OpenBoot Quick Reference Exemplar S-Class Servers

Second Edition

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B5655-90008

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Second	B5655-90008	Released with Exemplar OpenBoot V3.0
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Syntax

Commands entered at the OpenBoot ok prompt execute left-to-right after pressing **Enter**. Enter multiple commands on a single line separated by one or more spaces.

Help commands

`help` *[category | command]*	Lists all help categories, commands for the specified *category* or the individual *command*.

Emergency keyboard commands

Esc	Interrupts auto-boot sequence when *auto-boot?* option is `true`

Display commands

`.attributes`	Displays the current node properties.
`.io`	Displays the number of PCI units available.
`.memory`	Displays the memory configuration of the current node.
`.obp`	Displays the OBP loader release and build version.
`.post`	Displays POST release version number.
`.properties`	Same as `.attributes`.
`banner`	Displays the power-on banner.
`date` *[-u]*	Displays the date in local or universal (*u*) time coordinates.
`devalias`	Displays all current device aliases.
`devalias` *alias*	Displays the device path corresponding to *alias*.
`lifls` */flash@1,0*	Lists firmware modules located in flash RAM.
`list` *[block-device] [boot-directory]*	Displays a directory on any disk drive attached to the system. Commonly used to verify boot files.
`ls`	Lists device paths under the currently selected node.
`pim-info` *[N [toc | hpmc]]*	Displays valid TOC or HPMC PIM information for the current CPU or the specified CPU number (*N*).
`printenv` *[option]*	Displays all NVRAM values or the specified NVRAM *option*.
`pwd`	Displays current node name.
`show-children` *[device-path]*	Displays information about all devices attached to the controller specified by *device-path*.
`show-devs` *[device-path]*	Displays entire device tree or all devices under *device-path*.
`show-map` *[device | unit]*	Displays all logical unit mappings or all entries for the named *device* or logical *unit*.
`show-part` *[block-device]*	Displays all disk partitions or only those for specified *block-device*.
`words`	Displays names of the current node's methods.

Configuration commands

`date` *[-u] [mmddhhmm[yy]]*	Sets the date in local or universal time coordinates (*-u*).
`devalias` *alias device-path*	Sets a temporary device *alias* representing the *device-path*. Used until power off or system reset.
`mkmap` *[-n] unit device*	Maps a *device*, i.e., a tape drive or network interface (*n*), to a logical *unit* number used by SPP-UX to identify the device.
`nvalias` *alias device-path*	Creates a persistent device alias by writing the `devalias` *alias device-path* command in NVRAMRC. (Alias persists until `nvunalias` or `set-defaults` executes.)
`nvunalias` *alias*	Deletes the named *alias* from NVRAMRC.
`password`	Sets the security mode password. Prompts twice; once for an 8 character password entry and once for validation.
`rmmap` *device*	Undefines a mapping created with `mkmap`.
`setenv` *option value*	Sets the NVRAM *option* to the specified decimal or text *value*.
`set-default` *option*	Resets the specified NVRAM *option* value to the factory default.
`set-defaults`	Resets all NVRAM options values to the factory defaults, if any.
`time` *[-u] [hhmm[ss]]*	Sets the date in local or universal time coordinates (*-u*).

NVRAMRC commands

`nvedit`	Invokes the NVRAMRC editor. If data remains in the temporary buffer from a previous `nvedit` session, it resumes editing that content. If no data remains from a previous session, `nvedit` reads the current NVRAMRC contents into the buffer for editing. Since `nvedit` stores its changes only in a temporary buffer, use `nvstore` to permanently save information to NVRAMRC.
`nvquit`	Discards temporary buffer contents without writing to NVRAMRC. Prompts for confirmation.
`nvramrc eval`	Executes commands saved in NVRAMRC without rebooting.
`nvrecover`	Enters the editor and recovers NVRAMRC contents lost by `set-defaults` if `nvedit` was not executed after the NVRAMRC contents loss and before `nvrecover` execution.
`nvrun`	Executes temporary buffer contents.
`nvstore`	Copies temporary buffer contents to NVRAMRC.

