



## OpenBoot Download Manual

### Version 2.41a5

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## OpenBoot Information

### Prerequisites

- Local boot disk
- Solaris (SPARC PCI) version 2.6, 7, 8 or 9 (both 32 and 64-bit)
- The intended Fibre Channel target disk should have enough free space to hold all system files and the swap slice of the current local boot disk
- Fibre Channel drives connected to the host adapter using fiber optic or copper duplex media (user supplied).

### Compatibility

- Emulex® Fibre Channel SBus host bus adapters LP8000S and LP9002S (minimum firmware version 3.82a1)
- Supports multi-topology: Fabric, Point-to-Point, FC-AL: Public and Private Loop.

## Things to Know Before You Download

- This version of OpenBoot must be downloaded to the flash ROM in one of two ways:
  - By using the lpsutil utility (applies to version 4.21e or earlier of the driver for Solaris SBus).
  - By using the lputil utility (applies to version 5.02d or later of the driver for Solaris).
- The documentation for this version of OpenBoot refers to lputil version 1.6a6, which accompanies the current Emulex driver for Solaris. If you are using an earlier version of the Emulex driver, refer to its documentation.
- Ensure that critical files on your local boot disk are backed up as a measure of protection.
- This download assumes that there is already a local boot disk.
- If there is more than one logical disk drive on the Fibre Channel adapter, you must use persistent binding ('nailing' a specific SCSI ID to a specific WWPN or D\_ID).
- It will be necessary to correlate the intended boot disk displayed by the 'probe-scsi-all' command to the devices displayed by the operating system.

## Changes and Corrections

The following changes and corrections have been made since OpenBoot version 2.40a0. For a list of earlier changes and corrections, see the readme file that accompanies the OpenBoot download.

- A change to the command that sets the boot device ID enables you to use the "AI\_PA" command to set the boot device ID on the HBA in loop mode. For more on this change, see the online Configuration manual.
- This version of OpenBoot declares the variable for #lun-a0 in fcp-luns to "Value". It was "Constant" in the previous versions. This change to value prevents a system's FCode interpreter from corrupting.

## Known Issues

The following issues have been reported at the time of publication. These issues may not yet have been verified or confirmed and may apply to another product, such as the driver or hardware.

- None at this time.

## Files Included in this Package

The following files are included in the release of OpenBoot version 2.41a5.

File Name	Description
<b>readme.txt</b>	Release notes for OpenBoot version 2.41a5
<b>tsf241a5.prg</b>	LP8000S OpenBoot version 2.41a5
<b>tsc241a5.prg</b>	LP9002S OpenBoot version 2.41a5



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## Introduction

The boot code on Solaris systems is referred to as OpenBoot. Installing OpenBoot on Solaris SBus systems involves performing the following step:

1. Load OpenBoot on your system using the driver utility for Solaris (lputil).

After OpenBoot is loaded, refer to the online Configuration manual for details on using OpenBoot.

## Load OpenBoot (SBus)

### Prerequisites

- The driver for Solaris is installed properly.
- The driver utilities kit (including lputil, which is used in this procedure) has been installed properly.
- The boot code file has been downloaded to a local drive.

### Load OpenBoot

1. Start the utility by entering the complete path to lputil. The path in the example reflects the default installation path. If the installation path was modified, adjust the command appropriately.

```
/usr/sbin/lpfc/lputil
```

**Note** If you are using an older version of the Emulex driver for Solaris (version 4.21e or earlier), type the following command:

```
/usr/sbin/lpfs/lputil
```

2. From the Main menu, enter 3, Firmware Maintenance.
3. Enter 6, Load FCode Image.
4. Enter the full path to the OpenBoot file.

The new OpenBoot file is transferred to flash ROM.

5. Enter 0 twice to exit.



## OpenBoot Configuration Manual

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## Introduction

OpenBoot is a set of F-Code instructions in the host adapter flash ROM that allows you to designate a Fibre Channel hard drive as the boot drive. OpenBoot works with the existing system BIOS on Solaris SBus systems. The procedures in the online Configuration manual explain how to set up your boot disk. The paths displayed in these procedures are samples. You will enter similar path names, but they will be different from the ones in these sample commands.

