

**Sun InfiniBand Dual Port 4x QDR PCIe
ExpressModule Host Channel Adapter M2**

User's Guide



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Using This Documentation

This guide provides an overview, installation instructions, and specifications of the Sun InfiniBand Dual Port 4x QDR PCIe ExpressModule Host Channel Adapter M2 from Oracle. The instructions in this guide are designed for system administrators with experience installing network hardware and software.

Note – This ExpressModule is based on Mellanox Technologies’ MT26428 ConnectX IB-HCA device.

- “Product Notes” on page v
- “Related Documentation” on page vi
- “Feedback” on page vi
- “Access to Oracle Support” on page vi

Product Notes

For late-breaking information and known issues about this product, refer to the product notes at:

<http://docs.oracle.com/cd/E19157-01/>

Related Documentation

Documentation	Links
All Oracle products	http://docs.oracle.com
Sun InfiniBand Dual Port 4x QDR PCIe ExpressModule Host Channel Adapter M2	http://docs.oracle.com/cd/E19157-01/
Oracle Integrated Lights Out Manager (ILOM)	http://www.oracle.com/goto/ILOM/docs
Oracle Solaris 11 OS	http://www.oracle.com/goto/Solaris11/docs
Oracle Solaris 10 OS	http://www.oracle.com/goto/Solaris10/docs
Oracle VM Server for SPARC	http://www.oracle.com/goto/VM-SPARC/docs
Oracle VTS	http://www.oracle.com/goto/VTS/docs

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Installing the ExpressModule

The ExpressModule is dual-port 4x IB PCIe Generation 2.

- [“ExpressModule Features”](#) on page 2
- [“ExpressModule Specifications”](#) on page 4
- [“InfiniBand Interface”](#) on page 5
- [“PCI ExpressModule Interface”](#) on page 6
- [“LEDs and Ports”](#) on page 6
- [“Node GUID”](#) on page 8
- [“Hardware and Software Requirements”](#) on page 8
- [“Install the ExpressModule”](#) on page 1
- [“Hot-Swap the ExpressModule \(Oracle Solaris\)”](#) on page 9
- [“Hot-Swap the ExpressModule \(Linux\)”](#) on page 11

Related Information

- [“Installing InfiniBand Software on the Oracle Solaris OS”](#) on page 15
- [“Installing the InfiniBand Support Software on Linux”](#) on page 21

▼ Install the ExpressModule

The IB ExpressModule is a standard PCI Express (PCIe) x8 adapter with a standard x8 edge connector. Consult the Sun Blade 6000 chassis documentation for instructions on how to install a PCI Express card into that system. This procedure is for the initial installation of the ExpressModule only.



Caution – Electronic components on printed circuit boards are extremely sensitive to static electricity. Ordinary amounts of static electricity generated by your clothing or work environment can damage the electronic equipment. When installing the ExpressModule in a system, use antistatic grounding straps and antistatic mats to help prevent damage due to electrostatic discharge.

1. **Halt and power off your system.**
2. **Install the ExpressModule into the ExpressModule slot, pushing the module's edge connector into the connector on the chassis.**
Ensure that the front plate on the ExpressModule mounts flush with the chassis panel opening.
3. **Connect the 4x end of the InfiniBand I/O cables to the ExpressModule port connectors.**
Ensure that the connectors are properly engaged.



Caution – Avoid putting unnecessary stress on the connection. Do not bend or twist the cable near the connectors and avoid cable bends of more than 90 degrees.

4. **If not already connected, connect the InfiniBand I/O cables to the appropriate ports on the InfiniBand switch.**
5. **Turn power back on to the system and allow the chassis to reboot.**
6. **Verify the installation.**
See “Verify the Installation (Oracle Solaris)” on page 17 or “Verify the Installation (Linux)” on page 25.

Related Information

- “Installing InfiniBand Software on the Oracle Solaris OS” on page 15
- “Installing the InfiniBand Support Software on Linux” on page 21

ExpressModule Features

The main features of the [ExpressModule](#) are as follows:

- PCIe 2.0 ExpressModule
- PCI Express expansion board with an x8 edge connector compatible with PCI Express 1.0a specifications

- Two 40 Gbps 4x IB QSFP ports for connecting IB traffic (4x IB connectors)
- 4x IB port speed support: 10 Gbps, 20 Gbps, or 40 Gbps QDR
- Media detect circuit supporting external InfiniBand active QSFP (copper) and fiber solutions
- IBTA v1.2.1 compliant
- Compliant to the *PCI ExpressModule Electromechanical Specification, Revision 1.1*
- Compliant to the *InfiniBand Architecture Specification, Release 1.2*
- EU RoHS compliant

