable	
pci[3]-fcode-enable	
pci[4]-fcode-enable	
pci[5]-fcode-enable	
pci[6]-fcode-enable	
pci[7]-fcode-enable	
ttyb-rts-dtr-off `false`	Controls `tty` device driver. Currently nonfunctional.
ttyb-ignore-cd `true`	
ttya-rts-dtr-off `false`	
ttya-ignore-cd `true`	
ttyb-mode `9600,8,n,1,-`	
ttya-mode `9600,8,n,1,-`	
fcode-debug? `false`	When true, lets FCode drivers print more information as they boot.
local-mac-address? `true`	When true, sets `/core/lan` device driver to use built-in node serial number to derive the ethernet physical address. When false, user must set the OBP *system–mac-address* value to load firmware or boot OS from network using ethernet and NFS.
ramdisk-offset `1c000000`	Sets physical address OBP uses to load ramdisk images. Used by kernel developers only.
tz `CST6CDT,92/03:00,302/01:00`	Controls timezone and daylight savings time conversion rules for `date` command I/O. Syntax same as *TZ* variable in HP-UX `environ(5)` man page.
diag-device `/core@f0,f0000000/lan@0,d30000`	When the *diag-switch?* flag is true, OBP uses these as implicit arguments for `boot` or `load` commands. When *diag-switch?* is true, OBP will not load tunables or server files. Currently used only in the lab.
diag-directory `diag-directory`	
diag-file `diag-file`	
boot-device `/pci@fe,10000/qlisp@0,0/sd@2,0:a`	Specifies program(s) OBP loads when `diag-switch?` is false. If value is `mach`, OBP loads both tunables and server. If value is `hpux`, OBP loads only the named *boot-file*. If value is `vmunix` and *boot-mode* is `hpux`, OBP boots the `PDCBOOT` firmware loader which boots ISL, HP-UX and the `/vmunix` kernel using normal HP-UX boot software. If *boot-device* value is /core@f0,f0000000/lan@0,d3000, *boot-directory* changes.
boot-directory `/stand/spp3`	
boot-file `mach`	
boot-args	
dns-ip# `<no default>`	DNS IP number used to resolve hostnames in *boot-directory* when booting or loading from the network.

cluster-boot? `false`	When true, causes OBP to boot each node in a hypernode cluster as an independent machine. Not . used in single node OBP 3.0 release.
load-tunables? `true`	Obsolete. Ignored by OBP 3.0
system-mac-address `<no default>`	Tells OBP the `/core/lan` device physical ethernet address to use. Format is parameter `X:X:X:X:X:X` and must be set only when *local-mac-address?* value is `false`.
udp-log# `<no default>`	UDP port number to use to log events to test station.
unit-map `<no default>`	Tape and network perpherals mapping table used by `show-map`, `mkmap` and `rmmap`.
use-nvramrc? `false`	When a user edits the `nvramrc` file to execute Forth commands during the boot process, set this flag to true. Creating a non-volatile device alias with `nvalias` automatically sets this flag to `true` and commands are placed in the `nvramrc` file.
nvramrc	Forth script OBP executes during the latter phase of booting and before probing the I/O system.
security-mode `none`	Used to restrict access to the interactive OBP command mode.
security-password	
security-#badlogins `<no default>`	
last-hardware-update `<no default>`	Stores a string containing last machine modification date. A typical use would be to type the `date` command at the ok prompt then use `setenv` to set the *last-hardware-update* string using the current date.
mfg-switch? `false` Boolean flag	Resets all parameters to defaults at next OBP reboot if NVRAM becomes corrupted. Ignored by OBP 3.0.
diag-switch? `false` boolean flag	Sets *diagnostic-mode?* to true with boots OBP from *diag-device* instead of *boot-device* and *diag-file* instead of *boot-file*. Also displays new device names as they are compiled into the device tree at I/O system probe time.
auto-boot? `false`	Determines if OBP is set to reboot the operating system after a reset. If true, OBP automatically probes the I/O system and boots the system using current *boot-device*, *boot-directory* and *boot-args* values.
watchdog-reboot? `false`	Determines if OBP automatically reboots after a watchdog reset. Currently non-functional.