## Prerequisites

- The LP8000S or LP9002S installed
- An Emulex FC driver supporting Solaris (4.02i or above is recommended)
- An installed Fibre Channel drive

## Things to Know Before You Set Up

- Always reset the system to default value mode before making changes to your boot settings. Changes will not be saved if a reset is not performed first. From the system monitor prompt, type:

```
ok set-default-mode
```

## Setting Up a Boot Disk

### Prerequisites

- The LP8000S or LP9002S installed
- An Emulex FC driver supporting Solaris (4.02i or above is recommended)
- An installed Fibre Channel drive
- The system is reset to default value mode. Changes will not be saved if a reset is not performed first. To reset the system monitor prompt, type:

```
ok set-default-mode
```

### Procedure

1. Show all system devices. From the system prompt, type:

```
ok show-devs
```

The actual output will vary depending on your system. The path to the Emulex adapter will end with `lpfs@#`. This procedure is an example only.

```
/sbus@1f,2000/lpfs@1  
/sbus@1f,4000/lpfs@2  
/sbus@1f,2000/lpfs@3
```

2. Select the Emulex adapter. Select the second adapter shown above by entering the path to the adapter. The path you type will be similar to, but different than the one entered in this example command:

```
ok" /sbus@1f,4000/lpfs@2" select-dev
```

3. Check the OpenBoot version. Type:

```
ok .version
```

4. Check the topology of the current device. Type:

```
ok show-devs
ok " /sbus@1f,4000/lpfs@2" select-dev
ok .topology
ok unselect-dev
```

5. Use these commands to set the topology for the intended Fibre Channel boot disk to point-to-point (that is, if the HBA is connected to a switch). Type:

```
ok " /sbus@1f,4000/lpfs@2" select-dev
ok set-ntp
ok unselect-dev
ok reset
```

To set the topology back to loop (if the HBA is connected to a hub), type these commands.

```
ok " /sbus@1f,4000/lpfs@2" select-dev
ok set-fc-al
ok unselect-dev
ok reset
```

By default, the topology is set to auto-FCAL. To set auto topology with public or private loop first, enter these commands.

```
ok " /sbus@1f,4000/lpfs@2" select-dev
ok set-auto-fcal
ok unselect-dev
ok reset-all
```

To set auto topology with point-to-point first, type these commands.

```
ok " /sbus@1f,4000/lpfs@2" select-dev
ok set-auto-ntp
ok unselect-dev
ok reset-all
```

- Determine the device: WWPN, DID, or ALPA.

```
ok probe-scsi-all
```

Make note of the actual DID, WWPN, or ALPA and the corresponding boot entry.

- Set the boot device ID. Type:

```
ok "/sbus@1f,4000/lpfs@2" select-dev  
ok [wwpn|did|alpa] [lun] [target id] set-boot-id  
ok unselect-dev
```

where **[wwpn|did|alpa]** - enter the device WWPN (point to point), DID (public loop), or ALPA (private loop)

**[lun]** - enter the LUN number in hex. To enter the decimal LUN number, enter d# [lun].

**[target id]** - enter the target id in hex. To enter the decimal target ID, enter d# [target id].

For example, with alpa=e1, lun=100 (decimal), and target id=10 (decimal).

```
ok did e1 d# 100 d# 10 set-boot-id
```

- Boot to the original local disk to set up the newly defined Fibre Channel disk. Type:

```
ok boot [local disk]
```

where:

**[local disk]** - enter the complete path or the alias of the original boot disk.

**Note** If the Fibre Channel disk is not found when the system is rebooted, enter "touch /reconfigure" and reboot.  
 If the disk is still not discovered, edit the "/kernel/drv/lpfc.conf" file and change the topology from 4 to 2 or reverse. It may also be necessary to add an entry for the boot drive to the sd.conf file.

Signature	OpenBoot signature
Valid_flag	internal flag for
OpenBoot	
Host_did	shows host DID number
Enable_flag	internal flag for
OpenBoot	
Boot_id	shows Target ID number
Lnk_timer	internal use for
OpenBoot	
Plogi_timer	internal use for
OpenBoot	
LUN	shows Boot LUN in use
DID	shows Boot DID in use
WWPN	shows Boot WWPN in use

**Note** Target ID can be bound to either DID (destination ID) or WWPN (worldwide port name) and saved in an adapter nvram. It can also be saved in an environmental variable boot-device.