FIGURE: ExpressModule With Metal Case

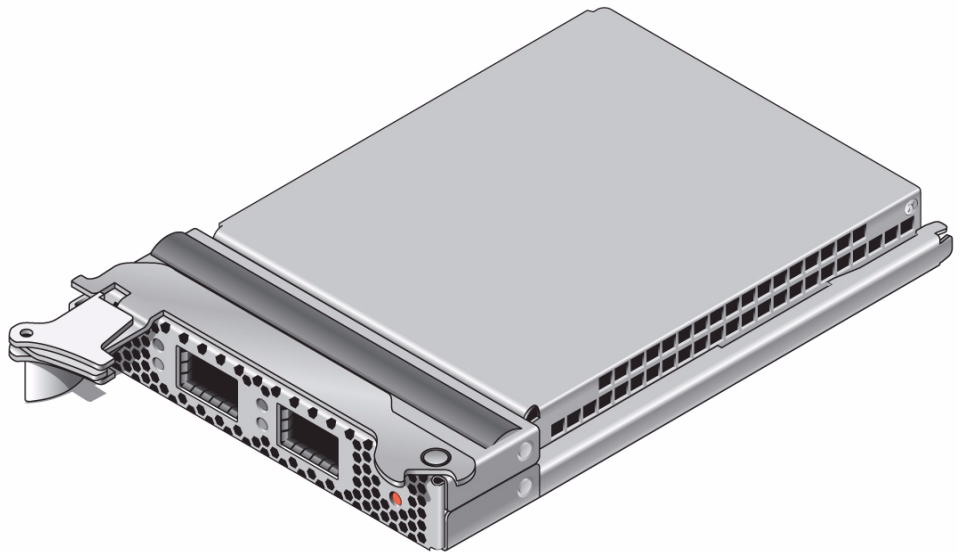


FIGURE: ExpressModule Without Metal Case

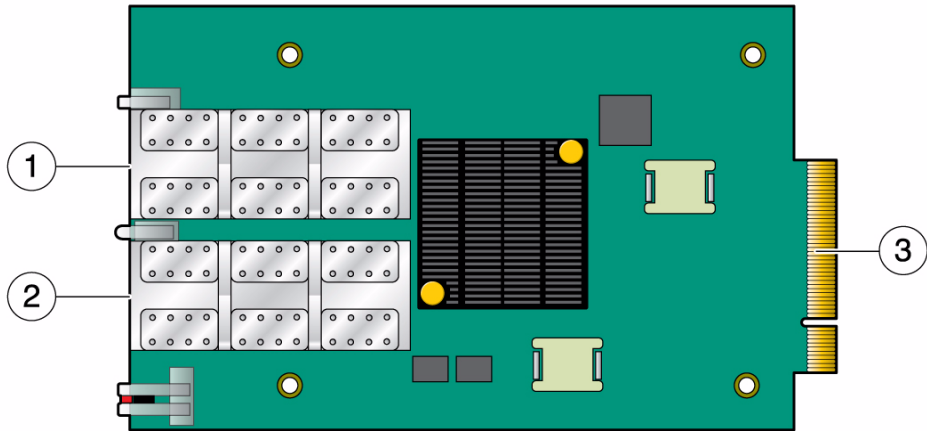


Figure Legend

-
- 1 InfiniBand Port 1
 - 2 InfiniBand Port 2
 - 3 PCI Express connector
-

Related Information

- [“ExpressModule Specifications” on page 4](#)

ExpressModule Specifications

The ExpressModule receives power from the server or workstation slot connector. All other required power is generated by ExpressModule switch-mode regulators.

TABLE: Specifications

Physical

Size	198 mm x 112 mm (7.8in. x 4.4in.)
Air flow	200 LFM @ 55°C
4x 10Gbps connector	InfiniBand (copper, current rating: 0.5A max) with active media ExpressModule support

Protocol Support

TABLE: Specifications

InfiniBand	IBTA v1.2.1, auto-negotiation 40 Gbps, 5 Gbps 20 Gbps, 5 Gbps 10 Gbps, 2.5 Gbps
QoS	8 InfiniBand virtual lanes for each port
RDMA support	All ports
PCI Express	2.0 SERDES @ 5.0 GT/s
Power and Environmental	
Voltage	12 V, 3.3 V
Typical power	12.23 W
Maximum power	14.32 W
Temperature	0°C to 55°C
Regulatory	
Safety	IEC/EN 60950-1:2001, ETSI EN 300 019-2-2
Environmental	IEC 60068-2- 64, 29, 32
RoHS	RoHS-R5

Related Information

- [“ExpressModule Features” on page 2](#)

InfiniBand Interface

The ExpressModule is compliant with the *InfiniBand Architecture Specification, Release 1.2*. The ExpressModule has two compliant 4x InfiniBand ports (Port 1 and Port 2), each having four Tx/Rx pairs of SerDes. The ExpressModule provides access to these ports by means of two 4x InfiniBand [QSFP](#) connectors for external InfiniBand copper cables also compliant with the [IBTA](#) specification 1.2.1. Connector 1 connects to Port 1 of the device, while connector 2 connects to Port 2.

