Sun™ Dual Port 4x IB Host Channel Adapter PCI-ExpressModule User's Guide

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Contents

Declaration of Conformity

Compliance Model Number:	MSEA282NC
Product Family Name:	IBHCA_PEM is a dual port 4x (10 Gbps) InfiniBand PCI-e HCA

EMC

USA—FCC Class A

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

1. This equipment may not cause harmful interference.
2. This equipment must accept any interference that may cause undesired operation.

European Union

This equipment complies with the following requirements of the EMC Directive 89/336/EEC:

As Telecommunication Network Equipment (TNE) in Both Telecom Centers and Other Than Telecom Centers per (as applicable):

EN 300 386 V.1.3.2 (2003-05) Required Limits:	
EN 55022:1994 +A1:1995 +A2:1997	ClassA
EN 61000-3-2:2000	Pass
EN 61000-3-3:1995 +A1:2000	Pass
IEC 61000-4-2	6 kV (Direct), 8 kV (Air)
IEC 61000-4-3	3 V/m 80-1000MHz, 10 V/m 800-960 MHz, and 1400-2000 MHz
IEC 61000-4-4	1 kV AC and DC Power Lines, 0.5 kV Signal Lines
IEC 61000-4-5	2 kV AC Line-Gnd, 1 kV AC Line-Line and Outdoor Signal Lines, 0.5 kV Indoor signal Lines > 10m.
IEC 61000-4-6	3 V
IEC 61000-4-11	Pass

As Information Technology Equipment (ITE) Class A per (as applicable):

EN 55022:1994 +A1:1995 +A2:1997	Class A
EN 61000-3-2:2000	Pass
EN 61000-3-3:1995 +A1:2000	Pass
EN 55024:1998 +A1:2001 +A2:2003 Required Limits:	
IEC 61000-4-2	4 kV (Direct), 8 kV (Air)
IEC 61000-4-3	3 V/m
IEC 61000-4-4	1 kV AC Power Lines, 0.5 kV Signal and DC Power Lines
IEC 61000-4-5	1 kV AC Line-Line and Outdoor Signal Lines, 2 kV AC Line-Gnd, 0.5 kV DC Power Lines
IEC 61000-4-6	3 V
IEC 61000-4-8	1 A/m
IEC 61000-4-11	Pass

Safety: This equipment complies with the following requirements of the Low Voltage Directive 73/23/EEC:

EC Type Examination Certificates:

EN 60950-1:2001, 1st Edition	TÜV Rheinland Certificate No.
IEC 60950-1:2001, 1st Edition	CB Scheme Certificate No.
Evaluated to all CB Countries	
UL and cUL/CSA 60950-1:2001, CSA C22.2 No. 60950-00	File: Vol. Sec.
FDA DHHS Accession Number (Monitors Only)	

Supplementary Information: This product was tested and complies with all the requirements for the CE Mark. This equipment complies with the Restriction of Hazardous Substances (roHS) directive 2002/95/EC.

/S/   /S/

Dennis P. Symanski   DATE   Donald Cameron   DATE
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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.

FCC Class B 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 B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

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.

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

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

Cet appareil numérique de la classe B 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

クラス A VCCI の表示があるワークステーションおよびオプション製品は、クラス A 情報技術装置です。これらの製品には、下記の項目が該当します。

> この装置は、情報処理装置等電波障害自主規制協議会 (VCCI) の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

クラス B VCCI 基準について

クラス B VCCI の表示 VCI があるワークステーションおよびオプション製品は、クラス B 情報技術装置です。これらの製品には、下記の項目が該当します。

> この装置は、情報処理装置等電波障害自主規制協議会 (VCCI) の基準に基づくクラス B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをしてください。

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。

GOST-R Certification Mark
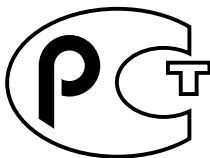
Safety Agency Compliance Statement

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.

SELV Compliance

Safety status of I/O connections comply to SELV requirements.

Power Cord Connection

Caution – Sun products are designed to work with power systems having a grounded neutral (grounded return for DC-powered products). To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Caution – Not all power cords have the same current ratings. Do not use the power cord provided with your equipment for any other products or use. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Sun product.

注意 – 添付の電源コードを他の装置や用途に使用しない
添付の電源コードは本装置に接続し、使用することを目的として設計され、その安全性が確認されているものです。決して他の装置や用途に使用しないでください。火災や感電の原因となる恐れがあります。

The following caution applies only to devices with a Standby power switch:

Caution – The power switch of this product functions as a standby type device only. The power cord serves as the primary disconnect device for the system. Be sure to plug the power cord into a grounded power outlet that is nearby the system and is readily accessible. Do not connect the power cord when the power supply has been removed from the system chassis.

The following caution applies only to devices with multiple power cords:

Caution – For products with multiple power cords, all power cords must be disconnected to completely remove power from the system.

Battery Warning

Caution – There is danger of explosion if batteries are mishandled or incorrectly replaced. On systems with replaceable batteries, replace only with the same manufacturer and type or equivalent type recommended by the manufacturer per the instructions provided in the product service manual. Do not disassemble batteries or attempt to recharge them outside the system. Do not dispose of batteries in fire. Dispose of batteries properly in accordance with the manufacturer's instructions and local regulations. Note that on Sun CPU boards, there is a lithium battery molded into the real-time clock. These batteries are not customer replaceable parts.

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.

Rack System Warning

The following warnings apply to Racks and Rack Mounted systems.

Caution – For safety, equipment should always be loaded from the bottom up. That is, install the equipment that will be mounted in the lowest part of the rack first, then the next higher systems, etc.

Caution – To prevent the rack from tipping during equipment installation, the anti-tilt bar on the rack must be deployed.

Caution – To prevent extreme operating temperature within the rack insure that the maximum temperature does not exceed the product's ambient rated temperatures.

⚠ Caution – To prevent extreme operating temperatures due to reduced airflow consideration should be made to the amount of air flow that is required for a safe operation of the equipment.

Laser Compliance Notice

Sun products that use laser technology comply with Class 1 laser requirements.

> Class 1 Laser Product
> Luokan 1 Laserlaite
> Klasse 1 Laser Apparat
> Laser Klasse 1

CD and DVD Devices

The following caution applies to CD, DVD, and other optical devices.

⚠ Caution – Use of controls, adjustments, or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Conformité aux normes de sécurité

Veuillez 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.

Arret – 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.

Conformité SELV

Le niveau de sécurité des connexions E/S est conforme aux normes SELV.