Keyboard editor commands

Ctrl-A	Go to start of line
Ctrl-B	Go back one character
Ctrl-D	Delete current character
Ctrl-E	Go to end of line

Ctrl-F	Go forward one character
Ctrl-H	Delete previous character (also **Del** or **Backspace** keys)
Ctrl-K	Delete to end of line
Ctrl-L	Show command history list, then retype line
Ctrl-N	Recall subsequent command line
Ctrl-P	Recall previous command line
Ctrl-Q	Quote next character (to type a control character)
Ctrl-R	Retype line
Ctrl-U	Delete entire line
Ctrl-W	Delete previous word
Ctrl-Y	Insert save buffer contents before the cursor
Esc B	Go to previous word
Esc D	Delete from cursor to end of word
Esc F	Go to next word
Esc H	Delete from cursor to beginning of word (also **Ctrl-W**)
Ctrl-Space	Complete the current command
Ctrl-/	Show all possible matches/completions
Ctrl-?	Show all possible matches/completions
Ctrl-}	Show all possible matches/completions

Device tree browsing commands

`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 parent of the current device node.
`cd /`	Selects the root machine node.
`device-end`	Deselects the current device node, leaving no node selected.

Boot commands

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

- *device* is the full device path name or alias.
  Examples:
  `sd0a` (alias for default SCSI disk root partition)
  `rmt0` (alias for default SCSI DAT install tape drive)
  `fddi0` (alias for FDDI network controller)
- *boot-directory* is the HFS full directory path name in the boot partition containing the three boot files (mach, server, and tunables). Valid only for disk devices.
- *boot-args*
  -s — Boots SPP-UX in single-user mode if *boot-file*=`mach`.
  -mk-debug — Microkernel waits fro kgdb to attach.
  -halt — Halt after loading
  -noheader — *boot-file* is Forth or FCode, not a.out.

`reset`	Restarts POST.
`soft-reset`	Resets the system forcing `core` mode reboot (debug mode).

File loading commands

`fwcp` *[test station IP address:source file] [sector / FILE]*

Loads firmware modules to flash RAM.

`go` Begin executing a previously loaded binary program, or resume executing an interrupted program.

`load` [*specifiers*] Load file(s) from specified source. Specifiers are same as for `boot`.

`source` *[devspec;][nfs-server:]full-pathname | filepathname*

Loads and interprets a Forth file from the default *boot-device* file system.

Number base commands

`.d`	Display n in decimal without changing base.
`.h`	Display n in hex without changing base.
`binary`	Set the number base to 2.
`d#` *number*	Interpret the next number in decimal.
`decimal`	Set the number base to 10.
`h#` *number*	Interpret the next number in hex; base is unchanged.
`hex`	Set the number base to 16.
`octal`	Set the number base to 8.

ROBP commands

ROBP provides restricted OBP functionality after the system boots or to control user access before boot time. Set *security-mode* to `command` or `full` to invoke ROBP at boot time and require password access to higher level OBP commands. The following OBP commands are available in ROBP while the operating system is running:

`.attributes`	`.io`	`.memory`
`.obp`	`.post`	`.properties`
`banner`	`date`	`devalias`
`devalias`	`lifls`	`list`
`ls`	`pim-info`	`printenv`
`pwd`	`show-children`	`show-devs`
`show-map`	`show-part`	`words`

The following commands work only in ROBP:

`_version` Displays the `robp` version number.

`_quit` Quit `robp`.

OBP options

Option Default value Data type	Description

alternate-obp?
`false`
`boolean`
	When `true`, the OBP loaded in the TC area of flash memory boots instead of the one loaded in the normal OBP area.

auto-boot?
`false`
`boolean`
	Determines if OBP automatically probes the I/O system and boots the operating system.

