

Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule

User's Guide



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Safety Agency Compliance Statements

Read this section before beginning any procedure. The following text provides safety precautions to follow when installing a Sun Microsystems product.

Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols may appear in this book:



Caution – There is a risk of personal injury and equipment damage. Follow the instructions.



Caution – Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.



Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Depending on the type of power switch your device has, one of the following symbols may be used:



On – Applies AC power to the system.



Off – Removes AC power from the system.



Standby – The On/Standby switch is in the standby position.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems is not responsible for regulatory compliance of a modified Sun product.

Placement of a Sun Product



Caution – Do not block or cover the openings of your Sun product. Never place a Sun product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your Sun product.

System Unit Cover

You must remove the cover of your Sun computer system unit to add cards, memory, or internal storage devices. Be sure to replace the cover before powering on your computer system.



Caution – Do not operate Sun products without the cover in place. Failure to take this precaution may result in personal injury and system damage.

Conformité aux normes de sécurité

Veillez lire attentivement cette section avant de commencer. Ce texte traite des mesures de sécurité qu'il convient de prendre pour l'installation d'un produit Sun Microsystems.

Mesures de sécurité

Pour votre sécurité, nous vous recommandons de suivre scrupuleusement les mesures de sécurité ci-dessous lorsque vous installez votre matériel:

- Suivez tous les avertissements et toutes les instructions inscrites sur le matériel.
- Assurez-vous que la tension et la fréquence de votre source d'alimentation correspondent à la tension et à la fréquence indiquées sur l'étiquette de la tension électrique nominale du matériel
- N'introduisez jamais d'objets quels qu'ils soient dans les ouvertures de l'équipement. Vous pourriez vous trouver en présence de hautes tensions dangereuses. Tout objet étranger conducteur risque de produire un court-circuit pouvant présenter un risque d'incendie ou de décharge électrique, ou susceptible d'endommager le matériel.

Symboles

Vous trouverez ci-dessous la signification des différents symboles utilisés:



Attention – Vous risquez d'endommager le matériel ou de vous blesser. Veuillez suivre les instructions.



Attention – Surfaces brûlantes. Evitez tout contact. Les surfaces sont brûlantes. Vous risquez de vous blesser si vous les touchez.



Attention – Tensions dangereuses. Pour réduire les risques de décharge électrique et de danger physique, observez les consignes indiquées.

Selon le type d'interrupteur marche/arrêt dont votre appareil est équipé, l'un des symboles suivants sera utilisé:



Marche – Met le système sous tension alternative.



Arrêt – Met le système hors tension alternative.



Veilleuse – L'interrupteur Marche/Veille est sur la position de veille.

Modification du matériel

N'apportez aucune modification mécanique ou électrique au matériel. Sun Microsystems décline toute responsabilité quant à la non-conformité éventuelle d'un produit Sun modifié.

Positionnement d'un produit Sun



Attention – Evitez d'obstruer ou de recouvrir les orifices de votre produit Sun. N'installez jamais un produit Sun près d'un radiateur ou d'une source de chaleur. Si vous ne respectez pas ces consignes, votre produit Sun risque de surchauffer et son fonctionnement en sera altéré.

Couvercle de l'unité

Pour ajouter des cartes, de la mémoire ou des périphériques de stockage internes, vous devez retirer le couvercle de votre système Sun. Remettez le couvercle supérieur en place avant de mettre votre système sous tension.



Attention – Ne mettez jamais des produits Sun sous tension si leur couvercle supérieur n'est pas mis en place. Si vous ne prenez pas ces précautions, vous risquez de vous blesser ou d'endommager le système.

Einhaltung sicherheitsbehördlicher Vorschriften

Lesen Sie vor dem Ausführen von Arbeiten diesen Abschnitt. Im folgenden Text werden Sicherheitsvorkehrungen beschrieben, die Sie bei der Installation eines Sun Microsystems-Produkts beachten müssen.