Connexion du cordon d'alimentation

Attention – Les produits Sun sont conçus pour fonctionner avec des systèmes d'alimentation équipés d'un conducteur neutre relié à la terre (conducteur neutre pour produits alimentés en CC). Pour réduire les risques de décharge électrique, ne branchez jamais les produits Sun sur une source d'alimentation d'un autre type. Contactez le gérant de votre bâtiment ou un électricien agréé si vous avez le moindre doute quant au type d'alimentation fourni dans votre bâtiment.

Attention – Tous les cordons d'alimentation ne présentent pas les mêmes caractéristiques électriques. Les cordons d'alimentation à usage domestique ne sont pas protégés contre les surtensions et ne sont pas conçus pour être utilisés avec des ordinateurs. N'utilisez jamais de cordon d'alimentation à usage domestique avec les produits Sun.

L'avertissement suivant s'applique uniquement aux systèmes équipés d'un interrupteur Veille:

Attention – L'interrupteur d'alimentation de ce produit fonctionne uniquement comme un dispositif de mise en veille. Le cordon d'alimentation constitue le moyen principal de déconnexion de l'alimentation pour le système. Assurez-vous de le brancher dans une prise d'alimentation mise à la terre près du système et facile d'accès. Ne le branchez pas lorsque l'alimentation électrique ne se trouve pas dans le châssis du système.

L'avertissement suivant s'applique uniquement aux systèmes équipés de plusieurs cordons d'alimentation:

Attention – Pour mettre un système équipé de plusieurs cordons d'alimentation hors tension, il est nécessaire de débrancher tous les cordons d'alimentation.

Mise en garde relative aux batteries

Attention – Les batteries risquent d'exploser en cas de manipulation maladroite ou de remplacement incorrect. Pour les systèmes dont les batteries sont remplaçables, effectuez les remplacements uniquement selon le modèle du fabricant ou un modèle équivalent recommandé par le fabricant, conformément aux instructions fournies dans le manuel de service du système. N'essayez en aucun cas de démonter les batteries, ni de les recharger hors du système. Ne les jetez pas au feu. Mettez-les au rebut selon les instructions du fabricant et conformément à la législation locale en vigueur. Notez que sur les cartes processeur de Sun, une batterie au lithium a été moulée dans l'horloge temps réel. Les batteries ne sont pas des pièces remplaçables par le client.

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.

Mise en garde relative au système en rack

La mise en garde suivante s'applique aux racks et aux systèmes montés en rack.

Attention – Pour des raisons de sécurité, le matériel doit toujours être chargé du bas vers le haut. En d'autres termes, vous devez installer, en premier, le matériel qui doit se trouver dans la partie la plus inférieure du rack, puis installer le matériel sur le niveau suivant, etc.

Attention – Afin d'éviter que le rack ne penche pendant l'installation du matériel, tirez la barre anti-basculement du rack.

Attention – Pour éviter des températures de fonctionnement extrêmes dans le rack, assurez-vous que la température maximale ne dépasse pas la fourchette de températures ambiantes du produit déterminée par le fabricant.

Attention – Afin d'empêcher des températures de fonctionnement extrêmes provoquées par une aération insuffisante, assurez-vous de fournir une aération appropriée pour un fonctionnement du matériel en toute sécurité

Avis de conformité des appareils laser

Les produits Sun qui font appel aux technologies lasers sont conformes aux normes de la classe 1 en la matière.

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Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser Klasse 1
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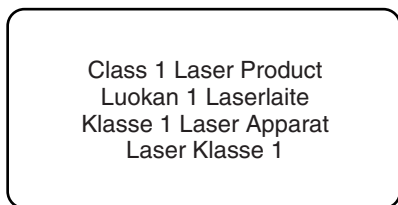
Périphériques CD et DVD

L'avertissement suivant s'applique aux périphériques CD, DVD et autres périphériques optiques:

Attention – L'utilisation de contrôles et de réglages ou l'application de procédures autres que ceux spécifiés dans le présent document peuvent entraîner une exposition à des radiations dangereuses.

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 Fremdobjekte in die Öffnungen am Gerät ein. Es können gefährliche Spannungen anliegen. Leitfähige Fremdobjekte 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.

Aufstellung von Sun-Geräten

⚠ **Achtung –** Geräteöffnungen Ihres Sun-Produkts dürfen nicht blockiert oder abgedeckt werden. Sun-Geräte sollten niemals in der Nähe von Heizkörpern oder Heißluft-klappen aufgestellt werden. Die Nichtbeachtung dieser Richtlinien kann Überhitzung verursachen und die Zuverlässigkeit Ihres Sun-Geräts beeinträchtigen.

SELV-Konformität

Der Sicherheitsstatus der E/A-Verbindungen entspricht den SELV-Anforderungen.

Anschluss des Netzkabels

⚡ **Achtung –** Sun-Geräte sind für Stromversorgungssysteme mit einem geerdeten neutralen Leiter (geerdeter Rückleiter bei gleichstrombetriebenen Geräten) ausgelegt. Um die Gefahr von Stromschlägen zu vermeiden, schließen Sie das Gerät niemals an andere Stromver-sorgungssysteme an. Wenden Sie sich an den zuständigen Gebäudeverwalter oder an einen qualifizierten Elektriker, wenn Sie nicht sicher wissen, an welche Art von Stromver-sorgungssystem Ihr Gebäude angeschlossen ist.

⚡ **Achtung –** Nicht alle Netzkabel verfügen über die gleichen Nennwerte. Herkömmliche, im Haushalt verwendete Verlängerungskabel besitzen keinen Überlastschutz und sind daher für Computersysteme nicht geeignet. Verwenden Sie bei Ihrem Sun-Produkt keine Haushalts-Verlängerungskabel.

Die folgende Warnung gilt nur für Geräte mit Standby-Netzschalter:

⚡ **Achtung –** Beim Netzschalter dieses Geräts handelt es sich nur um einen Ein/Standby-Schalter. Zum völligen Abtrennen des Systems von der Stromversorgung dient hauptsächlich das Netzkabel. Stellen Sie sicher, dass das Netzkabel an eine frei zugängliche geerdete Steckdose in der Nähe des Systems ange-schlossen ist. Schließen Sie das Stromkabel nicht an, wenn die Stromversorgung vom Systemchassis entfernt wurde.