## Making a Bootable System Disk

### Prerequisites

- The LP8000S or LP9002S installed
- An Emulex FC driver supporting Solaris (4.02i or above is recommended)
- An installed Fibre Channel drive
- The system is reset to default value mode. Changes will not be saved if a reset is not performed first. To reset the system monitor prompt, type:

```
ok set-default-mode
```

### Procedure

The examples in this procedure use the logical drive designated as "c1t1d0" (controller 1, target 1, lun 0). Your logical drive may be different.

1. Boot from the local system disk.
2. Run the format utility. Type:

```
# format
```

3. Select the logical drive to become the boot disk (in this case, c1t1d0).
4. Select the partition option and partition the disk as desired.
5. Select the label option and write a volume label to the target disk.

For help with the format utility, refer to the man page "man format".

6. Install the boot on partition 0 of the target disk. (Type this command as one line.)

```
# installboot /usr/platform/`uname -i`/lib/fs/ufs/bootblk /dev/rdisk/c1t1d0s0
```

7. Create a file system for each partition that will contain a mounted file system. Type:

```
# newfs -v /dev/rdisk/c1t1d0s0(will become root)
# newfs -v /dev/rdisk/c1t1d0s6(will become usr)
# newfs -v /dev/rdisk/c1t1d0s7(will become export/home)
```

8. Create temporary mount points for the new partitions. Type:

```
# mkdir root2
# mkdir usr2
# mkdir export2
```

9. /dev/fd must be unmounted to copy the root file system. First, kill the volume manager. Type:

```
# ps -ef|grep vold (to obtain the PID or process id)
# kill -9 PID(where PID is obtained above)
# umount /dev/fd
```

10. Mount, copy, then unmount the usr2 file system. Type:

```
# mount /dev/dsk/c1t1d0s6 /usr2
# cd /usr
# tar cvf - * | ( cd /usr2; tar xf -)
# umount /usr2
```

11. Copy the export/home file system. Type:

```
# mount /dev/dsk/c1t1d0s7 /export2
# cd /export
# tar cvf - * | (cd /export2; tar xf -)
# umount /export2
```

12. Copy the root file system by first building a file list. Type:

```
# cd /ls -a > root_copy
```

13. Use the vi editor to edit root\_copy and delete all entries that refer to mount points. Type:

```
., .., usr, tmp, proc, export, root2, export2, usr2, opt (if a separate mount point)
```

and any other apparent file systems displayed by the df command. Your goal in editing this file is to have the root\_copy point to system files on the root directory without pointing to mount points.

14. Join file names so that they are on one line; if you are using vi, press <shift> <j> to do this.
15. Add the tar command to the file list so that the result looks like this:

```
tar cvf - TT_DB arg bak bin cdrom dev devices doit etc firmware fun kernel lib
mnt mt netplatform .Xauthority .cpr_config .dt .dtprofile sbin timer var x xfn | (cd /
root2; tar xf - )
```

16. Perform copy. Type:

```
# mount /dev/dsk/c1t1d0s0 /root2
chmod 777 root_copy
sh root_copy
```

17. Create the additional mount points (file system names). Type:

```
# cd /root2
# mkdir export
# mkdir opt (if opt is a separate mount point)
# mkdir proc
# mkdir tmp
# mkdir vol
# mkdir usr
```

18. Repeat for any other mounts unique to your system that were excluded in the copy.

19. Edit `/root2/etc/vfstab` changing the controller number, target number, and LUN number to point to the new Fibre Channel boot disk. For example, if the Fibre Channel boot disk is `c1t1d0`, replace all local disk entries of `c0t0d0` with `c1t1d0`.

Currently file shows:

```
/dev/dsk/c0t0d0s1 (swap)

/dev/dsk/c0t0d0s0and /dev/rdisk/
c0t0d0s0 (root)

/dev/dsk/c0t0d0s6and /dev/rdisk/
c0t0d0s6 (usr)

/dev/dsk/c0t0d0s7and /dev/rdisk/
c0t0d0s7 (export)
```

Edit file to show:

```
/dev/dsk/c1t1d0s1 (swap)

/dev/dsk/c1t1d0s0and /dev/rdisk/
c1t1d0s0 (root)

/dev/dsk/c1t1d0s6and /dev/rdisk/
c1t1d0s6 (usr)

/dev/dsk/c1t1d0s7and /dev/rdisk/
c1t1d0s7 (export)
```

20. Reboot the system

```
# sync
# sync
# halt
ok reset
```

21. Boot to disk.

```
ok boot disk
```

The system should boot to the Fibre Channel disk.