Sicherheitsvorkehrungen

Treffen Sie zu Ihrem eigenen Schutz bei der Installation des Geräts die folgenden Sicherheitsvorkehrungen:

- Beachten Sie alle auf den Geräten angebrachten Warnhinweise und Anweisungen.
- Stellen Sie sicher, dass Spannung und Frequenz der Stromversorgung den Nennleistungen auf dem am Gerät angebrachten Etikett entsprechen.
- Führen Sie niemals Fremdoobjekte in die Öffnungen am Gerät ein. Es können gefährliche Spannungen anliegen. Leitfähige Fremdoobjekte können einen Kurzschluss verursachen, der einen Brand, Stromschlag oder Geräteschaden herbeiführen kann.

Symbole

Die Symbole in diesem Handbuch haben folgende Bedeutung:



Achtung – Gefahr von Verletzung und Geräteschaden. Befolgen Sie die Anweisungen.



Achtung – Heiße Oberfläche. Nicht berühren, da Verletzungsgefahr durch heiße Oberfläche besteht.



Achtung – Gefährliche Spannungen. Befolgen Sie die Anweisungen, um Stromschläge und Verletzungen zu vermeiden.

Je nach Netzschaltertyp an Ihrem Gerät kann eines der folgenden Symbole verwendet werden:



Ein – Versorgt das System mit Wechselstrom.



Aus – Unterbricht die Wechselstromzufuhr zum Gerät.



Wartezustand – Der Ein-/Standby-Netzschalter befindet sich in der Standby-Position.

Modifikationen des Geräts

Nehmen Sie keine elektrischen oder mechanischen Gerätemodifikationen vor. Sun Microsystems ist für die Einhaltung der Sicherheitsvorschriften von modifizierten Sun-Produkten nicht haftbar.

Gehäuseabdeckung

Sie müssen die Abdeckung Ihres Sun-Computersystems entfernen, um Karten, Speicher oder interne Speichergeräte hinzuzufügen. Bringen Sie vor dem Einschalten des Systems die Gehäuseabdeckung wieder an.



Achtung – Nehmen Sie Sun-Geräte nicht ohne Abdeckung in Betrieb. Die Nichtbeachtung dieses Warnhinweises kann Verletzungen oder Geräteschaden zur Folge haben.

Normativas de seguridad

Lea esta sección antes de realizar cualquier operación. En ella se explican las medidas de seguridad que debe tomar al instalar un producto de Sun Microsystems.

Medidas de seguridad

Para su protección, tome las medidas de seguridad siguientes durante la instalación del equipo:

- Siga todos los avisos e instrucciones indicados en el equipo.
- Asegúrese de que el voltaje y frecuencia de la fuente de alimentación coincidan con el voltaje y frecuencia indicados en la etiqueta de clasificación eléctrica del equipo.
- No introduzca objetos de ningún tipo por las rejillas del equipo, ya que puede quedar expuesto a voltajes peligrosos. Los objetos conductores extraños pueden producir cortocircuitos y, en consecuencia, incendios, descargas eléctricas o daños en el equipo.

Símbolos

En este documento aparecen los siguientes símbolos:



Precaución – Existe el riesgo de que se produzcan lesiones personales y daños en el equipo. Siga las instrucciones.



Precaución – Superficie caliente. Evite todo contacto. Las superficies están calientes y pueden causar lesiones personales si se tocan.



Precaución – Voltaje peligroso. Para reducir el riesgo de descargas eléctricas y lesiones personales, siga las instrucciones.

En función del tipo de interruptor de alimentación del que disponga el dispositivo, se utilizará uno de los símbolos siguientes:



Encendido – Suministra alimentación de CA al sistema.



Apagado – Corta la alimentación de CA del sistema.



Espera – El interruptor de encendido/espera está en la posición de espera.

Modificaciones en el equipo

No realice modificaciones de tipo mecánico ni eléctrico en el equipo. Sun Microsystems no se hace responsable del cumplimiento de normativas en caso de que un producto Sun se haya modificado.