Die folgende Warnung gilt nur für Geräte mit mehreren Netzkabeln:

⚡ **Achtung –** Bei Produkten mit mehreren Netz-kabeln müssen alle Netzkabel abgetrennt wer-den, um das System völlig von der Stromver-sorgung zu trennen.

Warnung bezüglich Batterien

⚠ **Achtung –** Bei unsachgemäßer Handhabung oder nicht fachgerechtem Austausch der Batterien besteht Explosionsgefahr. Verwen-den Sie bei Systemen mit austauschbaren Batterien ausschließlich Ersatzbatterien desselben Typs und Herstellers bzw. einen entsprechenden, vom Hersteller gemäß den Anweisungen im Service-Handbuch des Produkts empfohlenen Batterietyp. Versuchen Sie nicht, die Batterien auszubauen oder außerhalb des Systems wiederaufzuladen. Werfen Sie die Batterien nicht ins Feuer. Entsorgen Sie die Batterien entsprechend den Anweisungen des Herstellers und den vor Ort geltenden Vorschriften. CPU-Karten von Sun verfügen über eine Echtzeituhr mit integrier-ter Lithiumbatterie. Diese Batterie darf nur von einem qualifizierten Servicetechniker aus-gewechselt werden.

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.

Warnungen bezüglich in Racks eingebauter Systeme

Die folgenden Warnungen gelten für Racks und in Racks eingebaute Systeme:

⚠ **Achtung –** Aus Sicherheitsgründen sollten sämtliche Geräte von unten nach oben in Racks eingebaut werden. Installieren Sie also zuerst die Geräte, die an der untersten Position im Rack eingebaut werden, gefolgt von den Systemen, die an nächsthöherer Stelle eingebaut werden, usw.

⚠ **Achtung –** Verwenden Sie beim Einbau den Kippschutz am Rack, um ein Umkippen zu vermeiden.

⚠ **Achtung –** Um extreme Betriebstemperaturen im Rack zu vermeiden, stellen Sie sicher, dass die Maximaltemperatur die Nennleistung der Umgebungstemperatur für das Produkt nicht überschreitet

⚠ **Achtung –** Um extreme Betriebstemperaturen durch verringerte Luftzirkulation zu vermeiden, sollte die für den sicheren Betrieb des Geräts erforderliche Luftzirkulation eingesetzt werden.

Hinweis zur Laser-Konformität

Sun-Produkte, die die Laser-Technologie verwenden, entsprechen den Laser-Anforderungen der Klasse 1.

Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser Klasse 1

CD- und DVD-Geräte

Die folgende Warnung gilt für CD-, DVD- und andere optische Geräte:

⚠ **Achtung –** Die hier nicht aufgeführte Verwendung von Steuerelementen, Anpassungen oder Ausführung von Vorgängen kann eine gefährliche Strahlenbelastung verursachen.

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.

Cumplimiento de la normativa para instalaciones SELV

Las condiciones de seguridad de las conexiones de entrada y salida cumplen los requisitos para instalaciones SELV (del inglés *Safe Extra Low Voltage*, voltaje bajo y seguro).

Conexión del cable de alimentación

Precaución – Los productos Sun se han diseñado para funcionar con sistemas de alimentación que cuenten con un conductor neutro a tierra (con conexión a tierra de regreso para los productos con alimentación de CC). Para reducir el riesgo de descargas eléctricas, no conecte ningún producto Sun a otro tipo de sistema de alimentación. Póngase en contacto con el encargado de las instalaciones de su empresa o con un electricista cualificado en caso de que no esté seguro del tipo de alimentación del que se dispone en el edificio.

Precaución – No todos los cables de alimentación tienen la misma clasificación eléctrica. Los alargadores de uso doméstico no cuentan con protección frente a sobrecargas y no están diseñados para su utilización con sistemas informáticos. No utilice alargadores de uso doméstico con el producto Sun.

La siguiente medida solamente se aplica a aquellos dispositivos que dispongan de un interruptor de alimentación de espera:

Precaución – El interruptor de alimentación de este producto funciona solamente como un dispositivo de espera. El cable de alimentación

hace las veces de dispositivo de desconexión principal del sistema. Asegúrese de que conecta el cable de alimentación a una toma de tierra situada cerca del sistema y de fácil acceso. No conecte el cable de alimentación si la unidad de alimentación no se encuentra en el bastidor del sistema.

La siguiente medida solamente se aplica a aquellos dispositivos que dispongan de varios cables de alimentación:

Precaución – En los productos que cuentan con varios cables de alimentación, debe desconectar todos los cables de alimentación para cortar por completo la alimentación eléctrica del sistema.

Advertencia sobre las baterías

Precaución – Si las baterías no se manipulan o reemplazan correctamente, se corre el riesgo de que estallen. En los sistemas que cuentan con baterías reemplazables, reemplácelas sólo con baterías del mismo fabricante y el mismo tipo, o un tipo equivalente recomendado por el fabricante, de acuerdo con las instrucciones descritas en el manual de servicio del producto. No desmonte las baterías ni intente recargarlas fuera del sistema. No intente deshacerse de las baterías echándolas al fuego. Deshágase de las baterías correctamente de acuerdo con las instrucciones del fabricante y las normas locales. Tenga en cuenta que en las placas CPU de Sun, hay una batería de litio incorporada en el reloj en tiempo real. Los usuarios no deben reemplazar este tipo de baterías.

Cubierta de la unidad del sistema

Debe extraer la cubierta de la unidad del sistema informático Sun para instalar tarjetas, memoria o dispositivos de almacenamiento internos. Vuelva a colocar la cubierta antes de encender el sistema informático.

Precaución – No ponga en funcionamiento los productos Sun que no tengan colocada la cubierta. De lo contrario, puede sufrir lesiones personales y ocasionar daños en el sistema.

Advertencia sobre el sistema en bastidor

Las advertencias siguientes se aplican a los sistemas montados en bastidor y a los propios bastidores.

Precaución – Por seguridad, siempre deben montarse los equipos de abajo arriba. A saber, primero debe instalarse el equipo que se situará en el bastidor inferior; a continuación, el que se situará en el siguiente nivel, etc.

Precaución – Para evitar que el bastidor se vuelque durante la instalación del equipo, debe extenderse la barra antivolcado del bastidor.

Precaución – Para evitar que se alcance una temperatura de funcionamiento extrema en el bastidor, asegúrese de que la temperatura máxima no sea superior a la temperatura ambiente establecida como adecuada para el producto.

Precaución – Para evitar que se alcance una temperatura de funcionamiento extrema debido a una circulación de aire reducida, debe considerarse la magnitud de la circulación de aire requerida para que el equipo funcione de forma segura.

