



# Sun Blade™ 6048 Switched InfiniBand Network ExpressModule User's Guide

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Sun Microsystems, Inc.  
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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.

## 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

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。

## 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.

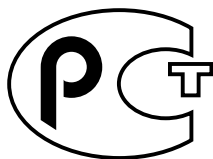
以下声明适用于运往中国且其认证标志上注有 "Class A" 字样的产品。

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:



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

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

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

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



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**On** – Applies AC power to the system.

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**Off** – Removes AC power from the system.

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

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## 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



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**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.

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## SELV Compliance

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

## Power Cord Connection



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**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.

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**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.

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**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。

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



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**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.

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



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

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## Battery Warning



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**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

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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.

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## 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.



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

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## Rack System Warning

The following warnings apply to Racks and Rack Mounted systems.



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**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.

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

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

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**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.

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## Laser Compliance Notice

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

Class 1 Laser Product  
Luokan 1 Laserlaitte  
Klasse 1 Laser Apparat  
Laser Klasse 1

- 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.

## CD and DVD Devices

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



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

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## 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.

## Symboles

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



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

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

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

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



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**Marche** – Met le système sous tension alternative.

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**Arrêt** – Met le système hors tension alternative.

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

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## 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



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**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.

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## Conformité SELV

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

## Connexion du cordon d'alimentation



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**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.

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**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.

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



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**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.

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



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

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## Mise en garde relative aux batteries



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**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.

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## 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.



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**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.

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## Mise en garde relative au système en rack

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



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**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.

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

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**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.

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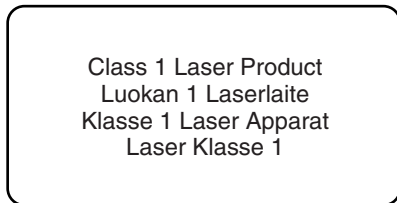
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**Attention** – Afin d'empêcher des températures de fonctionnement extrêmes provoquées par une aération insuffisante, assurez-vous de fournir une aération appropriée pour un fonctionnement du matériel en toute sécurité

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## 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.



## 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 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.



## Aufstellung von Sun-Geräten

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

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## SELV-Konformität

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

## Anschluss des Netzkabels

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**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 Stromversorgungssysteme an. Wenden Sie sich an den zuständigen Gebäudeverwalter oder an einen qualifizierten Elektriker, wenn Sie nicht sicher wissen, an welche Art von Stromversorgungssystem 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 angeschlossen 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 Netzkabeln müssen alle Netzkabel abgetrennt werden, um das System völlig von der Stromversorgung zu trennen.

---

## Warnung bezüglich Batterien

---



**Achtung** – Bei unsachgemäßer Handhabung oder nicht fachgerechtem Austausch der Batterien besteht Explosionsgefahr. Verwenden 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 integrierter Lithiumbatterie. Diese Batterie darf nur von einem qualifizierten Servicetechniker ausgewechselt 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.

---



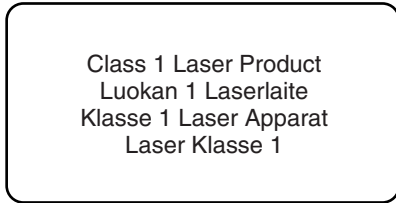
---

**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.



## 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

---

This user's guide describes how to install and configure the Sun™ Blade 6048 Switched InfiniBand Network ExpressModule (NEM) in a powered-on Sun Blade™ 6048 Series Modular System.

These instructions are designed for enterprise system administrators with experience installing network hardware and software.

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## How This Document Is Organized

[Chapter 1](#) provides an overview of the Sun Blade 6048 Switched InfiniBand Network ExpressModule (IB NEM). This chapter also describes the host platforms and operating systems that support the IB NEM.

[Chapter 2](#) describes how to replace or install the IB NEM and verify that it has been installed correctly. This chapter also describes how to remove the IB NEM.