Colocación de un producto Sun



Precaución – No obstruya ni tape las rejillas del producto Sun. Nunca coloque un producto Sun cerca de radiadores ni fuentes de calor. Si no sigue estas indicaciones, el producto Sun podría sobrecalentarse y la fiabilidad de su funcionamiento se vería afectada.

Regulatory Compliance Statements

Your Sun product is marked to indicate its compliance class:

- Federal Communications Commission (FCC) — USA
- Industry Canada Equipment Standard for Digital Equipment (ICES-003) — Canada
- Voluntary Control Council for Interference (VCCI) — Japan
- Bureau of Standards Metrology and Inspection (BSMI) — Taiwan

Please read the appropriate section that corresponds to the marking on your Sun product before attempting to install the product.

FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

ICES-003 Class A Notice - Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

VCCI 基準について

クラス A VCCI 基準について

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BSMI Class A Notice

The following statement is applicable to products shipped to Taiwan and marked as Class A on the product compliance label.

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

CCC Class A Notice

The following statement is applicable to products shipped to China and marked with "Class A" on the product's compliance label.

以下声明适用于运往中国且其认证标志上注有 "Class A" 字样的产品。

声明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Declaration of Conformity

To receive a copy of the latest Declaration of Conformity (DoC) for the product, either contact your local Sun sales representative, or create an online request at:

(https://www2.sun.de/dct/forms/reg_us_1607_755_0.jsp)

Preface

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

Note – The Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule is based on Mellanox Technologies’ MT26428 ConnectX IB adapter (HCA) device.

Related Documentation

The following table lists the documentation for this product. The online documentation is available at:

<http://docs.sun.com/app/docs/prod/qdr.pcie.expmod>

Application	Title	Part Number	Format	Location
Unpacking the product	<i>Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule Getting Started Guide</i>	820-6541	Printed PDF	Shipping kit Online
Installation and use	<i>Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule User’s Guide</i>	820-6539	PDF HTML	Online
Latest Information	<i>Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule Product Notes</i>	820-6540	PDF HTML	Online
Solaris support	Solaris 10 Operating System documentation collection http://docs.sun.com/app/docs/prod/solaris.10		PDF HTML	Online

If you download software from Mellanox Technologies, as described in this manual, you might also need documentation that is available at:

<http://www.mellanox.com>

Details on locating specific manuals at this web site are provided in [Chapter 3](#).

Application	Title	Format	Location
Installing Linux support software	<i>Mellanox OFED for Linux Installation Guide</i>	PDF	Online
Use of Linux support software and IPoIB features	<i>Mellanox OFED Stack for Linux User's Manual</i>	PDF	Online
Latest information on Linux support software	<i>Mellanox OFED for Linux Release Notes</i>	Text file	Online
Use of BoIB features	<i>Boot over IB (BoIB) User's Manual</i>	PDF	Online
Latest information on BoIB	<i>Mellanox Boot over IB (BoIB) in "Mellanox OFED for Linux" Release Notes</i>	Text file	Online

Documentation, Support, and Training

Sun Function	URL
Documentation	http://www.sun.com/documentation/
Support	http://www.sun.com/support/
Training	http://www.sun.com/training/

Third-Party Web Sites

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resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Information	URL
PCI Express specifications	http://www.pcisig.com
Mellanox Technologies HCA information, firmware downloads, and Linux software downloads	http://www.mellanox.com
OFED information	http://www.openfabrics.org
InfiniBand Specifications	http://infinibandta.org/

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Include the title and part number of your document with your feedback:

Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule User's Guide, part number 820-6539-13.