Aviso de cumplimiento de la normativa para la utilización de láser

Los productos Sun que utilizan tecnología láser cumplen los requisitos establecidos para los productos láser de clase 1.

```
Class 1 Laser Product
Luokan 1 Laserlaite
Klasse 1 Laser Apparat
Laser Klasse 1
```

Dispositivos de CD y DVD

La siguiente medida se aplica a los dispositivos de CD y DVD, así como a otros dispositivos ópticos:

⚠ **Precaución –** La utilización de controles, ajustes o procedimientos distintos a los aquí especificados puede dar lugar a niveles de radiación peligrosos.

Nordic Lithium Battery Cautions

Norge

⚠ **Advarsel –** Litiumbatteri — Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

Sverige

⚠ **Varning –** Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

Danmark

⚠ **Advarsel! –** Litiumbatteri — Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

Suomi

⚠ **Varoitus –** Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Preface

The *Sun™ Dual Port 4x IB Host Channel Adapter PCI-ExpressModule User's Guide* provides detailed procedures for installing the hardware and software for the Sun IB-Host Channel Adapter PCI-ExpressModule. This manual includes an overview of the adapter, supported platforms, cable information, and related documentation.

This document is written for enterprise system administrators with experience installing network hardware and software.

Note – The Sun IB-Host Channel Adapter PCI-ExpressModule card is an InfiniBand (IB) host channel adapter (HCA) card. The adapter is referred to as *IB-EM* in this manual.

How This Document Is Organized

Chapter 1 provides a description of the adapter.

Chapter 2 details how to install the adapter card and cables, and how to verify the installation.

Chapter 3 contains information for configuring Internet Protocol over InfiniBand (IPoIB).

Chapter 4 provides an overview of the InfiniBand software for both Solaris and Linux Operating Systems.

Appendix A contains information on the InfiniBand cable and connector pin outs.

Appendix B provides an overview of the SunVTS™ diagnostic software and the `ibhcatest` test. The appendix also includes some troubleshooting tasks.

Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at:

  http://docs.sun.com

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface[*]	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

* The settings on your browser might differ from these settings.

Related Documentation

The documents listed as online are available at:

http://www.sun.com/products-n-solutions/hardware/docs/

Application	Title	Part Number	Format	Location
Installation	*Sun Dual Port 4x IB Host Channel Adapter PCI-ExpressModule Release Notes*	819-6183	PDF HTML	Online
Service	*System Administration Guide: Devices and Files System*	817-5093	PDF HTML	Online
Network Services	*System Administration Guide: Network Services*	816-4555	PDF HTML	Online
Switch Installation	*Sun InfiniBand Switch Nine-Port Hardware Installation Guide*	819-0504	Printed PDF HTML	Hardcopy packaged with switch. Online
Switch Administration	*Sun InfiniBand Switch Nine-Port Administration Guide*	819-0502	PDF HTML	Online
Switch Administration	*Sun InfiniBand Switch Nine-Port Release Notes*	819-1278	PDF HTML	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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http://www.sun.com/hwdocs/feedback

Please include the title and part number of your document with your feedback:

Sun IB Host Channel Adapter PCI-ExpressModule User's Guide, part number 819-6182-10

Overview

This chapter provides an overview of the Sun IB-Host Channel Adapter PCI-ExpressModule. It includes the following sections:

- "Product Features" on page 1
- "Hardware Overview" on page 2
- "Hardware, Software, and Cable Requirements" on page 4

Product Features

Sun IB-Host Channel Adapter PCI-ExpressModule card features include:

- Dual (4X 10Gb/s) Infiniband ports
- Integrated serializer/deserializer (SerDes)
- x8 PCI-Express 16Gb/s full duplex
- InfiniBand Trade Association (IBTA) version 1.1 interoperability
- Dual copper connectors (MicroGigaCN)
- Optimal cooling architecture
- Robust form factor for enterprise class applications
- InfiniRISC™ embedded RISC processor
- 256 MByte of fixed local DDR memory

Hardware Overview

The Sun IB-Host Channel Adapter PCI-ExpressModule is an InfiniBand (IB) host channel adapter (HCA) ExpressModule (EM) and is referred to as the IB-EM in this manual. This IB-EM is a high performance, highly integrated dual 4x InfiniBand adapter. The adapter supports a single x8 PCI-Express connection, which provides full duplex data transfers of up to 16 Gbps. FIGURE 1-1 shows the IB-EM card

The board characteristics are:

- Power: approximately 12 watts total
- Adapter protection from ESD and handling damage
- Requires 4x-12x InfiniBand cables
- 3.3V PCI-ExpressModule slot
- Link status indication LED
- Two 4x InfiniBand (IB) ports

The standard PCI-Express interface is used for data traffic, management traffic, and to generate and receive inbound configuration packets
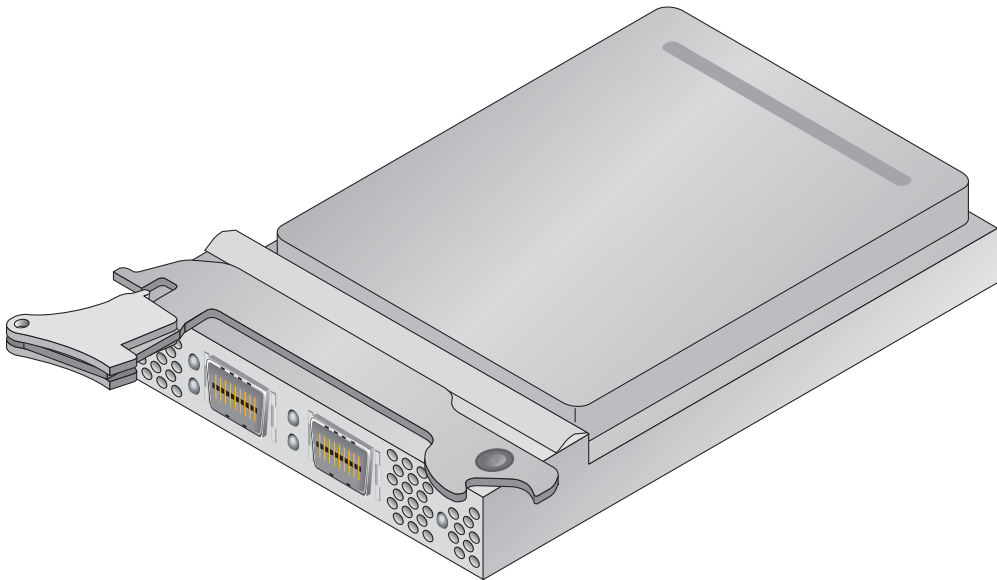
FIGURE 1-1   Sun Dual Port 4x IB Host Channel Adapter PCI-ExpressModule

I/O Interfaces

The IB-EM includes the following interfaces:

■ Two 4x InfiniBand copper connectors

■ PCI-E x8-lane edge connector

InfiniBand Interface

The IB-EM provides two 4x InfiniBand v1.1 connector (or ports) for external copper cables and is IBTA specification 1.1-compliant.