Furthermore, the ExpressModule is embedded with a media detect circuit that supports external InfiniBand active copper and fiber solutions.

Related Information

- [“PCI ExpressModule Interface” on page 6](#)
- [“LEDs and Ports” on page 6](#)

PCI ExpressModule Interface

The ExpressModule is compatible with the *PCI ExpressModule Electromechanical Specification, Revision 1.1*. The device can be either a master initiating the PCI Express bus operations, or a slave responding to PCI bus operations.

Related Information

- [“InfiniBand Interface” on page 5](#)
- [“LEDs and Ports” on page 6](#)

LEDs and Ports

The ExpressModule has four LEDs located on the InfiniBand ports panel, with two LEDs for each 4x port.

FIGURE: InfiniBand Ports and LEDs

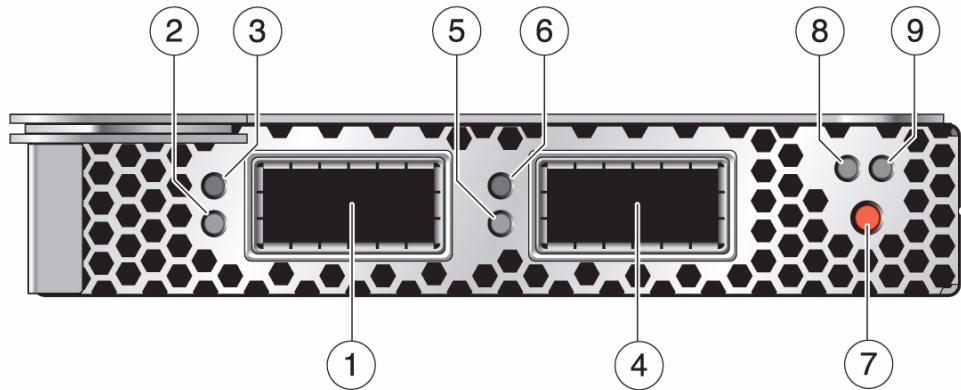


Figure Legend

-
- 1 InfiniBand Port 1
 - 2 Green LED for Port 1 (Physical Link)
 - 3 Amber LED for Port 1 (Data Activity Link)
 - 4 InfiniBand Port 2
 - 5 Green LED for Port 2 (Physical Link)
 - 6 Amber LED for Port 2 (Data Activity Link)
 - 7 Hot Swap button
 - 8 Power On indicator
 - 9 Service Required indicator
-

The pair of LEDs for each port have the meanings described in the following table.

TABLE: LED Meanings

LED Color	LED Name	LED State	Meaning
Green	Physical Link	Lit	The link bringup process has successfully completed and the link width, link speed, link polarity, and link reversal have been negotiated with the neighbor port on the other end of the cable.
		Unlit	A physical connection has not been established.

TABLE: LED Meanings (*Continued*)

LED Color	LED Name	LED State	Meaning
Amber	Data Activity	Steady light	Infiniband is discovered over the physical link, but no data is being passed.
		Blinking light	Data is being passed.
		Unlit	A physical or logical connection (or both) has not been established.

Related Information

- “InfiniBand Interface” on page 5
- “PCI ExpressModule Interface” on page 6

Node GUID

A label on the ExpressModule enclosure displays the 64-bit GUID. This GUID uniquely identifies this device in the server and on the IB fabric.

Related Information

- “Verify the Installation (Oracle Solaris)” on page 17
- “Update the Firmware (Oracle Solaris)” on page 19

Hardware and Software Requirements

For the latest list of supported platforms and operating systems, refer to the *Sun InfiniBand Dual Port 4x QDR PCIe ExpressModule Host Channel Adapter M2 Product Notes*. This document is available at: <http://docs.oracle.com>.

Related Information

- “Install the ExpressModule” on page 1

▼ Hot-Swap the ExpressModule (Oracle Solaris)

Note – Hot-swapping is not supported with Oracle Solaris 10 10/09. The following procedure is for Oracle Solaris 10 9/10.

This procedure is for removing and installing an ExpressModule without powering off the system.