Overview

This chapter includes:

- [“Adapter Hardware Overview” on page 1](#)
- [“Hardware and Software Requirements” on page 6](#)

Adapter Hardware Overview

The main features of the Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule are as follows:

- Compliant to the *PCI ExpressModule Electromechanical Specification, Revision 1.1*
- Compliant to the *InfiniBand Architecture Specification, Release 1.2*
- Two 40 Gbps 4x InfiniBand (IB) QSFP ports for connecting InfiniBand traffic (4x IB connectors)
- Media detect circuit supporting external InfiniBand active QSFP (copper) and fiber solutions
- EU Restriction of Hazardous Substances (RoHS) compliant
- IBTA (InfiniBand Trade Association) v1.2 compliant
- PCIe 2.0 adapter
- PCI Express expansion board with an x8 edge connector compatible to the PCI Express 1.0a specification
- Media detect circuit, which supports external InfiniBand fiber solutions
- 4x IB port speed support: 10 Gbps, 20 Gbps, or 40 Gbps (QDR - quad data rate)

ExpressModule

FIGURE 1-1 ExpressModule

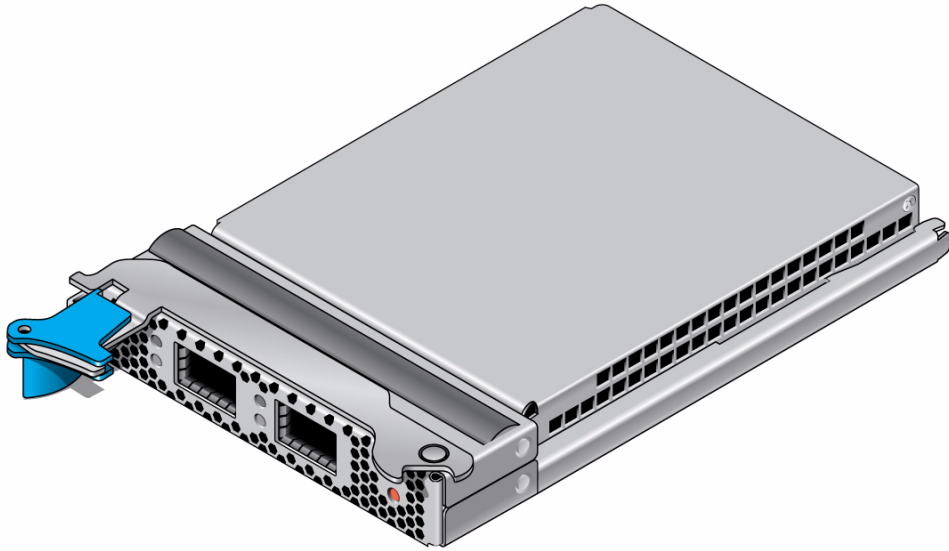


FIGURE 1-2 ExpressModule Without Metal Case

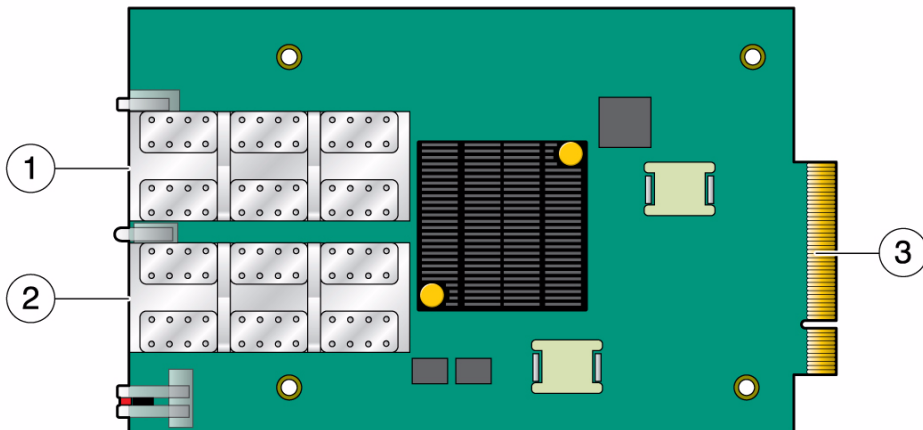


Figure Legend

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

I/O Interfaces

The ExpressModule includes the following interfaces:

- Two 4x InfiniBand QSFP connectors
- PCI ExpressModule to server or workstation connector
- I/O panel LEDs

InfiniBand Interface

The Sun Dual Port 4x QDR IB Host Channel Adapter PCIe 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 connectors for external InfiniBand copper cables also compliant with the IBTA specification 1.2. 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.