22. View the current dump device setting.

```
# dumpadm
```

23. Change the dump device to the swap area of the Fibre Channel drive.

```
# dumpadm -d /dev/dsk/c1t1d0s1
```

where `/dev/dsk/c1t1d0s1` is a sample path to the swap area of the Fibre Channel drive. Your path may be different from the one shown here. Enter your path.

## Set Up Persistent Binding

Persistent binding allows you to permanently assign a system SCSI target ID to a specific Fibre Channel (FC) device even though the device's ID on the FC loop (D\_ID) may be different each time the FC loop initializes. This capability is useful in multi-server environments that share a device. You can simplify system management by having multiple servers use the same SCSI target ID when referring to the shared FC device.

To start the lputil utility, type:

```
/usr/sbin/lpfc/  
lputil
```

The Main menu opens:

```
MAIN MENU  
  
1. List Adapters  
2. Adapter Information  
3. Firmware Maintenance  
4. Reset Adapter  
5. Persistent Binding  
0. Exit  
  
Enter choice =>5
```

Select choice #5. The Persistent Binding menu opens:

```
PERSISTENT BINDINGS MENU  
  
1. Display Current Bindings  
2. Display All Nodes  
3. Duplicate Adapter Bindings  
4. Bind Target Manually  
5. Bind Automapped Targets  
6. Delete Bindings  
  
0. Return to Main Menu  
  
Enter choice =>4
```

Use this menu to view bindings and nodes, establish new bindings, or delete bindings.

1. To establish new bindings, select option => 4.
2. Select an adapter.
3. Select a binding method.

**Note** In a fabric environment, the D\_ID may change when the system is rebooted. We suggest binding to the Node Name or Port Name in a fabric environment.

1. By Node Name
2. By Port Name
3. By D\_ID
0. Cancel

4. Enter the Node Name, Port Name, or D\_ID, depending on binding method.
5. Enter the target number => 0.

## Viewing OpenBoot Commands

Command	Effect
ok .boot - id	Prints current boot device id
ok .version	Prints current version of OpenBoot
ok .topology	Prints current topology
ok .nvram	Prints current flags for OpenBoot
ok .host-did	Prints actual current AL-PA of adapter
ok set-default-mode	Resets to default value mode
ok remove-boot-id	Removes boot id from boot list
ok devalias	Displays boot list
ok show-devs	Displays list of devices found
ok probe-scsi-all	Displays current SCSI and FC devices



## OpenBoot Troubleshooting Manual

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## Introduction

There are circumstances in which your system may operate in an unexpected manner. The Troubleshooting manual explains several of these circumstances and offers one or more workarounds for each situation.

## The System Cannot mount or fsck /vfstab on a Fibre Channel Boot Disk

**Situation:** During the boot process, the system cannot mount or fsck /vfstab on a Fibre Channel boot disk.

**Solution:** Make sure that persistent binding is implemented correctly.

## A Loaded File Is Not Executable

**Situation:** After entering boot disk, a message displays that the file that was loaded is not executable.

**Solution:** The boot block may not be installed correctly to the Fibre Channel drive. See the make bootable system disk procedure in the online Configuration manual..

## The System Hangs or Reboots After Displaying Driver Information

**Situation:** The system hangs for a long time after displaying driver information or reboots after displaying driver information.

**Solution:** Possible incorrect topology set in `/kernel/drv/lpfc.conf` file on the target disk.

## Fibre Channel Disk Is Not Found

**Situation:** You have performed the setup tasks and the Fibre Channel disk is not found when you reboot the system.

**Solution:** Enter "touch/reconfigure" and reboot. If the disk is still not discovered, edit the "kernel/drv/lpfc.conf" file and change the topology from 4 to 2 or the reverse. It may also be necessary to add an entry for the boot drive to the sd.conf file.