1. Add this line to the `/etc/system` file:

```
set pcie:pcie_disable_ari = 1
```

Reboot the system after the modification for the changes to take effect.

2. Unplumb the ExpressModule:

```
# ifconfig ibd(0/1 or 2/3 ...) unplumb
```

3. Find the device number as required for hot-swapping:

Note – The `Ap_Id` changes from platform to platform. Use the `Ap_Id` related to the `ib/hp` type. Refer to the hot-plug/hot-swap procedures in the Solaris 10 documentation collections at: <http://docs.oracle.com>

The following is an example. The output from your platform could look different.

```
# cfgadm
Ap_Id                Type      Receptacle  Occupant
Condition
FEM0                 unknown   empty       unconfigured
unknown
FEM1                 unknown   empty       unconfigured
unknown
PCI-EM0              ib/hp     connected   configured ok
PCI-EM1              ib/hp     connected   configured ok
c2                   scsi-sas  connected   unconfigured
unknown
c3                   scsi-sas  connected   unconfigured
unknown
```

c4	scsi-sas	connected	unconfigured	
unknown				
hca:212800013F2A8A	IB-HCA	connected	configured	
ok				
hca:212800013F2A96	IB-HCA	connected	configured	
ok				
ib	IB-Fabric	connected	configured	ok
usb0/1	unknown	empty	unconfigured	ok

4. Unconfigure the ExpressModule:

```
# cfgadm -c unconfigure PCI-EM0
```

5. Disconnect the ExpressModule:

```
# cfgadm -c disconnect PCI-EM0
```

6. Remove the ExpressModule from the server.

7. Install a new ExpressModule.

See [“Install the ExpressModule”](#) on page 1.

8. Connect the ExpressModule.

```
# cfgadm -c connect PCI-EM0
```

9. Configure the ExpressModule.

```
# cfgadm -c configure PCI-EM0
```

10. Plumb the ExpressModule.

```
# ifconfig ibdn plumb IP_address up
```

11. Verify the installation.

See [“Verify the Installation \(Oracle Solaris\)”](#) on page 17.

Related Information

- [“Install the ExpressModule”](#) on page 1
- [“Hot-Swap the ExpressModule \(Linux\)”](#) on page 11

▼ Hot-Swap the ExpressModule (Linux)

This procedure is for removing and installing an ExpressModule without powering off the system.

1. Verify that the IB status is okay:

```
> ibstat
CA 'mlx4_0'
  CA type: MT26428
  Number of ports: 2
  Firmware version: 2.6.0
  Hardware version: a0
  Node GUID: 0x0002c903000379a4
  System image GUID: 0x0002c903000379a7
  Port 1:
    State: Active
    Physical state: LinkUp
    Rate: 20
    Base lid: 26
    LMC: 0
    SM lid: 23
    Capability mask: 0x02510868
    Port GUID: 0x0002c903000379a5
  Port 2:
    State: Down
    Physical state: Polling
    Rate: 10
    Base lid: 28
    LMC: 0
    SM lid: 1
    Capability mask: 0x02510868
    Port GUID: 0x0002c903000379a6
```

2. Load the acpiphp module:

Note – Do not use the `acpiphp` command for hot-plug operations in SUSE Linux SLES10SP2. Use the `modprobe pciehp pciehp_poll_mode=1` command instead. The remaining steps and commands are the same for the SUSE Linux SLES10SP2 hot-plug procedure.

```
> modprobe acpiphp
```

3. If IPoIB is configured, type:

```
> ifconfig ib $n$  down
```

where n is the instance number of the ExpressModule.

4. Press the Hot-Swap button on the ExpressModule.

Within eight seconds, the green LEDs will extinguish. The ExpressModule is now physically ready to be removed from the chassis slot.

5. Type:

```
> /etc/init.d/openibd status
HCA driver loaded

Configured IPoIB devices:

Currently active IPoIB devices:

The following OFED modules are loaded:

rdma_ucm
ib_sdp
rdma_cm
ib_addr
ib_ipoib
mlx4_core
mlx4_ib
ib_mthca
ib_uverbs
ib_umad
ib_ucm
ib_sa
ib_cm
ib_mad
ib_core
```

The output displays the driver as loaded but not attached to any device, which indicates the driver is stable.

6. Insert the ExpressModule into the chassis slot.

7. After approximately one minute, after all the LEDs are extinguished, press the Hot-Swap button again.

The LEDs start to blink and both the ExpressModule and the ports become active in nine seconds.