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.

LED Assignment

The ExpressModule has four LEDs located on the InfiniBand ports panel, with two LEDs for each 4x port. See [FIGURE 1-3](#).

FIGURE 1-3 InfiniBand Ports and LEDs

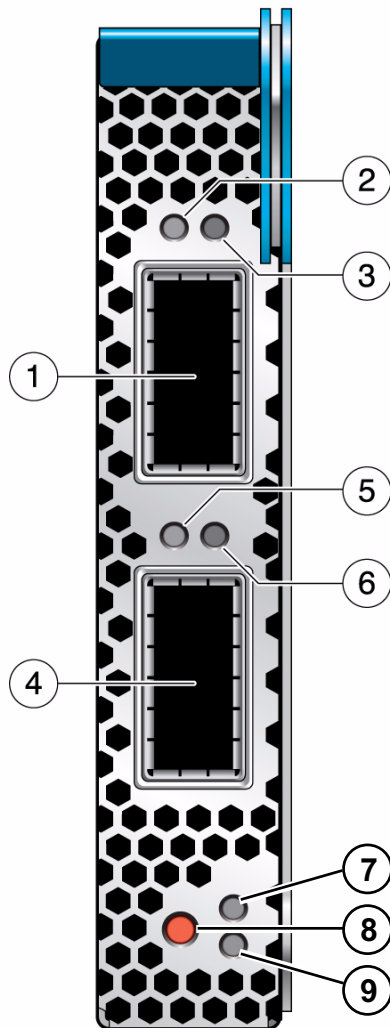


Figure Legend

-
- 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)
-

Figure Legend (Continued)

-
- 7 Power On Indicator
 - 8 Hot Swap Button
 - 9 Service Required Indicator
-

The pair of LEDs for each port have the meanings described in [TABLE 1-1](#).

TABLE 1-1 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.
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.

Power

The ExpressModule receives power from the server or workstation slot connector. All other required power is generated by ExpressModule switch-mode regulators. For power consumption see [Appendix A](#).

Node GUID

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

Hardware and Software Requirements

For the latest list of supported platforms and operating systems, refer to the *Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule Product Notes*, part number 820-6540. This document is available at <http://docs.sun.com>.

IB-HCA ExpressModule Installation

This chapter describes how to install the Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule and verify that it has been installed correctly.

- [“Installing the IB-HCA ExpressModule” on page 7](#)
- [“Install the ExpressModule” on page 7](#)

Installing the IB-HCA ExpressModule

The following instructions describe the basic tasks required to install the ExpressModule. Refer to your system installation or service manual for detailed ExpressModule installation instructions.

▼ Install the ExpressModule

- 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 card 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 server to reboot.**

This completes the hardware installation. Proceed to the verification instructions in [“Verify the Installation With the Solaris 10 OS”](#) on page 15 or [“Verify the Installation With Linux”](#) on page 20.

Hot-Swapping With the Linux OS

Use the following procedure to hot-swap the ExpressModule with the Linux OS.

▼ To Hot-Swap the ExpressModule Using the Linux OS

1. Type the following and 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 by typing the following:

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 of the **acpiphp** command. The remaining steps and commands are the same for the SuSE Linux SLES10SP2 hot-plug procedure.

```
> modprobe acpiphp
```

3. If IPoIB is configured, type one of the following:

```
> ifconfig ib0 down
```

```
> ifconfig ib1 down
```

Where *n* is the instance number of the ExpressModule.

4. Press the Hot-Swap button on the ExpressModule (see [FIGURE 1-3](#)).

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

5. Type the following:

```
> /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 chassis slot.

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

The LEDs start to blink and both the ExpressModule and the ports come up in nine seconds.

8. Type the following to 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
```

InfiniBand Software on the Solaris Operating System and 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.