[Chapter 3](#) provides an overview and installation instructions for the InfiniBand software stack for the CentOS operating systems.

[Chapter 4](#) describes configuration aspects of running the Internet Protocol over InfiniBand (IPoIB).

[Chapter 5](#) provides information on updating the IB NEM firmware on CentOS.

[Appendix A](#) provides information to help you select the appropriate cables to support expected performance.

---

# 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                               | <i>machine-name%</i> |
| C shell superuser                     | <i>machine-name#</i> |
| 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 <code>.login</code> file.<br>Use <code>ls -a</code> to list all files.<br><code>% You have mail.</code>  |
| <b>AaBbCc123</b> | What you type, when contrasted with on-screen computer output  | <code>% su</code><br>Password:   |
| <i>AaBbCc123</i> | Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values. | Read Chapter 6 in the <i>User's Guide</i> .<br>These are called <i>class</i> options.<br>You <i>must</i> be superuser to do this.<br>To delete a file, type <code>rm filename</code> . |

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



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# Related Documentation

The documents listed as online are available at:

<http://docs.sun.com/>

| <b>Document</b>  | <b>Part Number</b> | <b>Available</b>   |
|--|--------------------|--------------------|
| <i>Where to Find Sun Blade 6048 Modular System Documentation</i> | 820-2311           | Printed and online |
| <i>Sun Blade 6048 Modular System Site Planning Guide</i>         | 820-0426           | Online             |
| <i>Sun Blade 6048 Modular System Unpacking Guide</i>             | 820-2987           | Printed and online |
| <i>Sun Blade 6048 Modular System Setup Poster</i>                | 820-2310           | Printed and online |
| <i>Sun Blade 6048 Modular System Installation Guide</i>          | 820-2312           | Printed and online |
| <i>Sun Blade 6048 Modular System Service Manual</i>              | 820-2863           | Online             |
| <i>Sun Blade 6048 Modular System Safety and Compliance Guide</i> | 820-0053           | Online             |
| <i>Sun Blade 6048 Modular System Product Notes</i>               | 820-2309           | Online             |
| <i>Integrated Lights Out Manager (ILOM) 2.0 User Guide</i>       | 820-1188           | Online             |

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# Documentation, Support, and Training

| Sun Function  | URL   |
|---------------|---|
| Documentation | <a href="http://docs.sun.com/">http://docs.sun.com/</a>                 |
| Support       | <a href="http://www.sun.com/support/">http://www.sun.com/support/</a>   |
| Training      | <a href="http://www.sun.com/training/">http://www.sun.com/training/</a> |

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## Third-Party Web Sites

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## Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

<http://www.sun.com/hwdocs/feedback>

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

*Sun Blade 6048 Switched InfiniBand Network ExpressModule User's Guide*, Sun part number: 820-2189-10.

# Introduction to the Sun Blade 6048 Switched InfiniBand Network ExpressModule

---

This chapter provides an overview of the Sun Blade 6048 Switched InfiniBand Network ExpressModule (IB NEM). This chapter also lists the host platforms and operating systems that support the NEM.

This chapter includes the following sections:

- [Section 1.1, “Product Features” on page 1-1](#)
- [Section 1.2, “Platform and Operating System Support” on page 1-3](#)
- [Section 1.3, “IB NEM Indicators, Buttons, and Ports” on page 1-3](#)

You can order additional Sun Blade 6048 Switched InfiniBand Network ExpressModules from Sun Microsystems using the following Marketing part number: X5196A-Z.

---

## 1.1 Product Features

The Sun Blade 6048 Switched InfiniBand Network ExpressModule is a 24-port Network ExpressModule that provides two InfiniBand SDR connections to each Sun Blade Server Module. Each 4X SDR port supports an x8 PCI Express (PCIe) connection to its Server Module, providing full-duplex data transfers of up to 20 Gbps.

