Readme File

QLA FCode for 2Gb HBAs

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1. Package Contents

NOTE: This FCode is for Peripheral Component Interconnect (PCI), PCI-X, or compact PCI (cPCI) HBAs only. 2300/2310-based HBAs must use `ifp2300.prom` file. 2312 based HBAs must use `ifp2312.prom` file. If you load the incorrect file, the adapter will not function properly.

The following table describes the contents provided in the FCode binary package.

Filename	Description
ifp2300.prom	FCode binary file for use with 2300/2310 based HBAs
ifp2312.prom	FCode binary file for use with 2312 based HBAs
qla2x00flash	Solaris flash utility
Readme	Readme for qla2x00flash
release.txt	QLA FCode release notes file
readme.txt	QLA FCode readme file

2. Supported Features

The QLA FCode for 2Gb HBAs supports the following features:
- 256 ID support
- Extended LUN support
- Fabric boot support
- Local loop boot support
- 1 or 2 Gigabit data rate support
- OS and Openboot support
- Solaris 6, 7, 8, 9, and 10

3. HBA Configuration Parameters

The following subsections describe the HBA configuration:
- 3.1 Selecting a Boot Device
- 3.2 Setting and Viewing Fibre Channel Connection Mode
- 3.3 Setting and Viewing Fibre Channel Data Rate (1 or 2 Gigabit)
- 3.4 Setting and Viewing Adapter LoopId
- 3.5 Setting and Viewing the BIOS Compatibility Mode Device Name
- 3.6 Selftest

3.1 Selecting a Boot Device

TThe following subsections describe how to select a boot device:
- 3.1.1 Scanning for Attached Fibre Channel (FC) Devices
- 3.1.2 Saving the Boot Device Information to the Adapter NVRAM
- 3.1.3 Verifying the Boot Device
- 3.1.4 Booting the Device
- 3.1.5 Clearing the Boot Device Information from the NVRAM

NOTE: Please type `reset-all` at the `ok` prompt in the following cases:
- If the Solaris has been shutdown to the `ok` prompt, before a `select-dev` is performed.
- After a `select-dev` has been performed, before booting Solaris.

To prevent an automatic boot of the system after typing `reset-all`, set the `OpenBoot PROM` (OBP) environment variable `auto-boot?` to `false`. For example:
```
>ok setenv auto-boot? false <cr>
```

3.1.1 Scanning for Attached Fibre Channel (FC) Devices

To scan for attached FC devices, enter the following:
```
>ok probe-scsi-all
```
or
At the `ok` prompt locate the QLogic device in device tree and select it. For example:
```
>ok show-devs . . . /pci@1f,0/pci@1/QLGC,qla@4 . .
>ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
>ok show-children
```

Select a boot device and write down the World Wide Port Name (WWPN), LoopId, and Logical Unit Number (LUN) of the boot device.

3.1.2 Saving the Boot Device Information to the Adapter NVRAM

If you have not already done so, you must select the device.

NOTE: Starting with FCode version 2.10b2, 16-bit LUN, and target ID numbers are supported. However, the LUN is no longer saved in NVRAM. It is entered only on the command line or specified in the device alias (devalias). See section 5.2, "Building a Bootable Disk."

For example:
```
>ok " /pci@1f,0/pci@1/QLGC,qla@4" select-dev
```
Enter the `WWPN` and `LoopId` and type `set-boot-ID`.

Example:
```
>ok 50001fe1500a5c7d 81 set-boot-ID
Calculating NVRAM checksum, please wait... done
Calculating NVRAM checksum, please wait... done
login-boot-device: successful
Boot WWN – 50001fe1 500a5c70 WWPN – 50001fe1 500a5c7d ID – 81
LUN # is not stored in NVRAM. Only needed on command line.
```

If the following message is displayed, the boot device cannot be logged in:
```
Boot device login failed, check boot device settings
```

Please recheck the boot device settings and re-enter them using the `set-boot-ID` command.

3.1.3 Verifying the Boot Device

To verify the boot device, type `show-boot-ID` at the `ok` prompt. For example:
```
>ok show-boot-ID
Boot WWN – 50001fe1 500a5c70 WWPN – 50001fe1 500a5c7d ID – 81
LUN # is not stored in NVRAM. Only needed on command line
>ok
```

3.1.4 Booting the Device

To boot the device, type the complete boot path, including `ID` and `LUN`, at the `ok` prompt.