This chapter provides an overview of installing and using the InfiniBand software stack for the Solaris OS and Linux operating system.

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.

This chapter includes:

- [“InfiniBand Software on the Solaris Operating System” on page 13](#)
- [“InfiniBand Support Software for Linux” on page 17](#)
- [“Internet Protocol Over InfiniBand on Linux” on page 19](#)
- [“Boot Over InfiniBand on Linux” on page 19](#)
- [“Additional InfiniBand Software for Linux” on page 21](#)

InfiniBand Software on the Solaris Operating System

InfiniBand software is bundled with the Solaris 10 OS. The package containing the device driver for the Sun Dual Port 4x QDR IB Host Channel Adapter is SUNWhermon. The driver name is hermon.

InfiniBand Software for Solaris 10

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

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

Note – The SUNWhermon package that is available in the Solaris 10 10/09 OS and subsequent Solaris Update releases must be used with this IB-HCA 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 doing a software install, use the `pkgadd(1)` utility to add the package prior to using the Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule.

Sun Firmware Flash Update Tool for IB-HCAs

The Sun Firmware Flash Update tool in the Solaris 10 OS does not support the Sun Dual Port 4x QDR IB Host Channel Adapter. You must download a separate package containing that tool from the Oracle Download Webpage at: <http://www.sun.com/download/index.jsp>.

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.

To check that the correct version is installed, type:

```
# firmwareflash -v  
  
firmwareflash: version v1.9
```

Note – This command must display version number 1.9 or higher.

▼ Verify the Installation With the Solaris 10 OS

Before you can verify the installation, you must install the adapter in the chassis, power on the server, and cable the server to an operational InfiniBand switch. Afterward, perform the following steps:

1. **Ensure that the cables are connected to the adapter and switches.**
2. **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.
3. **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.
4. **Check that the amber LED is illuminated for each port that is connected to the switch.**
5. **Verify that the IB-HCA ports are up and the driver is attached.**
 - a. **Use the `cfgadm(1m)` command to 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 card. See [“Node GUID” on page 5](#). The `condition` column must display `ok` to indicate that the driver has discovered the hardware and bound to it. Refer to the `cfgadm_ib(1m)` man pages for details about the IB specific extensions.