The NEM supports 24 independent InfiniBand Host Channel Adapter (HCA) ports operating at up to 20-Gbps (DDR) speed, and 12Gigabit (1 Gbps) Ethernet ports. The NEM is also backward compatible with 10-Gbps (SDR) devices.

To connect to the external InfiniBand network, standard InfiniBand connectors (iPASS) are used with passive copper cables.

TABLE 1-1 lists additional features of the Sun IB NEM.

**TABLE 1-1** Sun IB NEM Features

| <b>Feature</b>                                       | <b>Description</b>   |
|--|--|
| Hot-plug operations supported                        | Enables system administrators to easily add or remove IB NEMs, as needed, without powering down the system   |
| IB transfer rate (maximum)                           | 20 Gbps (DDR) per server<br>480 Gbps aggregate throughput  |
| InfiniBand Trade Association (IBTA) interoperability | Version 1.2  |
| IB uplink interface                                  | iPASS connectors   |
| Host interface                                       | 12 PCIe x8 links   |
| Ethernet interface                                   | 12 Gigabit ports   |
| PCIe transfer rate (maximum) per lane                | 2.5 Gbps (PCIe Generation One)<br>5 Gbps (PCIe Generation Two)   |
| IB interface chip                                    | Mellanox ConnectX IB   |
| Onboard memory                                       | Two 2-MB flash ROM per HCA   |
| Maximum IB cable length                              | 15 meters, using passive copper cables<br>16 meters, using active copper cables  |
| LED indicators                                       | <ul style="list-style-type: none"> <li>• One green LED per 4x port showing physical link state</li> <li>• Attention push button, LED (white), OK LED (green), Service Action Required LED (amber), Ready-to-Remove LED (blue)</li> </ul> |
| Form factor  | Sun proprietary form factor  |
| RoHS   | 5 of 6 compliant   |
| Power consumption                                    | Approximately 240 watts total  |
| Protection   | Protected from electrostatic discharge (ESD) and handling damage   |

---

## 1.2 Platform and Operating System Support

This section provides information about selected platforms that are compatible with the heterogeneous InfiniBand network design.

[TABLE 1-2](#) lists operating system support for the IB NEM on the Sun Blade 6000 Series Modular System, and required drivers.

**TABLE 1-2** Operating System Support

| Operating System | Version Details     | Driver Required     |
|------------------|---------------------|---------------------|
| CentOS           | Release 4.4 (Final) | OFED-1.2.5 or later |
| RHEL             | RHEL4 u4            |                     |
|                  | RHEL4 u5            |                     |
|                  | RHEL5 u1            |                     |

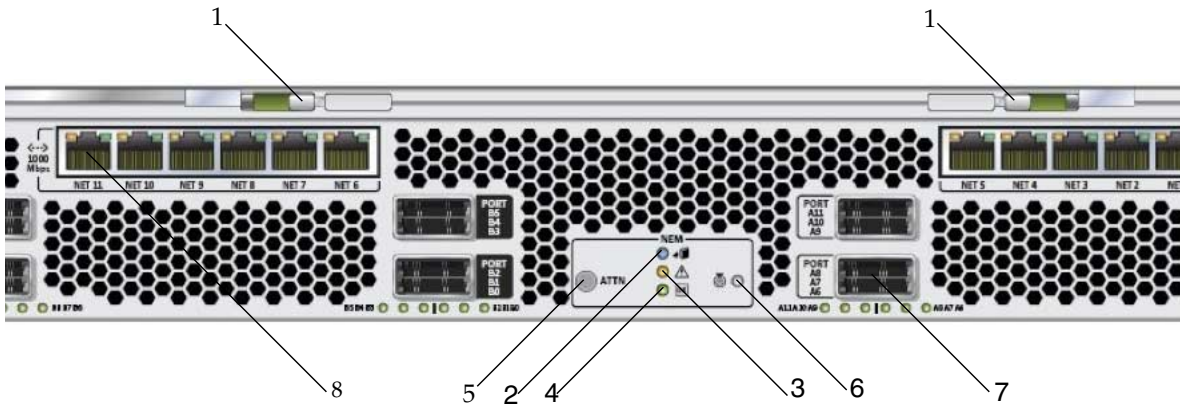
For more information about the InfiniBand software stack and related topics, see [Chapter 3](#).