The ID must match the one entered in section 3.1.2.

Example:
```
>ok boot /pci@1f,0/pci@1/QLGC,qla@4/sd@81,1
```
NOTE: If the boot was interrupted or any of the QLogic FCode commands were executed, you should enter the `reset` command before attempting to boot the system.

3.1.5 Clearing the Boot Device Information from the NVRAM

To clear the boot device information from the NVRAM, enter `clear-boot-ID` at the `ok` prompt. For example:
```
>ok clear-boot-ID
```

3.2 Viewing and Setting or Changing the FC Connection Mode

This section consists of the following subsections:
- 3.2.1 Viewing the Current Host Adapter FC Connection Mode
- 3.2.2 Changing the Current Host Adapter FC Connection Mode

3.2.1 Viewing the Current Host Adapter FC Connection Mode

To view the current host adapter FC connection mode, type `show-connection-mode` at the `ok` prompt. For example:

```
>ok show-connection-mode
Current HBA connection mode: 2 - Loop preferred, otherwise
point-to-point

Possible connection mode choices:

0 - Loop Only
1 - Point-to-point only
2 - Loop preferred, otherwise point-to-point
```

3.2.2 Setting or Changing the Current Host Adapter FC Connection Mode

To set or change the current host adapter FC connection mode, at the `ok` prompt, enter the number of the desired connection mode choice from the following list:

```
Possible connection mode choices:
0 - Loop Only
1 - Point-to-point only
2 - Loop preferred, otherwise point-to-point
```

Then type `set-connection-mode`. For example:

```
>ok 0 set-connection-mode
Calculating NVRAM checksum, please wait...

Current HBA connection mode: 0 - Loop Only
```

3.3 Viewing and Setting or Changing the Current Host Adapter FC Data Rate (1 or 2 Gigabit)

This section consists of the following subsections:

- 3.3.1 Viewing the Current Host Adapter FC Data Rate
- 3.3.2 Setting or Changing the Current Host Adapter FC Data Rate

3.3.1 Viewing the Current Host Adapter FC Data Rate

To view the current host adapter FC data rate, type `show-data-rate` at the `ok` prompt. For example:

```
>ok show-data-rate
Current HBA data rate: One Gigabit rate

Possible data rate choices:

0 - One Gigabit rate
1 - Two Gigabit rate
2 - Auto-negotiated rate
```

3.3.2 Setting or Changing the Current Host Adapter FC Data Rate

To change the current host adapter FC data rate, at the `ok` prompt, enter the number of the desired data rate choice from the following list:

```
Possible data rate choices:
0 - One Gigabit rate
1 - Two Gigabit rate
2 - Auto-negotiated rate
```

Then type `set-data-rate`. For example:

```
>ok 1 set-data-rate

Calculating NVRAM checksum, please wait...
Current HBA data rate: Two Gigabit rate
```

3.4 Viewing and Setting or Changing the Current Host Adapter LoopId

This section consists of the following subsections:
- 3.4.1 Viewing the Current Host Adapter LoopId
- 3.4.2 Setting or Changing the Current Host Adapter LoopId

3.4.1 Viewing the Current Host Adapter LoopId

To view the current host adapter loopId, type `show-adapter-loopid` at the `ok` prompt. For example:

```
>ok show-adapter-loopid
Adapter loopId - 7c
```

3.4.2 Setting or Changing the Current Host Adapter LoopId

To change the current host adapter loopid, at the `ok` prompt, enter the number of the desired adapter loopid and enter `set-adapter-loopid`. For example:

```
>ok 0 set-adapter-loopid
Adapter loopid - 0
```

3.5 Setting and Viewing the BIOS Compatibility Mode Device Name

Do not change this parameter unless the following has occurred:
- The adapter was shipped with PC BIOS code and Solaris device paths were created for the attached storage devices. Later the adapter was flashed with FCode causing a change in the device paths and mount point failures, etc.
- If the Solaris devices paths are created with BIOS on the adapter, the device paths contain fibre-channel as in the following example:
  `/devices/pci@1f,0/pci@1/fibre-channel@4`
- If the adapter is subsequently flashed with FCode the device paths contain `QLGC,qla` as in the following example:
  `/devices/pci@1f,0/pci@1/QLGC,qla@4`