PCI-Express Interface

The PCI-Express bus is a PCI-Express x8 version 1.0a-compliant interface. The adapter can be either a master initiating the PCI bus operations or a slave responding to PCI bus operations. The PCI-Express bus can connect to a host CPU in an HCA application.

LED Displays

Two InfiniBand ports connectors are located on the front panel of the adapter. Each port has two LEDs, as shown in FIGURE 1-2. An explanation of the LEDs is given in TABLE 1-1.

TABLE 1-1   IB-EM LEDs

Color	Meaning
Green	Physical Link – The physical link LED illuminates once the Tavor driver is successfully attached to the port.
Amber	Logical Link – The logical link LED illuminates once the InfiniBand port is in the Up state. This LED also blinks when there is traffic on the port.
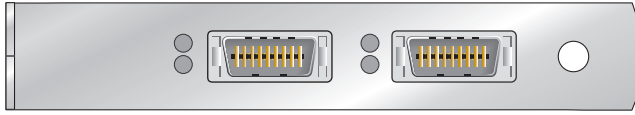
FIGURE 1-2   LED Layout

Hardware, Software, and Cable Requirements

The hardware, software, and cable requirements for the Sun IB-Host Channel Adapter PCI-ExpressModule card are listed in TABLE 1-2.

TABLE 1-2   Hardware, Software, and Cable Requirements

Operating System	Servers
Solaris 10 1/06 Operating system and future compatible releases	Sun™ Fire X8000
RedHat Enterprise Linux 4.0 Update 3	
InfiniBand Switches	
X3152A	Sun™ InfiniBand Switch P9, interoperable with most leading IB switch vendors
Diagnostics Version	
	SunVTS Version 6.0 Patch Set 1 and subsequent compatible releases
Supported Cables	
X9280A	Sun 4x-to-12x InfiniBand cable, 2 meter length
X9281A	Sun 4x-to-12x InfiniBand cable, 5 meter length

Note – Use only supported cables to ensure reliable InfiniBand interface connections. These cables can be ordered from Sun Microsystems, Inc. Connecting to other IB switch vendor ports may require 4x-4x IB cables. Refer to the documentation for the IB switch you use.

Installing the Adapter

This chapter describes how to install both the Sun IB-Host Channel Adapter PCI-ExpressModule hardware and verify that it has been installed correctly. It contains the following section:

- "Installing the Hardware" on page 5
- "Verifying the Installation" on page 6

Installing the Hardware

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

▼ To Install the Adapter

1. **Halt and power off your system.**

2. **Install the IB-EM card into the ExpressModule slot, pushing the card's edge connector into the connector on the chassis.**

   Ensure that the front plate on the IB-EM card mounts flush with the chassis panel opening.

3. **Connect the 4x end of the InfiniBand I/O cable(s) to the IB-EM port connector(s).**

   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 12x end of the InfiniBand I/O cable(s) 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 "To Verify the Installation" on page 6.

Verifying the Installation

Before you can verify the installation, you must install the adapter in the chassis, power the server, and cable it to an operational InfiniBand switch. The InfiniBand switch should automatically recognize InfiniBand servers when they are connected to the fabric.

▼ To Verify the Installation

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.**

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.**
   If the amber LED is not on, refer to Appendix B, "Diagnostic Software and Troubleshooting" on page 21 for more information.

5. **Verify that the IB-EM ports are up and the driver is attached.**

   To do this, type the following command:

   ```
   # dmesg | grep tavor
   ```

   The output shows recently printed system diagnostic messages that have the string tavor in the message. Included in the output is a message that tells whether the port is up or down. See the information in **_bold italics_** in the following example:

```
Feb 17 20:30:42 hostname px_pci: [ID 370704 kern.info] PCI-device:
pciex15b3,6278@0, tavor0
Feb 17 20:30:42 hostname genunix: [ID 936769 kern.info] tavor0 is
/pci@7c0/pci@0/pci@8/pciex15b3,6278@0
Feb 17 20:30:42 hostname tavor: [ID 548581 kern.info] tavor0: FW ver:
0004.0007.0190, HW rev: a0
Feb 17 20:30:42 hostname tavor: [ID 827127 kern.info] tavor0: MT23108 Sun
Microsystems InfiniBand HCA (0x0003ba0001001c18)
Feb 17 20:30:45 hostname genunix: [ID 979957 kern.info] NOTICE: tavor0: port 1 up
Feb 17 20:30:45 hostname genunix: [ID 611667 kern.info] NOTICE: tavor0: port 2 up
Feb 17 20:30:58 hostname genunix: [ID 408114 kern.info]
/pci@7c0/pci@0/pci@8/pciex15b3,6278@0 (tavor0) online
```

Configuring IP Over InfiniBand

This chapter describes how to configure IP over InfiniBand (IPoIB). This chapter contains the following sections:

- "IPoIB Configuration" on page 9

IPoIB Configuration

The following procedure can be used when making changes to your configuration. See *System Administration Guide: Basic Administration* (817-1985) for Solaris setup information.

▼ Configuring IPoIB

1. **Confirm that the IB-EM ports are up.**

   To do this, type the command:

   ```
   # dmesg | grep tavor
   ```

   The output shows recently printed diagnostic messages that have the string "tavor" in the message. Included in the output is a message that tells whether the port is up or down.

For example:

```
Feb 17 20:30:42 hostname px_pci: [ID 370704 kern.info] PCI-device:
pciex15b3,6278@0, tavor0
Feb 17 20:30:42 hostname genunix: [ID 936769 kern.info] tavor0 is
/pci@7c0/pci@0/pci@8/pciex15b3,6278@0
Feb 17 20:30:42 hostname tavor: [ID 548581 kern.info] tavor0: FW ver:
0004.0007.0190, HW rev: a0
Feb 17 20:30:42 hostname tavor: [ID 827127 kern.info] tavor0: MT23108 Sun
Microsystems InfiniBand HCA (0x0003ba0001001c18)
Feb 17 20:30:45 hostname genunix: [ID 979957 kern.info] NOTICE: tavor0: port 1 up
Feb 17 20:30:45 hostname genunix: [ID 611667 kern.info] NOTICE: tavor0: port 2 up
Feb 17 20:30:58 hostname genunix: [ID 408114 kern.info]
/pci@7c0/pci@0/pci@8/pciex15b3,6278@0 (tavor0) online
```

Refer to the Man Page dmesg(1M) for more information.