`auto-search`	Determines whether OBP ignores boot parameters and searches all devices for boot media. Normally false since searching all SCSI devices on over 20 PCI slots significantly slows boot time.

boot-args
`<no-default>`
`null string`
	Possible values are:
	-s
	Boots SPP-UX in single-user mode if *boot-file*=`mach`.
	-mk-debug
	Microkernel waits fro kgdb to attach.
	-halt
	Halt after loading
	-noheader
	boot-file is Forth or FCode, not a.out.

boot-device
`/pci@fe,2100000/qlisp@0,0/sd@2,0:a`
`string`
	Specifies programs OBP loads when *boot-mode* is `sppux`. The default is the root drive located internally opposite the ECUB, PCI slot 2 on EPIC 4, SCSI disk target 2, partition a. If *boot-file* value is `mach`, OBP loads both tunables and server.

boot-directory
`/stand/spp3`
`string`
	Directory containing the mach, tunables, and server files. If *boot-device* is a network device, use the syntax *ip#:/directory_path* where *ip#* is the NFS server IP address.

boot-file
`mach`
`string`
	If value is `mach`, OBP attempts to load the tunables and server from the *boot-directory*.

boot-mode
`core`
`bootmode`
	After a `soft-reset`, OBP boots in `core` mode and skips POST initialization regardless of the actual value of boot-mode.

cache-error-fdce
`false`
`boolean`
	Debug flag.

cache-error-reset
`false`
`boolean`
	Debug flag.

Option Default value Data type	Description
cpu-clock-speed 0 MHz	Determines clock calibration method. If the value is 0, OBP causes each CPU to self-calibrate its clock frequency using the Exemplar Time-of-Century counter. Other possible values are 120 and 180, the frequency in Megahertz OBP uses to calibrate the CPU.
dns-ip# <no default> ip#	DNS IP address used to resolve hostnames in *boot-directory* when booting or loading from the network.
dr2 00000000.00000000 hexint64	Along with *rdr9*, PDC_ENTRY and OBP use this value to diagnose register initial contents when a machine is reset.
fcode-debug? false boolean	When true, FCode device drivers output more information when booting.
input-device /core@f0,f0000000/tty:a string	Default is the RS232 port A on the system. Optional values are keyboard, ttya, ttyb, or other input device path name or alias. If the specified device is unavailable after a system reset or power on, input is sent to port 0 (tty:a).
local-mac-address? true boolean	When true, sets /core/lan device driver to use the built in node serial number to derive the Ethernet physical address.
nvramrc <no default> null string	The NVRAMRC Forth script name OBP executes during the latter phase of booting before probing the I/O system.
nvram-erase? false boolean	When OBP cannot boot and reset default values because of corrupt NVRAM, setting this option to true from the test station diagnostic shell clears all NVRAM settings enabling the set-defaults operation during do_reset.
output-device /core@f0,f0000000/tty:a string	Default is the RS232 port A on the system. Optional values are screen, ttya, ttyb, or other output device path name or alias. If the specified device is unavailable after a system reset or power on, output is sent to port 0 (tty:a).

Option Default value Data type	Description
`pci[X]-fcode-enable`	X=0-7. Enable booting up to three SCSI controllers each for a designated PCI bus. Specify slot numbers as a comma delimited list (`0,1,2`). Limiting FCode compilation to a single slot permits a full 24-controller system to boot without running out of compiler memory.

pim-save-first?
`false`
`boolean`
	Used in the machine check handler to alter the overwriting rules. If `true`, multiple HPMCs or TOCs do not overwrite the first occurrence. When `false`, each HPMC or TOC is saved.

rdr9
`00000001.20000000`
`hexint64`
	Along with *dr2*, PDC_ENTRY and OBP use this value to diagnose register initial contents when a machine is reset.

screen-#columns
`80`
`int8`
	Screen column width.

screen-#rows
`24`
`int8`
	Number of screen rows (lines). Use when a terminal has a scrollbar. Set to `0` to disable paging.

security-#badlogins
`<no default>`
`int32`
	Stores the number of incorrect security password entries.

security-mode
`none`
`security`
	Other possible values are `command` and `full`. It is not recommended to set this value in NVRAMRC.

security-password
`<no default>`
`password`
	Stores the password set by the `password` command to access the OBP unrestricted mode.

system-mac-address
`<no default>`
`mac#`
	Set only when *local-mac-address?* value is `false`.

tz
`CST6CDT,92/03:00,302/01:00`
`string`
	Controls time zone and daylight savings time conversion rules for the `date` command I/O.

udp-log#
`<no default>`
`int32`
	The UDP port number on the test station used to log events.

unit-map
`<no default>`
`maptable`
	Tape and network peripherals mapping table set by `show-map`, `mkmap`, and `rmmap` instead of `setenv` and `printenv`.

use-nvramrc?
`false`
`boolean`
	Determines whether OBP uses the NVRAMRC file contents to boot. Creating an alias with `nvalias` automatically sets this flag to `true`.