---

## 1.3 IB NEM Indicators, Buttons, and Ports

The Sun Blade 6048 Switched InfiniBand Network ExpressModule provides a standard set of status indicators, buttons, and ports on the back panel. [TABLE 1-3](#) describes the components indicated by the numbers.

**FIGURE 1-1** Sun Blade 6048 Switched InfiniBand Express NEM Back Panel Indicators, Buttons, and Ports



**TABLE 1-3** Sun Blade 6048 Switched InfiniBand Express NEM Back Panel Components and Functions

| Number | Component Name                    | Color | Description  |
|--------|-----------------------------------|-------|--|
| 1      | Ejector lever                     |       | To remove the NEM, you open this ejector lever.  |
| 2      | Ready-to-Remove indicator         | Blue  | Provides the following indications: <ul style="list-style-type: none"> <li>• Steady On – Lights when it is safe to remove the associated NEM from the NEM slot in the chassis.</li> <li>• Off – The NEM is not ready for removal.</li> </ul> This indicator is normally lit from the ILOM web interface through the Chassis Monitoring Module (CMM) or by pressing the Attention button. |
| 3      | Service Action Required indicator | Amber | Provides the following indications: <ul style="list-style-type: none"> <li>• Steady On – Lights when there is a fault associated with the NEM.</li> <li>• Off – The NEM has no fault condition.</li> </ul>   |

**TABLE 1-3** Sun Blade 6048 Switched InfiniBand Express NEM Back Panel Components and Functions *(Continued)*

| Number | Component Name   | Color | Description  |
|--------|------------------|-------|--|
| 4      | OK indicator     | Green | <p>Displays the different states of module initialization.</p> <p>Provides the following indications:</p> <ul style="list-style-type: none"> <li>• Steady On – Lights steadily when NEM is operating normally.</li> <li>• Slow Blink – Blinks slowly when NEM is transitioning from one state to the next.</li> <li>• Standby Blink – Blinks more slowly when NEM has been inserted and NEM is waiting for the Attention button to be pressed.</li> <li>• Off – NEM has no power or one of the other LEDs is lit.</li> </ul> <p>The primary purpose of this OK indicator is to provide a visual cue to the operator as to what will happen when using the Attention button.</p>  |
| 5      | Attention button |       | <p>When pressed, the Attention button enables you to activate (if inserting) or prepare to remove (if removing) a NEM during a hot-plug operation.</p>   |
| 6      | Locate indicator | White | <p>The Locate indicator is a bright white button with an associated indicator that blinks (4 Hz) when initiated (remotely) from the ILOM web interface.</p> <p>The Locate indicator enables a system operator to easily locate a NEM in a system within a large data center. Once activated, this indicator will time-out after 30 minutes.</p> <p>When pressed, the Locate button lights the Locate indicator.</p> <p>The Locate indicator provides these indications:</p> <ul style="list-style-type: none"> <li>• Fast blink – Identifies a specific NEM in the chassis. Lights when the LED is initiated from the web interface remotely or from a press of the Locate button locally.</li> <li>• Off – NEM locator function has not been selected.</li> </ul> |
| 7      | Connectors       |       | <p>The iPASS connector combines three 4x links per connector.</p>  |
| 8      | Connectors       |       | <p>RJ-45 Ethernet connector.</p>   |

Each InfiniBand port has one LED indicator, as shown in [FIGURE 1-2](#). [TABLE 1-4](#) lists and describes the LED indicator.