2. **Create the InfiniBand devices using the following command:**

```
# devfsadm -C
```

A /dev/ibd*n* device is created for each IB-EM port in the system where *n* is the port number. Refer to devfsadm(1M) for more information.

3. **Verify InfiniBand devices.**

Check that the InfiniBand devices were created. To do this, type the following command:

```
# ls -l /dev/ibd*
```

A list of InfiniBand devices (/dev/ibd*) is displayed.

```
# ls -l /dev/ibd*
lrwxrwxrwx   1 root     other       29 Apr 4 15:07 /dev/ibd ->
../devices/pseudo/clone@0:ibd
lrwxrwxrwx   1 root     root        88 Apr 4 15:26 /dev/ibd1 ->
../devices/pci@1b,0/pci1022,7450@3/pci15b3,5a46@1/pci15b3,5a44@0/ibport@1,8001
,ipib:ibd1
lrwxrwxrwx   1 root root            88 Apr 4 15:26 /dev/ibd3 ->
../devices/pci@1b,0/pci1022,7450@3/pci15b3,5a46@1/pci15b3,5a44@0/ibport@2,8001
,ipib:ibd3
```

4. **Plumb each of the IB devices.**

   To do this, type the following command for each IB-EM port in the system:

   ```
   # ifconfig ibdn plumb host-ipv4-address up
   ```

   where *n* is the instance number of the interface and *host-ipv4-address* is the designated IPv4 address for the device.

   If you are using IPv6, use the following command instead:

   ```
   # ifconfig ibdn inet6 plumb host-ipv6-address up
   ```

5. **Verify that the devices are plumbed.**

   To do this, type the command:

   ```
   # ifconfig -a
   ```

   The output includes information on the IB devices.

   ```
   # ifconfig -a
   lo0: flags=2001000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4,VIRTUAL> mtu 8232
   index 1
           inet 127.0.0.1 netmask ff000000
   ibd1: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 2044 index 2
           inet 192.128.91.198 netmask ffffff00 broadcast 192.128.91.255
           ipib 0:0:4:7:0:0:0:0:0:0:0:1:0:3:ba:0:1:0:1c:19
   ibd3: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 2044 index 3
           inet 192.128.92.198 netmask ffffff00 broadcast 192.128.92.255
           ipib 0:0:4:7:0:0:0:0:0:0:0:1:0:2:c9:2:0:0:55:d9
   #
   ```

6. **Check that data can be send over the InfiniBand link.**

   Use the `ping` command to send ICMP (ICMP6) ECHO_REQUEST packets and receive ICMP (ICMP6) ECHO_RESPONSE packets between InfiniBand hosts. For example:

   ```
   # ping host-ip-address
   ```

   where *host-ip-address* is the IP address of another IB host. See `ping`(1M) for details.

   Repeat this procedure on all hosts that are connected to the IB switch.

InfiniBand Software Overview

This chapter provides an overview of the IB software for both Solaris and Linux Operating Systems. This chapter includes the following topics:

- "InfiniBand Software for the Solaris Operating System" on page 15
- "Related Software Documentation" on page 18
- "Downloading the Software for the Linux Operating System" on page 19

InfiniBand Software for the Solaris Operating System

The InfiniBand software is included in the Solaris 10 Operating System. FIGURE 4-1 shows a block diagram of the InfiniBand software stack which includes the following modules:

- User Direct Access Programming Library (uDAPL)
- IP over InfiniBand Kernel (IPoIB)
- InfiniBand Transport Framework (IBTF)
- InfiniBand Management Framework (IBMF)
- Tavor HCA Driver
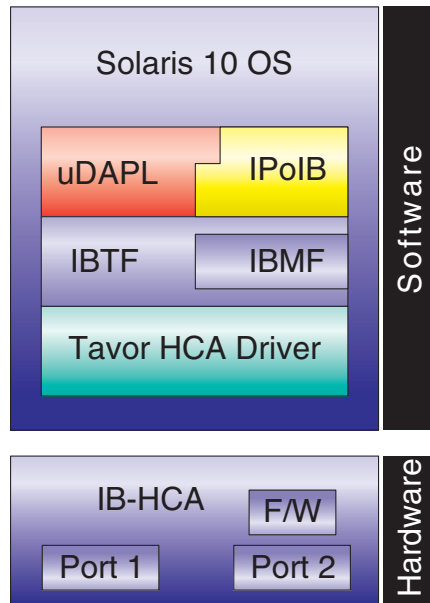
FIGURE 4-1   InfiniBand Software Stack

User Direct Access Programming Library

This library supports service providers written according to the uDAPL 1.2 specification. Sun provides default service provider modules to support the Tavor HCA driver.

IP over InfiniBand Kernel

The IPoIB kernel implements the IETF IPoIB protocol and provides IPoIB services for all IB-EM ports present in the system. This driver enables the standard Solaris TCP/IP stack to operate over Infiniband. The link layer driver encapsulates IPv4/6 packets, adds IB multicast support, extends ARP/ND address resolution, and changes the network stack to support link addresses greater than 6 bytes.

InfiniBand Transport Framework

IBTF is the Solaris implementation of the InfiniBand Transport Layer (IBTL). IBTF consists of InfiniBand Device Manager (IBDM), InfiniBand Communications Manager (IBCM) and an InfiniBand Nexus driver. The Nexus driver along with IBDM creates and manages InfiniBand devices. The following devices are supported:

- IB I/O controller (IOC) devices
- IB pseudo devices
- IB service devices
- HCA, port, virtual physical point of attachment (VPPA) service devices

See ib(4) and ib(7d) for details.

IBCM provides a transport layer abstraction to IB clients to set up reliable connected channels along with service, multicast, and path lookup-related functionality. See ibcm(7d) for details.

InfiniBand Management Framework

IBMF is a complementary component to IBTF that enables IB clients to provide and access management services over the IB fabrics. It has two logical components. One component deals with sending and receiving management data to any type of management entity. The other component deals with sending and receiving management data to the Subnet Administrator (SA) only. Since every IB client needs to send and receive management data to the SA, IBMF provides functions that specifically handle the SA interaction.