To access the device paths as created when BIOS was present on the adapter:

1. Select the host adapter device that you wish to change. See section 3.1.1 on scanning for attached Fibre Channel devices. To view the BIOS compatibility mode device name, type `show-mode` at the `ok` prompt:
   ```
   >ok show-mode
   Currently in FCode compatibility mode Possible mode choices:
   0 – FCode compatibility mode
   1 – BIOS compatibility mode
   >ok 1 set-mode BIOS compatibility mode
   >ok reset-all
   ```
2. Reboot and the device paths have `fibre-channel` in them.

3.6 Selftest

To invoke a minimal selftest, enter `test` at the `ok` prompt, followed by the adapter device path (recommend using Loopback plug). For example:
```
>ok test /pci@1f,0/pci@5/QLGC,qla@0
```

4. Utilities (Flashing Adapter with FCode)

To flash the FCode to an adapter, use the qla2x00flash utility. A QLogic Solaris HBA driver revision 3.13 or later must be installed before running this utility.

To run the utility, perform the following steps:

1. Copy the `qla2x00flash` file and `ifp23xx.prom` file to a desired directory.

2. Enter the command line with the appropriate path. For example:
   ```
   qla2x00flash –l /devices/pci@1f,0/pci@1/QLGC,qla@4:devctl ifp2300.prom
   ```
   or
   ```
   qla2x00flash –l /devices/pci@1f,0/pci@1/QLGC,qla@4:devctl ifp2312.prom
   ```

WARNING! EXTREME CARE MUST BE TAKEN WHEN CHANGING FLASH CONTENTS. INCORRECT DATA MAY RENDER THE ADAPTER UNUSABLE TO THE POINT THAT THE OPERATING SYSTEM MAY NO LONGER FUNCTION.

5. Additional Notes

This section consists of the following subsections:

- 5.1 Beacon Support
- 5.2 Building a Bootable Disk

5.1 Beacon Support

Beacon support allows you to locate a specific host adapter visually. When the feature is activated, the green LED on the back of the adapter flashes at approximately one-second intervals.

To enable beacon support, follow these steps:

1. Select the host adapter device that you wish to locate. See section 3.1.1, "Scanning for Attached Fibre Channel (FC) Devices."

2. Type `beacon` at the `ok` prompt:
   ```
   >ok beacon
   ```
   The following message is displayed:
   ```
   Flashing adapter green LED, type any character to quit – The green LED on the selected
   host adapter will flash until any character is entered on the keyboard.
   ```

NOTE: For multi-channel host adapters, only one channel's LED flashes.

5.2 Building a Bootable Disk

The procedure for building a bootable disk assumes that the system is already booted from an existing system disk and that you have already performed a full system backup. The device name shown in this example is for a device on the third PCI bus slot, target ID 129, LUN 1, slice 0. The device path is different on each system, depending on the PCI bus slot, target ID, LUN, etc.

You must have already followed the steps in section 3.1.2, "Saving the Boot Device Information to the Adapter NVRAM," before attempting to create a bootable disk.

This procedure uses the Solaris `ufsdump` command to create temporary `saveset` files for each partition on your current boot disk. To make this work, you must have enough extra disk space to create the `saveset` files or your Solaris machine must have a high-capacity tape drive attached.

1. Determine the amount of disk space used/available on your current boot disk using the `/usr/bin/df -k -l` command as shown in the following example:

```
/usr/bin/df -k -l

Filesystem          kbytes    used    avail capacity  Mounted on
/dev/dsk/c0t0d0s0   2577118 1650245  875331    66%    /
/proc                     0       0       0     0%    /proc
fd                        0       0       0     0%    /dev/fd
mnttab                    0       0       0     0%    /etc/mnttab
swap                1310480       0 1310480     0%    /var/run
swap                1311344     864 1310480     1%    /tmp
/dev/dsk/c0t0d0s7   5135326     114 5083859     1%    /home
```

This `df` example shows that the current boot disk is `/dev/dsk/c0t0d0sx`. There are two partitions of interest, slice 0 or `/` and slice 7 or `/home`. Slice 0 uses 1.6Gb and has 875Mb free. Slice 7 uses 114Kb and has 5Gb free. Therefore, you can use slice 7 or `/home` to store the temporary `saveset` files. If at least 1.7Gb free was not available on this disk, you must create a partition on the new bootable disk large enough to hold the largest temporary `saveset` plus the largest used space on a partition. In this example, that would be a partition at least 3.2Gb (1.6Gb+1.6Gb).