**FIGURE 1-2** Sun Blade 6048 Switched InfiniBand Express NEM Port LED Indicators



**TABLE 1-4** InfiniBand Port LED Indicator Description

| Number | Color | Description  |
|--------|-------|--|
| 1      | Green | This physical link LED illuminates when the port is electrically active, that is, when a driver is attached and a physical link to a remote switch (or, possibly an HCA) has been established. |



# Replacing the Sun Blade 6048 Switched InfiniBand Network ExpressModule

---

This chapter describes how to replace a Sun Blade 6048 Switched InfiniBand Network ExpressModule (IB NEM) in a powered-on Sun Blade 6048 Series Chassis. This chapter also includes instructions to verify that the replacement IB NEM has been installed correctly.

This chapter contains the following sections:

- [Section 2.1, “Replacing IB NEM Hardware” on page 2-2](#)
- [Section 2.2, “Verifying Installation” on page 2-4](#)
- [Section 2.4, “Troubleshooting a Hot-Remove Operation” on page 2-11](#)



---

**Caution** – Damage to the IB NEM can occur as the result of careless handling or electrostatic discharge (ESD). Always handle an IB NEM with care to avoid damage to electrostatic sensitive components. To minimize the possibility of ESD-related damage, Sun strongly recommends using both a workstation antistatic mat and an ESD wrist strap. You can get an ESD wrist strap from any reputable electronics store or from Sun as part number 250-1007.

---

You can install the IB NEM in the following Sun Blade 6048 Series Chassis:

- Sun Blade 6000 Chassis
- Sun Blade 6000 P Chassis

---

## 2.1 Replacing IB NEM Hardware

If an IB NEM fails or if you choose to change the I/O configuration, you will need to replace the IB NEM. You can replace an IB NEM in a powered-on Sun Blade 6048 Series Chassis using a hot-plug operation.

If you are removing but not replacing the IB NEM, you must install both IB NEM filler panels to meet FCC limits for electromagnetic interference (EMI) and to ensure proper airflow and cooling.

If you encounter a problem replacing the IB NEM, see [Section 2.4, “Troubleshooting a Hot-Remove Operation” on page 2-11](#).

---

**Note** – If you are installing a IB NEM in a Sun Blade 6048 Series Chassis that has not been powered on, see the *Sun Blade 6048 Series Installation Guide* (Sun Part number: 820-2312).

---

The IB NEMs are customer-replaceable units (CRUs).

### 2.1.1 Replace IB NEM in a Powered-On Chassis

#### 1. Identify which IB NEM to replace.

If the amber Service Action Required LED is lit, this indicates a problem with a specific IB NEM. Otherwise, you can choose any IB NEM to replace if, for example, you want to change the I/O configuration.

#### 2. Prepare the IB NEM for a hot-plug procedure. Use either of these methods:

- Press the Attention button on the IB NEM to initiate the hot-plug removal.

The green OK LED will blink for up to one minute, indicating that the IB NEM is being prepared for removal.

To abort the operation, press the Attention button again within five seconds.

Once the green LED goes dark and the blue LED is illuminated, you can safely remove the IB NEM.

- Use the ILOM web interface or the command-line interface (CLI) to initiate the hot-plug removal.

If the IB NEM fails the hot-plug preparation and its Ready-to-Remove indicator does not light, see [Section 2.4, “Troubleshooting a Hot-Remove Operation” on page 2-11](#).

3. **When the blue Ready-to-Remove LED is lit, physically remove the IB NEM as follows:**
  - a. **Remove all cables from the IB NEM.**
  - b. **Press the latch on both ejector levers inward at the same time.**
  - c. **Swing out the ejector levers to their fully open position.**
  - d. **Slide the IB NEM out of its slot.**

Support the weight of the IB NEM with one hand at the bottom of the IB NEM.