Tavor HCA Driver

The Tavor HCA driver controls the Arbel hardware running in Tavor compatibility mode. This driver interfaces with the IBTF and provides an implementation of Channel Interfaces that are defined by IBTF. It also enables management applications and agents to access the IB fabric.

Related Software Documentation

Manuals

- *System Administration Guide: Devices and Files System* (817-5093)

  For information on InfiniBand devices, see the *System Administration Guide: Devices and Files System* (817-5093)

- *System Administration Guide: Network Services* (816-4555)

  For general information on the InfiniBand network, see the *System Administration Guide: Network Services* (816-4555).

Note – You can view or print Sun documentation at the following web site: http://www.sun.com/documentation

---

Man Pages

- `cfgadm_ib`(1M) – InfiniBand hardware-specific commands for `cfgadm`
- `datadm`(1M) – maintain DAT static registry file
- `ifconfig`(1M) – configure network interface parameters
- `libdat`(3LIB) - direct access transport library
- `ib`(4) – InfiniBand device driver configuration files
- `ibmf`(7) – InfiniBand Management Transport Framework
- `daplt`(7D) – Tavor uDAPL service driver
- `ib`(7D) – InfiniBand Bus Nexus Driver
- `ibcm`(7D) – InfiniBand Communication Manager
- `ibd`(7D) – Infiniband IPoIB device driver
- `ibdm`(7D) – Solaris InfiniBand device manager
- `tavor`(7D) – InfiniBand (IB) Tavor driver

Downloading the Software for the Linux Operating System

If you are using the Linux operating system, use the Mellanox software to operate the IB-EM adapter. The Mellanox software and documentation are available at the following web site:

https://docs.mellanox.com/dm/ibg2/ReadMe.html

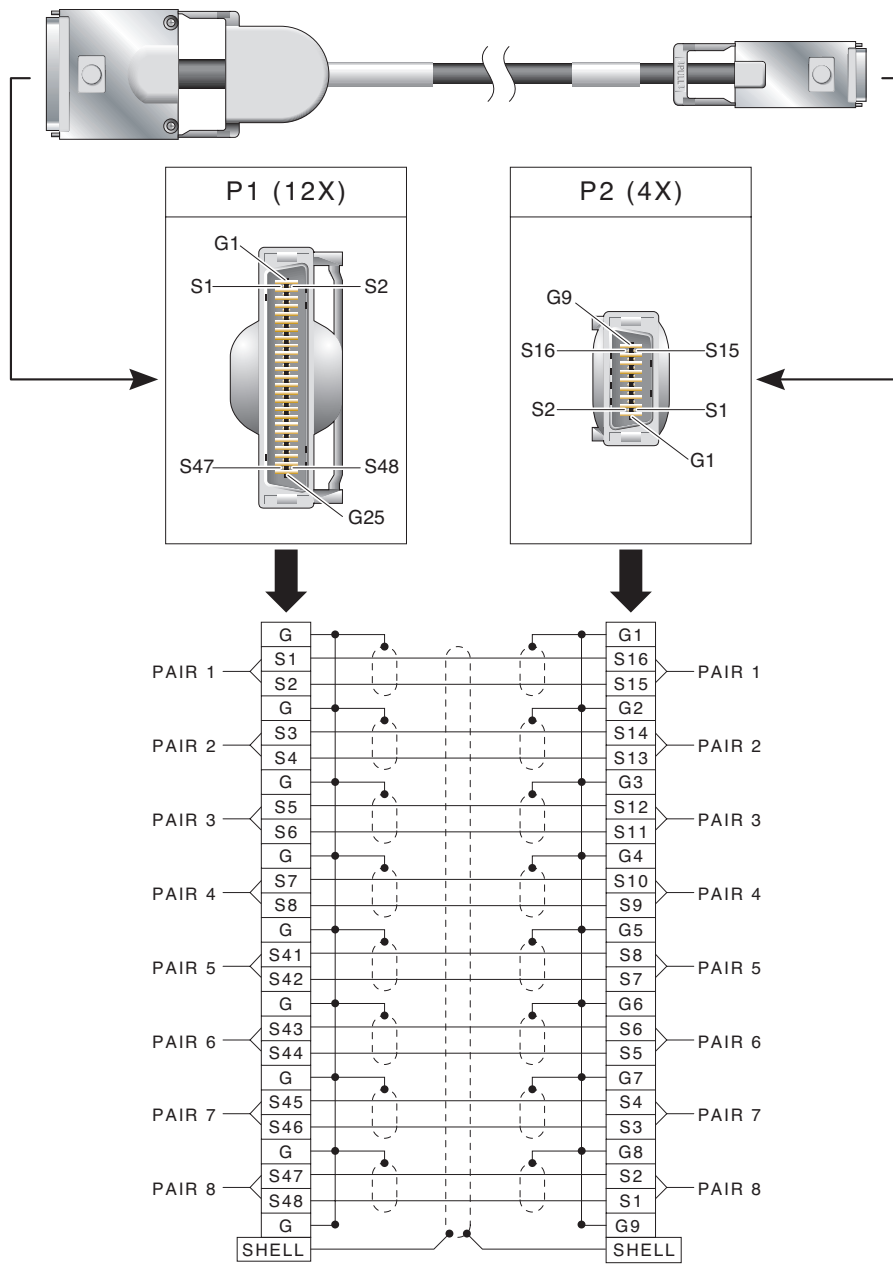http://www.openfabrics.org/downloads.html

InfiniBand Cable Pin Assignments

This appendix lists the cable pin assignments for the Sun IB-Host Channel Adapter PCI-ExpressModule. It contains the following section:

■ "Cable Pin Assignments" on page 19

Cable Pin Assignments

FIGURE A-1 shows the InfiniBand cable connectors and pin assignments.

FIGURE A-1 Sun 4x-to-12x InfiniBand Cable Pin Assignments

Diagnostic Software and Troubleshooting

This appendix provides an overview of the SunVTS™ diagnostic application and troubleshooting tips for checking the adapter. There is also a section outlining some common troubleshooting issues. This appendix contains the following sections:

- "SunVTS Diagnostic Testing" on page 21
- "Troubleshooting Tasks" on page 23
- "Other Useful Utilities" on page 24

SunVTS Diagnostic Testing

The SunVTS software executes multiple diagnostic hardware tests from a single user interface, and is used to verify the configuration and functionality of most hardware controllers and devices. The SunVTS software operates primarily from a graphical user interface, enabling test parameters to be set quickly and easily while a diagnostic test operation is being performed.