8. Verify that the InfiniBand ports are up:

```
> ibstat
CA 'mlx4_0'
  CA type: MT26428
  Number of ports: 2
  Firmware version: 2.6.0
  Hardware version: a0
  Node GUID: 0x0002c903000379a4
  System image GUID: 0x0002c903000379a7
  Port 1:
    State: Active
    Physical state: LinkUp
    Rate: 40
    Base lid: 26
    LMC: 0
    SM lid: 23
    Capability mask: 0x02510868
    Port GUID: 0x0002c903000379a5
  Port 2:
    State: Active
    Physical state: LinkUp
    Rate: 40
    Base lid: 28
    LMC: 0
    SM lid: 1
    Capability mask: 0x02510868
    Port GUID: 0x0002c903000379a6
```

9. Verify the installation.

See “Verify the Installation (Linux)” on page 25.

Related Information

- “Install the ExpressModule” on page 1
- “Hot-Swap the ExpressModule (Oracle Solaris)” on page 9

Installing InfiniBand Software on the Oracle Solaris OS

These topics provides an overview of installing and using the InfiniBand software stack for the Oracle Solaris OS.

Solaris 11 is supported. Consult the product notes for your chassis for recent information about supported operating systems, firmware and software updates, and other issues not covered in the main product documentation.

- [“InfiniBand Software for the Oracle Solaris 10 OS”](#) on page 15
- [“Download the Firmware Flash Update Tool for IB-HCAs \(Oracle Solaris 10\)”](#) on page 16
- [“Verify the Installation \(Oracle Solaris\)”](#) on page 17
- [“Update the Firmware \(Oracle Solaris\)”](#) on page 19
- [“InfiniBand Devices on the Oracle Solaris 10 OS”](#) on page 20

Related Information

- [“Installing the InfiniBand Support Software on Linux”](#) on page 21

InfiniBand Software for the Oracle Solaris 10 OS

InfiniBand is a network architecture for the large-scale interconnection of computing and I/O nodes through a high-speed switched fabric. To operate InfiniBand on an Oracle server, you need an InfiniBand HCA (the ExpressModule) and an InfiniBand software stack.

InfiniBand software is bundled with the Oracle Solaris 10 OS. The package containing the device driver for the adapter is `SUNWhermon`. The driver name is `hermon`.

For details about InfiniBand software supported in Oracle Solaris 10 releases, refer to the following documents in the Solaris 10 Release and Installation Collection available at <http://docs.oracle.com>:

- *Solaris 10 What's New*
- *Solaris 10 Release Notes*
- *Solaris 10 Package List*

Note – You must use the SUNWhermon package that is available in the Oracle Solaris 10 10/09 OS and subsequent Oracle Solaris releases with this ExpressModule.

The InfiniBand software stack, consisting of the upper-layer protocols and transport framework, is included in all of the Solaris software groups described in the *Solaris Installation Guide*. The SUNWhermon package is included in the Entire+OEM, Entire, and Developer software groups. If you are not using any of these groups, you must explicitly add the SUNWhermon package during initial installation. If you are not installing software, use the `pkgadd(1)` utility to add the package prior to using the ExpressModule.

Related Information

- “Download the Firmware Flash Update Tool for IB-HCAs (Oracle Solaris 10)” on page 16
- “Verify the Installation (Oracle Solaris)” on page 17
- “Update the Firmware (Oracle Solaris)” on page 19
- “InfiniBand Devices on the Oracle Solaris 10 OS” on page 20

▼ Download the Firmware Flash Update Tool for IB-HCAs (Oracle Solaris 10)

Note – The Oracle Solaris 11 OS `firmwareflash` utility supports the ExpressModule.

The Sun Firmware Flash Update tool in the Oracle Solaris 10 OS does not support the ExpressModule. You must download a separate package (version v2.0 or higher) containing that tool from the Oracle Download Webpage at:
<http://www.oracle.com/technology/software/index.html>

1. Go to the Download A-Z tab and search for the “Sun Firmware Flash Utility.” Refer to the installation instructions in the package README file.
2. Check that the correct `firmwareflash` version (v2.0 or higher) is installed:

```
# firmwareflash -v  
  
firmwareflash: version v2.0
```

Note – This command must display version number 2.0 or higher.