## 2.1.2 Install IB NEM in a Powered-On Chassis

1. **Align the replacement IB NEM with the bottom IB NEM slot.**

Ensure that the port connectors are facing toward you and that the ejector levers are fully open.
2. **Align the replacement IB NEM with the chassis guidance system, and slide the IB NEM into its slot until the ejector levers engage and start to close.**

Ensure that the IB NEM engages with the chassis guidance system. Failure to align the IB NEM correctly can result in damage to the IB NEM's internal connections to the chassis midplane.
3. **Close the levers to secure the IB NEM in its slot. The levers click when locked.**

Ensure that the back plate on the module mounts flush with the chassis panel opening.

The green OK indicator on the IB NEM should be in Standby Blink mode.
4. **Connect the InfiniBand cables to the IB NEM port connectors.**
5. **Ensure that the connectors are properly engaged.**

The connectors click when locked.



---

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

---

6. **If you have not already done so, connect the other end of the InfiniBand cables to the appropriate ports on an InfiniBand switch.**

**7. Press the Attention button to notify the Sun Blade Server Modules (host operating systems) of the IB NEM.**

After you physically install the IB NEM, the Chassis Monitoring Module (CMM) automatically detects the presence of the IB NEM. The green OK indicator on the IB NEM transitions from Standby Blink to Steady On when the IB NEM is operational.

- To complete installation on a Linux OS, see [Section 3.1.2.2, “Install the OFED Package”](#) on page 3-7.

---

**Note** – If you are replacing an IB NEM, you do not need to install the InfiniBand software packages. The appropriate software package will have been installed and configured as part of the initial IB NEM installation.

---

**8. Verify that the IB NEM is working properly.**

See [Section 2.2.1, “Verify Hardware Installation”](#) on page 2-4.

- To verify installation on the Linux OS, see [Section 2.3, “Verify Installation on Linux”](#) on page 2-10.

---

## 2.2 Verifying Installation

If you have not installed the IB NEM in the chassis and connected it to an operational InfiniBand switch, do so before you attempt to verify the installation. The InfiniBand switch should automatically recognize InfiniBand servers when the servers are connected to the fabric.

### 2.2.1 Verify Hardware Installation

**1. Once you have physically installed the IB NEM and ensured that the cables are connected to the IB NEM and switches, ensure that an IB subnet manager is running on the connected InfiniBand fabric (network).**

If the green port LED is illuminated, you have successfully completed the hardware installation and you can proceed to verification through the ILOM interfaces. The green LED indicates that the port is enabled, that is, that a physical link to a remote switch (or, possibly an HCA) has been established.

If the port LEDs are **not** illuminated, one possible cause might be that the InfiniBand drivers are not installed. You cannot verify a complete installation on Linux until you install these drivers.

2. You can now examine hardware status through one of the ILOM (Integrated Lights Out Manager) interfaces. Use one of the following procedures:

- Section 2.2.2, “Verify Installation Using the ILOM Web Interface” on page 2-5
- Section 2.2.3, “Verify Installation Using the ILOM CLI” on page 2-8

For a description of the possible states of the IB NEM LEDs, see Section 2.2.4, “Verify Component Status Using the LEDs” on page 2-8.

## 2.2.2 Verify Installation Using the ILOM Web Interface

1. Log in to the ILOM web interface using the IP address of the active CMM.

The initial page of the ILOM web interface appears, providing visual verification of successful hardware installation. Note the image of the installed IB NEM in the view of the back of the chassis.



2. In the left navigation pane, select CMM.

The ILOM Version Information page appears.

3. Select the System Information tab and then select the Components tab.

The Component Management page appears.

ABOUT Role (User): Administrator (root) CMM Hostname: SUNCMM0003BAF13B04 REFRESH LOG OUT

Sun™ Integrated Lights Out Manager Sun™ Microsystems, Inc. Java™

Chassis CMM Blade 0 Blade 1 Blade 2 Blade 3 Blade 4 Blade 5 Blade 6 Blade 7 Blade 8 Blade 9

System Information System Monitoring Configuration User Management Remote Control Maintenance

Versions Session Time-Out Components

### Component Management

View component details or prepare to install or remove a component from this page. To modify a component, select the radio button next to that component, then choose an option from the Action drop down list. Components without radio buttons cannot be modified. Choosing the *Prepare to Remove* action shuts down the selected component and lights its blue *Ready to Remove* LED.