POST options

Option Default value Data type	Description
80bit-dimms? false boolean	Flag informing POST of DRAMS size installed in the memory boards.
boot-module obp module	Determines the firmware module to which POST transfers control upon completion. Other possible values are TC and EPSDW.
cachetest? true boolean	Determines if POST executes self-tests on each CPU cache coming out of reset. Caches always initialize, but are tested only when this option is true.
ecubtest? true boolean	When this value is true, the POST monarch processor performs ECUB tests.
emac[X]-ee[0] 5faaaff9.b7ffffab hexint16	X=0-7. Specifies one of the two 64-bit error enable register contents for each of 8 MAC ASICs.
emac[X]-ee[1 00000000.00fff569 hexint16	X=0-7. Specifies one of the two 64-bit error enable register contents for each of 8 MAC ASICs.
emuc-ee <no default> hexint16	Specifies the CORE MUC FPGA error enable bits when *use-error-overrides?* is true.
epac[X]-ee[0] fffffeab.ffffeeee hexint16	X=0-7. Specifies one of the two 64-bit error enable register contents for each of 8 PAC ASICs.
epac[X]-ee[1] ffe5d6bb.ebffffff hexint16	X=0-7. Specifies one of the two 64-bit error enable register contents for each of 8 PAC ASICs.
epic[X]-ee 1557abea.b6aaaa01 hexint16	X=0-7. Specifies the 64-bit error enable register contents for each of 8 PIC ASICs.
epuc-ee <no default> hexint16	Specifies the CORE PUC FPGA error enable bits when *use-error-overrides?* is true.
erac[X]-ee ed80 hexint16	X=0-3. Specifies the Crossbar ASIC error enable bits when *use-error-overrides?* is true.
etac[X]-ee d7d65597.bfdfffd5 hexint16	X=0-7. Specifies the 64-bit error enable register contents for each of 8 TAC (SCI) ASICs.
force-monarch? false boolean	When true, both POST and OBP use the *monarch#* value as boot monarch CPU number.
monarch# 0 int8	Specifies the boot control CPU number OBP uses as monarch when *force-monarch?* is true. When false, POST and OBP randomly select the monarch.
obp-ip# <no default> ip#	IP number OBP uses as the /core/lan address.
master-error-enable? true boolean	If false and *use-error-overrides?* is false, POST sets all ASIC error configuration registers to zeros.
post-revision <no default> rev#	A read-only parameter containing the POST firmware software version number.

Option Default value Data type	Description

reduced-bandwidth?
`false`
`boolean`
	Determines if POST configures the memory subsystem for reduced bandwidth mode.

selftest?
`true`
`boolean`
	When this value is `true`, POST executes self-tests on each CPU coming out of reset.

ts-ip#
`<no default>`
`ip#`
	Test station IP number to which the /lan device is attached.

use-error-overrides?
`false`
`boolean`
	If `false`, POST uses current NVRAM ASIC error configuration parameters instead of POST defaults. If `true`, *master-error-enable?* is ignored.

verify-dimms?
`false`
`boolean`
	Determines if POST performs a destructive memory test during memory initialization. Normally, POST initializes only the tags and parity of the memory lines using diagnostic CSR writes without performing CPU loads and stores to memory.

Post boot configuration map options

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

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.

Option Default value Data type	Description
cpu[X] unknown mapstate	X=0-15. CPU module configuration map.
epac[X] unknown mapstate	X=0-7. PAC configuration map.
epic[X] unknown mapstate	X=0-7. PIC configuration map.
erac[X] unknown mapstate	X=0-3. Crossbar configuration map.

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