boot-mode `core`	Determines the memory map and OBP boot loader capabilities. In `core` mode, OBP is only a diagnostic tool. The PCI I/O system is not probed nor available. It is used automatically after a soft reset due to a hard error. In `sppux` mode, OBP boots the OS then copies itself to RAM. In `sppux` mode, OBP uses 0x1000-0x000fffff. In `hpux` mode, OBP uses 0x04f00000-0x4fffffff.
cache-error-fdce `false`	Debug flags generally never set to true.
cache-error-reset `false`	
hypernode-bitmask 0	Little-endian bitmask of hypernodes in the complex. Multinode OBP only.
cpu-clock-speed 0	If 0, OBP causes each CPU to self-calibrate its clock frequency using the Exemplar Time-of-Century counter as a known frequency standard. If set to one a permitted value (120 or 180), indicates the frequency in Megahertz OBP will use to calibrate the CPU.
nvram-erase? `false`	OBP is unable to boot and reset default values if NVRAM is corrupt. When true, OBP clears all previous NVRAM settings enabling the `set-defaults` operation. Set to true from the test station using the diagnostic shell command: `put` 0:0xf0f0d04050 0xff000000.
rdr9 `00000001.20000000`	Values PDC_ENTRY and OBP use for the diagnose register initial contents when a machine is reset.
dr2 `00000000.00000000`	
nrp-msg-port# `4098`	Controls the UDP port numbers OBP uses in multinode configurations to communicate with OBP on other nodes in the complex. Values must be the same on each node.
pty-recv-port# `4097`	
pty-send-port# `4096`	
simulator-mode? `false`	Set to true when OBP boots in software simulation to avoid errors due to deviations from actual hardware. Should always be false on actual hardware.
pim-save-first? `false`	Used in the machine check handler to alter the overwriting rules. If true, multiple HPMC or TOC will not overwrite the first occurrence. When false, only the most recent HPMC or TOC is saved.
alternate-obp? `false`	When true, OBP located in the TC area will boot instead of OBP located in the Opera.

The remaining options, accessible via OBP's `printenv/setenv` commands, are shared with POST firmware. In some cases, OBP uses the actual parameter, such as an IP address. In most cases, OBP simply sets or displays a value used only by POST. In some cases, OBP retains and resets a default value used when OBP discovers corrupted NVRAM. For options without an OBP default, the NVRAM value remains unchanged after the recovery process.

post-revision `<no default>`	Treat as a read-only parameter containing the POST firmware software version.
obp-ip# `<no default>`	A four part, period delimited, decimal Internet protocol number (e.g., 1.2.3.4) for OBP to use as the `/core/lan` address.
ts-ip# `<no default>`	Test station Internet protocol number to which the `/lan` device is attached.
boot-module `obp`	Set to OBP when POST (power on selftest) completes.
monarch# `0`	Booting control processor number in a multiple CPU configuration
force-monarch? `false`	Affects both POST and OBP monarch choice. When true, specifies the CPU to use as the boot monarch processor. When false, both POST and OBP select the monarch randomly.
selftest? `true`	When true, POST executes selftests on each CPU coming out of reset. Applies to all CPUs enabled for booting. See `cpu[X]`.
cachetest? `true`	When true, POST executes selftests on each CPU coming out of reset. Caches are always initialized but tested only when this option is true.
ecubtest? `true`	When true, POST monarch processor performs ECUB (Core utility) tests.
cti-cache-size `0 Megabytes`	A decimal number of megabytes of RAM POST configures as network cache when a machine is interconnected in a multinode complex.
high-availability? `<no default>`	If true, POST configures the memory controller ASICS to use *high-availability* mode. The POST default value is false.
use-7bit-id? `<no default>`	If true, a multinode complex uses 7-bit node ids. The POST default value is false (5 bit node id).
xring-only? `<no default>`	Diagnostic flag specifying the ring topology of a nonstandard multinode configuration. Currently unused.
80bit-dimms? `false`	Flag informing POST of DRAMS size installed in the memory boards. Usually false in single node configurations.
reduced-bandwidth? `false`	If true, POST configures the memory subsystem for reduced bandwidth mode.

verify-dimms? `false`	If true, POST performs a destructive memory test during memory initialization. Normally, POST intializes only the tags and parity of the memory lines using diagnostic CSR writes wihout performing CPU loads and stores to memory.
master-error-enable? `true`	If true, POST uses default values for all ASIC error config values. If false and *use-error-overrides?* is false, POST sets all ASIC error config registers to zeros.
use-error-overrides? `false`	If false, POST uses current NVRAM error config parameters instead of POST defaults. If true, *master-error-enable?* is ignored.

The following POST options are ASIC error config register initial value only if *use-error-overrides?* is `true`.