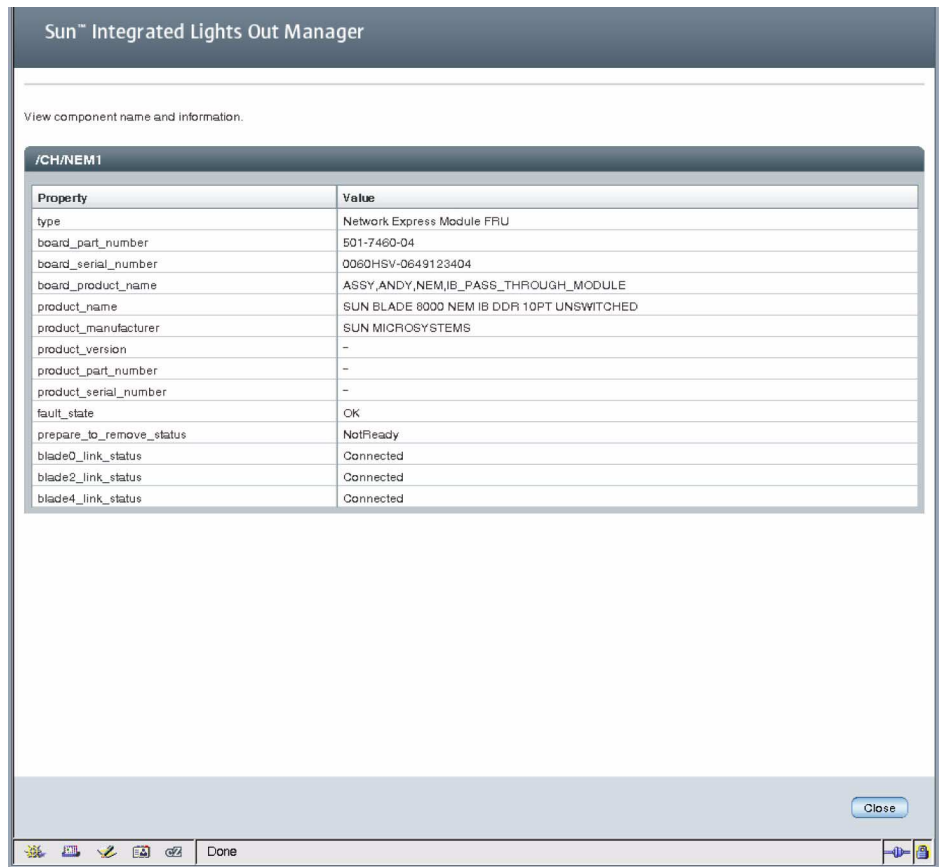
#### Component Management Status

— Actions —

| Component Name                        | Type                      | Ready to Remove Status | Fault Status |
|---------------------------------------|---------------------------|------------------------|--------------|
| • /CH                                 | Chassis                   | -                      | OK           |
| • /CH/EXTERNAL/AIR_TEMP               | Thermal Conditions        | -                      | OK           |
| • /CH/CMM0                            | Chassis Monitoring Module | Not Ready              | OK           |
| • /CH/PS0                             | Power Supply              | Not Ready              | OK           |
| • /CH/PS0/EXTERNAL/AC_INPUT           | Power Conditions          | -                      | OK           |
| • /CH/PS0/EXTERNAL/AC_INPUT_RANGE     | Power Conditions          | -                      | OK           |
| • /CH/PS0/EXTERNAL/AC_INPUT_HALF_LOAD | Power Conditions          | -                      | OK           |
| • /CH/PS1                             | Power Supply              | Not Ready              | OK           |
| • /CH/PS1/EXTERNAL/AC_INPUT           | Power Conditions          | -                      | OK           |
| • /CH/PS1/EXTERNAL/AC_INPUT_RANGE     | Power Conditions          | -                      | OK           |
| • /CH/PS1/EXTERNAL/AC_INPUT_HALF_LOAD | Power Conditions          | -                      | OK           |
| • /CH/PS2                             | Power Supply              | Not Ready              | OK           |
| • /CH/PS2/EXTERNAL/AC_INPUT           | Power Conditions          | -                      | OK           |
| • /CH/PS2/EXTERNAL/AC_INPUT_RANGE     | Power Conditions          | -                      | OK           |
| • /CH/PS2/EXTERNAL/AC_INPUT_HALF_LOAD | Power Conditions          | -                      | OK           |
| • /CH/PS3                             | Power Supply              | Ready (No Power)       | OK           |
| • /CH/PS3/EXTERNAL/AC_INPUT           | Power Conditions          | -                      | Faulted      |
| • /CH/PS3/EXTERNAL/AC_INPUT_RANGE     | Power Conditions          | -                      | OK           |
| • /CH/PS3/EXTERNAL/AC_INPUT_HALF_LOAD | Power Conditions          | -                      | OK           |
| • /CH/RFB0                            | Rear Fan Board            | -                      | -            |
| • /CH/RFM1                            | Rear Fan                  | Not Ready              | OK           |