Note – SunVTS diagnostic software is not currently available for Solaris x86 Operating Systems.

Refer to the SunVTS documents (listed in TABLE B-1) for instructions on how to run and monitor the `nettest` diagnostic. These SunVTS documents are available online at the following URL:

http://www.sun.com/products-n-solutions/hardware/docs/Software
/system_administration/tools/testing_valid/sunvts/index.html

Select the document for the Solaris release on your system

TABLE B-1   SunVTS Documentation

Title	Descriptions
SunVTS 6.0 PS1 Documentation Supplement (819-1804)	Describes the new SunVTS features and tests, including the `ibhcatest`.
SunVTS 6.0 User's Guide (817-7664)	Describes the SunVTS diagnostic environment.
SunVTS 6.0 Test Reference Manual (817-7665)	Describes each SunVTS test and describes the various test options and command-line arguments.
SunVTS 6.0 Quick Reference Card (817-7686)	Provides an overview of the user interface.

Using the SunVTS `ibhcatest`

The `ibhcatest` diagnostic test checks the functionality of Sun IB-Host Channel Adapter PCI-ExpressModule card. This test can be run from the SunVTS user interface, or it can be run from the command line. See the *SunVTS 6.0 Test Reference Manual* (817-7665) for more information about the `ibhcatest` test.

The `ibhcatest` diagnostic test is included in the SunVTS 6.0 Patch Set 1 and subsequent SunVTS software releases. SunVTS 6.0 Patch Set 1 is available for downloading from the SunSolve℠ web site http://sunsolve.sun.com using the following patch numbers:

- SPARC: patch 118962-01, or higher
- X86: patch 118961-01, or higher

The adapter and Tavor device driver must be installed, and the IB port interface must be configured `offline` for the `ibhcatest` to run. A loopback cable is not needed because `ibhcatest` includes an internal loopback test. Use the following procedure when running the `ibhcatest`.

▼ Using the `ibhcatest`

1. **Ensure that the SunVTS software and the Tavor driver are installed on your system.**

   To do this, type the following command:

   ```
   # pkginfo SUNWvts SUNWvtsx SUNWtavor
   ```

   If a SunVTS software package is not installed, refer to the *SunVTS User's Guide* for installation instruction. If the SUNWtavor package is not installed, check your Solaris Operating System documentation for software package information.

2. **Unplumb the interface from the system, using the `ifconfig` command:**

   ```
   # ifconfig ibdn down unplumb
   ```

   where *n* is the instance number of the interface.

3. **Refer to** *SunVTS 6.0 PS1 Documentation Supplement* (819-1804) **for instructions on how to run** `ibhcatest`**.**

Troubleshooting Tasks

The following tasks can be useful when troubleshooting the IB-HCA and the link.

- **Verify that the InfiniBand software packages are installed on the host.** To do this, type the command:

```
pkginfo -l | egrep "InfiniBand | Tavor | udapl"
```

Check that the following packages are installed:

- `SUNWib` – Sun InfiniBand Framework
- `SUNWtavor` – Sun Tavor HCA Driver
- `SUNWipoib` – Sun IP over InfiniBand
- `SUNWudaplr` – Direct Access Transport (DAT) registry package (`root`)
- `SUNWudaplu` – Direct Access Transport (DAT) registry packages (`usr`)
- `SUNWudapltr` – Service Provider for Tavor packages (`root`)
- `SUNWudapltu` – Service Provider for Tavor packages

If an InfiniBand software package is not installed, check your Solaris Operating System documentation for software package information.

■ **Check the system log or console for Tavor driver error messages.**

See tavor(7D) for error messages and descriptions. When the driver is attached to a port on the adapter, the following message is sent.

```
tavorn: port m up (link width 4x).
```

In the message, *n* is the instance of the Tavor device number and *m* is the port number on the adapter.

One way to check Tavor messages is by typing the following command:

```
# dmesg | grep tavor
```

Other Useful Utilities

These utilities can display status and other information about InfiniBand devices:

■ cfgadm
■ snoop
■ netstat
■ kstat

cfgadm

The cfgadm utility displays status and other information about the IB-HCA and IB fabric. See cfgadm_ib(1M) for details. For example:

```
# cfgadm -al
  Ap_Id                       Type        Receptacle  Occupant      Condition
  hca:21346543210a987          IB-HCA      connected    configured    ok
  ib                           IB-FABRIC   connected    configured    ok
  ib::80020123456789a          IB-IOC      connected    configured    ok
  ib::802abc9876543            IB-IOC      connected    unconfigured  unknown
  ib::80245678,ffff,ipib       IB-VPPA     connected    configured    ok
  ib::12245678,0,nfs           IB-PORT     connected    configured    ok
  ib::21346543,0,hnfs          IB-HCA_SVC  connected    configured    ok
  ib::sdp,0                    IB-PSEUDO   connected    configured    ok
```

snoop

The snoop program captures and inspects network packets. See the snoop(1M) man page for details. For example:

```
# snoop -d ibd1
Using device /dev/ibd1 (promiscuous mode)
    ib-1-167 -> *              ARP C Who is 199.1.1.168, ib-1-168 ?
    ib-1-168 -> ib-1-167       ARP R 199.1.1.168, ib-1-168 is
0:2:4:7:0:0:0:0:a:4:7c:4f:0:2:c9:2:0:0:55:91
    ib-1-167 -> ib-1-168       ICMP Echo request (ID: 35608 Sequence number: 0)
    ib-1-168 -> ib-1-167       ICMP Echo reply (ID: 35608 Sequence number: 0)
```

netstat

netstat shows network status. See the netstat(1M) man page for details. For example:

```
# netstat -I ibd 4
    input     ibd1        output        input  (Total)     output
packets errs  packets errs  colls  packets errs  packets errs  colls
2458394 0     2458268 0     0      2467288 0     2465951 0     0
92233   0     92237   0     0      92247   0     92238   0     0
92703   0     92702   0     0      92709   0     92704   0     0
```

kstat

kstat displays kernel statistics. See the kstat(1M) man page for details. For example:

```
# kstat ibd:1
module: ibd                          instance: 1
name:   ibd1                         class:    net

                                              0
        opackets                     27381595
        opackets64                   27381595
        promisc                      off       xmt_badinterp
              0
        xmtretry                     4
```

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