- b. Use the `cfgadm(1m)` command to obtain port GUIDs for each port on the IB-HCA.

```
# 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. Look for the row displaying `hca:GUID` where *GUID* is the 64-bit number from the physical label on the IB-HCA card. See [“Node GUID” on page 5](#).

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

- c. Use the `cfgadm(1m)` command to 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.

Sun Firmware Version for IB-HCAs on the Solaris OS

To use this ExpressModule with the Solaris OS, the minimum firmware version must be 2.7.000. Use the `firmwareflash` command to display the revision level of your IB-HCA ExpressModule.

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

Look for the revision number that appears after the `Firmware` revision string. If more than one 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 5](#).

If the firmware version is not at 2.7.000 or higher, update the firmware. Only update the firmware on your IB-HCA ExpressModule with files specifically approved for the Oracle product. Select and download approved firmware files from:

http://www.mellanox.com/support/firmware_table_Sun.php

After obtaining a firmware image, use the `firmwareflash` command to install the firmware. Once installed, reboot the system to enable the new firmware.

Using InfiniBand Devices on the Solaris 10 OS

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

Troubleshooting

Check the *Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule Product Notes* (820-6540) for information about known issues discovered using the Solaris 10 OS with your IB-HCA card.

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

InfiniBand Support Software for Linux

With most supported Linux releases, you must also install the `MLNX_OFED` software stack. This software is the Mellanox OpenFabrics Enterprise Distribution (OFED) for Linux. Refer to your Linux vendor for software installation recommendations and support.

▼ Download the MLNX_OFED Software and Documentation

1. Go to the Mellanox Technologies web site:

<http://www.mellanox.com>

2. Select the Products tab.
3. Select InfiniBand SW/Drivers from the menu for Products.
4. Select Linux SW/Drivers from the menu for InfiniBand SW/Drivers.
5. Select the download that corresponds to your operating system.

Follow those instructions to complete the download.

6. Select and download the related documentation for MLNX_OFED.

At minimum, download copies of these manuals that are offered on the Linux SW/Drivers page:

- Installation Guide
- Linux User's Manual
- Release Notes

▼ Install the MLNX_OFED Software on a Sun Server

1. Refer to the *Mellanox OFED for Linux Installation Guide* you downloaded from the Mellanox web site.

The instructions in that document are correct for installation on a Sun server except for a difference explained in the next step.

2. Whenever a procedure in the Mellanox guide calls for running the `mlnxofedinstall` script, always include the `--without-fw-update` option.

This option prevents the MLNX_OFED installation process from automatically updating the firmware on your Sun HCA. Only update the firmware on that device using files specifically approved for Sun product. You can select and download approved firmware files from:

http://www.mellanox.com/support/firmware_table_Sun.php

Internet Protocol Over InfiniBand on Linux

Support for Internet Protocol Over InfiniBand (IPoIB) is included in the `MLNX_OFED` software distribution. Details on using IPoIB are included in the *Mellanox OFED Stack for Linux User's Manual*.

Boot Over InfiniBand on Linux

Software to enable Boot Over InfiniBand (BoIB) on Linux is available from the Mellanox Technologies web site.

▼ Download the Boot Over IB Software and Documentation

1. Go to the Mellanox Technologies web site:

<http://www.mellanox.com>

2. Select the **Products** tab.
3. Select **Boot Over IB** from the menu for **Products**.
4. Select **Linux SW/Drivers** from the menu for **InfiniBand SW/Drivers**.
5. Select **Download**.

Follow the instructions provided on the web page to complete the download.

6. Select and download the related documentation for `MLNX_OFED`.

At minimum, download copies of these manuals that are offered on the Boot Over IB page:

- User's Manual
- Release Notes

Verifying the Installation With Linux

Before you can verify the installation, you must install the ExpressModule in the chassis, power on the server, and cable the server to an operational InfiniBand switch. The InfiniBand switch should automatically recognize an InfiniBand server that is connected to the fabric.

▼ Verify the Installation With Linux

The InfiniBand switch should automatically recognize the IB-HCA 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.

1. **Ensure that the cables are connected to the ExpressModule and switches.**
2. **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.

3. **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 ExpressModule and at the switch.

4. **Check that the amber LED is illuminated for each port that is connected to the switch.**
5. **Verify that the IB EM ports are up and the driver is attached, by typing:**

```
> 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.

Additional InfiniBand Software for Linux

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 OpenFabrics Enterprise Distribution (OFED) is the InfiniBand suite of software produced by this organization. Various vendors contribute their drivers (and other software components) to OFED.

Product Specifications

This chapter includes:

- [“ExpressModule Specifications” on page 23](#)

ExpressModule Specifications

[TABLE A-1](#) lists the specifications for the Sun Dual Port 4x QDR IB Host Channel Adapter PCIe ExpressModule.

TABLE A-1 Board Specifications

Physical

Size	198 mm X 112 mm (7.8in. x 4.4in.)
Air flow	200 LFM @ 55C
4x 20 Gb/sec connector	InfiniBand (Copper, current rating: 0.5A max) with active media adapter support

Protocol Support

IBTA v1.2	Auto-Negotiation* (40 Gbps, 20 Gbps, 10 Gbps)
QoS	8 InfiniBand virtual lanes for each port
RDMA support	All ports

Power and Environmental

Voltage	12 V, 3.3 V
Max power	12 W
Temperature	0 to 55° Celsius

* The auto-negotiation protocol is proprietary of Mellanox Technologies and compliant with the *InfiniBand Architecture Specification, Release 1.2*.

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