Related Information

- [“InfiniBand Software for the Oracle Solaris 10 OS”](#) on page 15
- [“Verify the Installation \(Oracle Solaris\)”](#) on page 17
- [“Update the Firmware \(Oracle Solaris\)”](#) on page 19
- [“InfiniBand Devices on the Oracle Solaris 10 OS”](#) on page 20

▼ Verify the Installation (Oracle Solaris)

1. **Install the ExpressModule in the chassis.**
See [“Install the ExpressModule”](#) on page 1.
2. **Power on the server and cable the server to an operational InfiniBand switch.**
Refer to your chassis documentation.
3. **Ensure that the cables are connected to the ExpressModule and switches.**
4. **Verify that the IB Subnet Manager is in operation on the network.**
Refer to the documentation for your network hardware.
5. **Check that the green LED is illuminated for each port that is connected to the switch.**
If the green LED is not on, check the cable connections at the adapter and at the switch.
6. **Check that the amber LED is illuminated for each port that is connected to the switch.**
7. **Verify that the IB-HCA ports are up and the driver is attached.**

a. Obtain the state of the device installed.

```
# cfgadm -als "cols=ap_id:condition" hca
Ap_Id                               Condition
hca:2C90109763F70                  ok
```

If more than one IB-HCA device is installed in the server, a row is displayed for each. Look for the row displaying `hca:GUID` where *GUID* is the 64-bit number from the physical label on the IB-HCA ExpressModule. See [“Node GUID” on page 8](#).

The Condition column must display `ok` to indicate that the driver has discovered the hardware and is bound to it. Refer to the `cfgadm_ib(1m)` man pages for details about the IB specific extensions.

b. Obtain port GUIDs for each port on the IB-HCA ExpressModule.

```
# cfgadm -als "cols=ap_id:info" hca
Ap_Id                               Information
hca:2C90109763F70                  VID: 0x15b3, PID: 0x5a44,
#ports: 0x2, port1 GUID: 0x2C90109763F71, port2 GUID:
0x2C90109763F72
```

If more than one IB-HCA device is installed in the server, a row is displayed for each device. Look for the row displaying `hca:GUID` where *GUID* is the 64-bit number from the physical label on the IB-HCA ExpressModule. See [“Node GUID” on page 8](#).

Use the port number and GUID displayed by this command for your IB-HCA device in the following step.

c. Verify that the IB ports and partitions are configured by the Subnet Manager.

```
# cfgadm -als "select=type(IB-VPPA),cols=ap_id"
Ap_Id
ib::2C90109763F71,ffff,ipib
ib::2C90109763F72,ffff,ipib
```

The command displays the `AP_ID` column where each row has the format of `ib::Port GUID,P_Key,ipib`. Match the Port GUIDs from the previous command with these port GUIDs. There must be one row corresponding to the port and *P_Key* setup by the Subnet Manager. If an entry is missing, check the Subnet Manager configuration.

Related Information

- [“InfiniBand Software for the Oracle Solaris 10 OS” on page 15](#)
- [“Download the Firmware Flash Update Tool for IB-HCAs \(Oracle Solaris 10\)” on page 16](#)

- “Update the Firmware (Oracle Solaris)” on page 19
- “InfiniBand Devices on the Oracle Solaris 10 OS” on page 20

▼ Update the Firmware (Oracle Solaris)

To use this ExpressModule with the Oracle Solaris OS, the minimum firmware version must be 2.7.8130.

1. Display the revision level of your ExpressModule.

```
# firmwareflash -l -c IB
```

Look for the revision number that appears after the `Firmware revision` string. If more than one IB-HCA device is displayed, look for the `Node Image GUID` that matches the GUID displayed on the physical GUID label of the IB-HCA ExpressModule being installed. See “Node GUID” on page 8.

If the firmware version is not at 2.7.8130 or higher, you must update the firmware. Only update the firmware on your IB-HCA ExpressModule with files specifically approved for the Sun product.

2. Select and download approved firmware files from:

<https://support.oracle.com/CSP/ui/flash.htm>

3. Use the `firmwareflash` command to install the firmware.

```
# firmwareflash -d device_path output -f firmware_bin_file
```

4. Reboot the system to enable the new firmware.

Related Information

- “InfiniBand Software for the Oracle Solaris 10 OS” on page 15
- “Download the Firmware Flash Update Tool for IB-HCAs (Oracle Solaris 10)” on page 16
- “Verify the Installation (Oracle Solaris)” on page 17
- “InfiniBand Devices on the Oracle Solaris 10 OS” on page 20

InfiniBand Devices on the Oracle Solaris 10 OS

For details about InfiniBand software stack configurations in an Oracle Solaris 10 release, refer to the *System Administration Guide: Devices and File Systems* document in the Solaris 10 System Administrator Collection available at <http://docs.oracle.com>.

Section 9 of this guide, titled “Using InfiniBand Devices (Overview/Tasks),” describes how to set up upper-layer protocols such as **IPoIB** and **uDAPL**.

When using IPoIB, verify that the `broadcast` group is configured by the Subnet Manager in the partition where the IPoIB link will be used.

Refer to the IB Subnet Manager documentation for more information.