2. Use the `format` command to create, label, and format partitions on the new bootable disk. These partitions must be large enough to contain the contents of the temporary `savesets`. If you are not familiar with the `format` command, carefully read about the command in the Solaris documentation and man pages.

   WARNING: Misusing the `format` command could destroy the data on the current disk drives.

   Example:

```
format
   partition
      print

Part      Tag    Flag     Cylinders        Size            Blocks
  0       root    wm      0 - 8738        4.00Gb     (8739/0/0) 8389440
  1       swap    wu   8739 - 9188      210.94Mb     (450/0/0)   432000
  2      backup   wu      0 - 9201        4.21Gb     (9202/0/0) 8833920
  3 unassigned    wm      0                  0       (0/0/0)          0
  4 unassigned    wm      0                  0       (0/0/0)          0
  5 unassigned    wm      0                  0       (0/0/0)          0
  6 unassigned    wm      0                  0       (0/0/0)          0
  7 unassigned    wm      0                  0       (0/0/0)          0

label
quit
quit
```

3. Use the `newfs` command to create the file system. For example:
   `newfs -v /dev/rdsk/c3t129d1s0`
   NOTE: The target device ID (t129) is in decimal format. The hexadecimal value for the target ID will be used in the boot command line shown in step 12, below.

4. Mount the boot partition to the `/mnt` mount point. For example:
   `mount /dev/dsk/c3t129d1s0 /mnt`

5. Change directories to the root partition mount point. For example:
   `cd /mnt`

6. Use the `ufsdump` utility to copy the root partition to the new boot disk. For example:
   `ufsdump 0f - / | ufsrestore rf -`

7. Run the following command:
   ```
   rm restoresymtable
   ```

8. Install the boot block on the new boot disk. For example:
   ```
   installboot /usr/platform/`uname -i`/lib/fs/ufs/bootblk /dev/rdsk/c3t129d1s0
   ```

9. Edit the new `vfstab` file to mount the new partition(s) properly during boot. In this case, you would change each reference of `c0t0d0s0` to `c3t129d1s0`. For example:
   ```
   vi /mnt/etc/vfstab
   ```

10. Edit the `/mnt/kernel/drv/sd.conf` to add the boot target ID and LUN. For example:
    ```
    name="sd" class="scsi" target=129 lun=1;
    ```

11. Shut down the system. For example:
    ```
    /sbin/init 0
    ```

12. Boot from the newly created boot disk.
    NOTE: You must enter the target ID # and LUN (`81,1` in this case) as 16-bit hexadecimal numbers. For example:
    ```
    boot /pci@1f,0/pci@1/QLGC,qla@4/sd@81,1
    ```

13. View the current dump device setting. For example:
    ```
    # dumpadm Dump content: kernel pages
    Dump device: /dev/dsk/c0t0d0s1 (swap)
    Savecore directory: /var/crash/saturn
    Savecore enabled: yes
    ```

14. Change the dump device to the swap area of the new boot drive. For example:
    ```
    # dumpadm -d /dev/dsk/c3t129d1s1
    ```
    NOTE: The following step sets the newly created boot disk to be the default boot disk.

15. Perform the following steps at the system OBP (`ok`) prompt:

    a. Create an alias entry for the new boot device (optional).
       NOTE: You must enter the target ID # and LUN # (81,1 in this case) as 16-bit hexadecimal numbers. For example:
       ```
       >ok nvalias fibredisk /pci@1f,0/pci@1/QLGC,qla@4/sd@81,1
       ```

    b. Set the default boot device to be the new boot device (optional). For example:
       ```
       >ok setenv boot-device fibredisk
       ```

6. Contacting Support

Please feel free to contact your QLogic approved reseller or QLogic Technical Support at any phase of integration for assistance. QLogic Technical Support can be reached by the following methods:

Web: http://support.qlogic.com

North America Contact Information
Email: support@qlogic.com
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Support contact information for other regions of the world is available at the QLogic website:
http://support.qlogic.com

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