emuc-ee `<no default>`	Specifies the CORE MUC FPGA error enable bits.
epuc-ee `<no default>`	Specifies the CORE PUC FPGA error enable bits.
erac[0]-ee `ed80`	Specifies the Crossbar ASIC error enable bits.
erac[1]-ee `ed80`	
erac[2]-ee `ed80`	
erac[3]-ee `ed80`	
epac[0]-ee[0] `fffffeab.ffffeeee`	Specifies each of the two 64-bit error enable register contents for each of 8 EPAC ASICs.
epac[0]-ee[1] `ffe5d6bb.ebffffff`	
epac[1]-ee[0] `fffffeab.ffffeeee`	
epac[1]-ee[1] `ffe5d6bb.ebffffff`	
epac[2]-ee[0] `fffffeab.ffffeeee`	
epac[2]-ee[1] `ffe5d6bb.ebffffff`	
epac[3]-ee[0] `fffffeab.ffffeeee`	
epac[3]-ee[1] `ffe5d6bb.ebffffff`	
epac[4]-ee[0] `fffffeab.ffffeeee`	
epac[4]-ee[1] `ffe5d6bb.ebffffff`	
epac[5]-ee[0] `fffffeab.ffffeeee`	
epac[5]-ee[1] `ffe5d6bb.ebffffff`	
epac[6]-ee[0] `fffffeab.ffffeeee`	
epac[6]-ee[1] `ffe5d6bb.ebffffff`	
epac[7]-ee[0] `fffffeab.ffffeeee`	
epac[7]-ee[1] `ffe5d6bb.ebffffff`	

emac[0]-ee[0] `5faaaff9.b7ffffab`	Specifies each of the two 64-bit error enable register contents for each of 8 MAC ASICs.
emac[0]-ee[1] `00000000.00fff569`	
emac[1]-ee[0] `5faaaff9.b7ffffab`	
emac[1]-ee[1] `00000000.00fff569`	
emac[2]-ee[0] `5faaaff9.b7ffffab`	
emac[2]-ee[1] `00000000.00fff569`	
emac[3]-ee[0] `5faaaff9.b7ffffab`	
emac[3]-ee[1] `00000000.00fff569`	
emac[4]-ee[0] `5faaaff9.b7ffffab`	
emac[4]-ee[1] `00000000.00fff569`	
emac[5]-ee[0] `5faaaff9.b7ffffab`	
emac[5]-ee[1] `00000000.00fff569`	
emac[6]-ee[0] `5faaaff9.b7ffffab`	
emac[6]-ee[1] `00000000.00fff569`	
emac[7]-ee[0] `5faaaff9.b7ffffab`	
emac[7]-ee[1] `00000000.00fff569`	
epic[0]-ee `1557abea.b6aaaa01`	Specifes the 64-bit error enable register contents for each of 8 PIC ASICs.
epic[1]-ee `1557abea.b6aaaa01`	
epic[2]-ee `1557abea.b6aaaa01`	
epic[3]-ee `1557abea.b6aaaa01`	
epic[4]-ee `1557abea.b6aaaa01`	
epic[5]-ee `1557abea.b6aaaa01`	
epic[6]-ee `1557abea.b6aaaa01`	
epic[7]-ee `1557abea.b6aaaa01`	

etac[0]-ee `d7d65597.bfdfffd5`	Specifies the 64-bit error enable register contents for each of 8 TAC (SCI) ASICs.
etac[1]-ee `d7d65597.bfdfffd5`	
etac[2]-ee `d7d65597.bfdfffd5`	
etac[3]-ee `d7d65597.bfdfffd5`	
etac[4]-ee `d7d65597.bfdfffd5`	
etac[5]-ee `d7d65597.bfdfffd5`	
etac[6]-ee `d7d65597.bfdfffd5`	
etac[7]-ee `d7d65597.bfdfffd5`	

The next set of config parameters constitutes a portion of the POST Boot Config Map. These values change as a side effect of POST configuration and are not simply user configurable options. For instance, if the user tries to enable `cpu[1]` and it is not installed, POST sets the value to `empty`. POST uses these values to set map parameters:

enable or *unknown*
POST autoconfigures the component.

disable
POST software deconfigures the component.

fail
The component failed a test. pass is normal and the component is usable.

pass
The component is normal and usable.

disabled
The user deconfigured the component by setting its value to `disable` and rebooting.

deconfig
POST deconfigured the component due to configuration rules enforced when a component is manually disabled or unavailable due to test failure.

cpu[0] unknown	CPU module config map.
cpu[1] unknown	
cpu[2] unknown	
cpu[3] unknown	
cpu[4] unknown	
cpu[5] unknown	
cpu[6] unknown	
cpu[7] unknown	
cpu[8] unknown	
cpu[9] unknown	
cpu[10] unknown	
cpu[11] unknown	
cpu[12] unknown	
cpu[13] unknown	
cpu[14] unknown	
cpu[15] unknown	
epac[0] unknown	PAC config map.
epac[1] unknown	
epac[2] unknown	
epac[3] unknown	
epac[4] unknown	
epac[5] unknown	
epac[6] unknown	
epac[7] unknown	

epic[0] unknown	PIC config map.
epic[1] unknown	
epic[2] unknown	
epic[3] unknown	
epic[4] unknown	
epic[5] unknown	
epic[6] unknown	
epic[7] unknown	
erac[0] unknown	Crossbar Config map.
erac[1] unknown	
erac[2] unknown	
erac[3] unknown	