Related Information

- “InfiniBand Software for the Oracle Solaris 10 OS” on page 15
- “Download the Firmware Flash Update Tool for IB-HCAs (Oracle Solaris 10)” on page 16
- “Verify the Installation (Oracle Solaris)” on page 17
- “Update the Firmware (Oracle Solaris)” on page 19
- “InfiniBand Devices on the Oracle Solaris 10 OS” on page 20

Installing the InfiniBand Support Software on Linux

These topics provides an overview of installing and using the InfiniBand software stack for the Oracle Solaris OS.

Consult the product notes for your server for recent information about supported operating systems, firmware and software updates, and other issues not covered in the main product documentation.

- [“InfiniBand Software for Linux” on page 21](#)
- [“Internet Protocol Over InfiniBand \(Linux\)” on page 25](#)
- [“Verify the Installation \(Linux\)” on page 25](#)

Related Information

- [“Installing InfiniBand Software on the Oracle Solaris OS” on page 15](#)

InfiniBand Software for Linux

InfiniBand is a network architecture for the large-scale interconnection of computing and I/O nodes through a high-speed switched fabric. To operate InfiniBand on a Sun server, you need an InfiniBand HCA (the ExpressModule) and an InfiniBand software stack.

Note – An InfiniBand software stack is part of the Oracle Linux distribution.

With most supported Linux releases, you must also install the OFED software stack (version 1.5.1 or higher). Refer to your Linux vendor for software installation recommendations and support.

As the popularity of InfiniBand technology increases, the number of Linux distributions and open source organizations producing drivers and tools will increase. For up-to-date information, check with open source organizations (such as <http://OpenFabrics.org>) and your current vendors.

The OpenFabrics organization is the Open Software solution in the InfiniBand software space. The OFED is the InfiniBand suite of software produced by this organization. Various vendors contribute their drivers (and other software components) to OFED.

If you are running a Linux OS without OFED, or using the EM in a network with the Sun Network QDR Infiniband Gateway Switch, you can download the BXOFED from My Oracle Support: <http://support.oracle.com>

Related Information

- “Acquire the BXOFED Software (Linux)” on page 22
- “Install the BXOFED Software (Linux)” on page 24
- “Verify the Installation (Linux)” on page 25
- “Internet Protocol Over InfiniBand (Linux)” on page 25

▼ Acquire the BXOFED Software (Linux)

If you are running a Linux OS without OFED, or if you are using the adapter with the Sun Network QDR Infiniband Gateway Switch, download the BXOFED software stack from the My Oracle Support web site.

1. Open a web browser on a host that will receive the BXOFED software.

2. Go to this URL:

<http://support.oracle.com>

Oracle’s My Oracle Support page is displayed.

3. Sign in if you already have an account.

The dashboard page is displayed.

Note – If you do not have an account, you must register.

4. Click the Patches & Updates tab.

The Patches & Updates page is displayed.

5. **In the Patch Search window, click the click Product or Family (Advanced Search).**
The Patch Search window updates.
6. **In the Product is field, type BridgeX.**
Possible products are suggested.
7. **Click on the most appropriate link.**
The Release is field might autopropagate with the most current version.
8. **In the Release drop-down menu, select the most current version of the BridgeX OFED software.**
For example, BridgeX OFED 1.5.1.
9. **Click outside the drop-down menu.**
10. **Click Search.**
The Patch Search window expands with the search results.
11. **In the Patch Name column, click the patch number link respective to your platform.**
For example, 12621910. The Patch Search window reformats.
12. **Click Read Me to display the README file.**
13. **Click Download.**
The File Download window opens.
14. **Click the *filename.zip* link to initiate the download.**
For example, p12621910_151_Linux-x86-64.zip.
15. **Indicate where the file should be saved.**
The file is downloaded and saved.
16. **In your receiving directory, decompress the *filename.zip* file.**
The BXOFED software is in the BXOFED-1.5.1-*version_for* Oracle.tgz file. There are also readme, release notes, installation guide and user manual files in the *filename.zip* file.
17. **Read the readme, release notes, and installation guide files for information how to install the BXOFED software.**

Related Information

- [“InfiniBand Software for Linux” on page 21](#)
- [“Verify the Installation \(Linux\)” on page 25](#)
- [“Internet Protocol Over InfiniBand \(Linux\)” on page 25](#)

▼ Install the BXOFED Software (Linux)

When you install the BXOFED software, any previous installations of OFED or BXOFED software are removed. Configuration files are not removed.

Note – If you are installing the BXOFED software on a cluster, install the software onto one of the cluster nodes, then install the `.rpm` files in the `OFED-1.5.1/RPMS` on all remaining cluster nodes using cluster-aware tools.

1. Become superuser of the host that received the BXOFED software.
2. Change to the directory where you extracted the `.tgz` file.
3. Run the installation script.

```
# ./BXOFED-1.5.1-1.6.3/install.pl
```

The script begins. Interactive menus direct you through the installation process. During the installation, two configuration files are created:

- `ofed.conf` – contains the names of the software modules installed and the configuration settings chosen during the installation.
- `ofed_net.conf` – contains the IPoIB configuration settings chosen during the installation.

The script finishes. This information is found in the respective locations:

- Man pages are installed in `/usr/share/man`.
- Documentation is installed under the `/usr/share/doc` directory.
- IPoIB configuration information is installed under the `/etc/sysconfig/network*` directory.
- The `openibd` daemon is installed under the `/etc/init.d` directory.
- BXOFED commands are located in the `/usr/bin` and `/usr/sbin` directories.
- BXOFED software installation information is displayed with the `/etc/infiniband/info` script.

4. (Optional) If the `.tgz` file was extracted to a NFS shared directory for a cluster, then to install the BXOFED software onto any remaining nodes in that cluster.
 - a. Log in as superuser of a node to receive the BXOFED software.
 - b. Change to the directory where the `.tgz` file was extracted.

c. Install the BXOFED software automatically.

```
# ./BXOFED-1.5.1-1.6.3/install.pl -c path/ofed.conf -n path/ofed_net.conf
```

where *path* is the directory path to the `ofed.conf` and `ofed_net.conf` files.

d. Repeat from [Step a](#) for all nodes to receive the BXOFED software.

5. Reboot the Linux InfiniBand host(s).

Related Information

- *Gateway Remote Administration*, upgrading the gateway firmware
- [“Acquire the BXOFED Software \(Linux\)”](#) on page 22
- [“Verify the Installation \(Linux\)”](#) on page 25

Internet Protocol Over InfiniBand (Linux)

Support for [IPoIB](#) is included in the BXOFED software distribution.

See [“Acquire the BXOFED Software \(Linux\)”](#) on page 22.

Related Information

- [“InfiniBand Software for Linux”](#) on page 21
- [“Acquire the BXOFED Software \(Linux\)”](#) on page 22
- [“Install the BXOFED Software \(Linux\)”](#) on page 24
- [“Verify the Installation \(Linux\)”](#) on page 25

▼ Verify the Installation (Linux)

1. Install the ExpressModule in the chassis.

See [“Install the ExpressModule”](#) on page 1.

2. **Power on the chassis and cable the chassis to an operational InfiniBand switch.**
Refer to your chassis documentation.

Note – The InfiniBand switch should automatically recognize the ExpressModule when it is connected to the fabric if the IB Subnet Manager is running on the switch or on a host within the subnet.

3. **Ensure that the cables are connected to the ExpressModule and switches.**
4. **Verify that the IB Subnet Manager is running on the IB switch or on a host within the subnet.**
Refer to the manual for the IB Subnet Manager for more information.
5. **Check that the green LED is illuminated for each port that is connected to the switch.**
If the green LED is not on, check the cable connections at the adapter and at the switch.
6. **Check that the amber LED is illuminated for each port that is connected to the switch.**
7. **Verify that the IB EM ports are up and the driver is attached:**

```
# ibstat
```

The state of each port is displayed:

State	Comments
Active	The port is working.
Down	The port is not working or the cable is not connected.
Initializing	If the initialization does not finish, the Subnet Manager might not be running for the subnet.

Related Information

- [“InfiniBand Software for Linux” on page 21](#)
- [“Acquire the BXOFED Software \(Linux\)” on page 22](#)
- [“Install the BXOFED Software \(Linux\)” on page 24](#)
- [“Internet Protocol Over InfiniBand \(Linux\)” on page 25](#)

Glossary

B

BoIB Boot over InfiniBand.

E

ExpressModule Sun InfiniBand Dual Port 4x QDR PCIe ExpressModule Host Channel Adapter M2.

I

IB InfiniBand. A switched fabric communications link primarily used in high-performance computing.

IB-HCA InfiniBand Host Channel Adapter.

IBTA InfiniBand Trade Association.

IPoIB Internet Protocol over InfiniBand.

M

MLNX_OFED Mellonox OpenFabrics Enterprise Distribution.

O

OFED OpenFabrics Enterprise Distribution.

P

PCIe PCI Express.

Q

QDR Quad data rate. A communication signaling technique wherein data is transmitted at four points in the clock cycle.

QSFP Quad Small Form-factor Pluggable. An interconnect system for the two ports.

R

RoHS Restriction of Hazardous Substances.

U

uDAPL User Direct Access Programming Library.

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