#### 4. Select the IB NEM component name.

You might need to scroll down in the Component Management Status page. The ILOM page showing the IB NEM status details appears.



Note that the IB NEM `prepare_to_remove_status` is `NotReady` and that the `bladen_link_status` is `Connected`, indicating successful hardware installation.

5. If you are physically near the IB NEM, you can examine its LEDs to verify that it has returned the expected feedback.

See [Section 2.2.4, “Verify Component Status Using the LEDs”](#) on page 2-8.

## 2.2.3 Verify Installation Using the ILOM CLI

1. Log in to the ILOM CLI.

2. To find the IB NEM in your system, enter:

```
> show /CH/
```

3. To verify that the IB NEM is installed, that is, that the Ready To Remove status is Not Ready, enter:

```
> show /CH/component
```

where *component* is *NEMn*. The system returns the following message:

```
> show /CH/NEM0
Targets:
  SP
  SEEPROM

Properties:
  type = Network Express Module
  fru_part_number = 375-3551-03
  fru_serial_number = 0000000-0748000416
  fru_name = (none)

Commands:
  cd
  show
```

Note that the IB NEM `prepare_to_remove` status is `NotReady` and that the `bladen_link_status` is `Connected`, indicating successful hardware installation.

4. If you are physically near the IB NEM, you can examine its LEDs to verify that it has returned the expected feedback.

See [Section 2.2.4, “Verify Component Status Using the LEDs”](#) on page 2-8.

## 2.2.4 Verify Component Status Using the LEDs

- Verify the status of the IB NEM using the LEDs.

[TABLE 2-1](#) lists the possible combinations for the IB NEM LEDs and the status of the IB NEM indicated by these combinations.



**TABLE 2-1** LED Combinations and IB NEM Status

| <b>Blue (Top)</b> | <b>Amber (Middle)</b> | <b>Green (Bottom)</b> | <b>IB NEM Status</b>                          |
|-------------------|-----------------------|-----------------------|---|
| On                | Off                   | Off                   | Ready to remove                               |
| Off               | On                    | Off                   | Service attention required                    |
| Off               | Off                   | Very Slow Blink       | Standby                                       |
| Off               | Off                   | Slow Blink            | Connecting (or disconnecting) links to blades |
| Off               | Off                   | On                    | Links connected to blades                     |

To verify successful IB NEM insertion, check the following LEDs and the ILOM interface status:

1. At module insertion, the green OK indicator goes to Standby Blink.
2. When you press the Attention button to activate the IB NEM, the green OK indicator transitions to Slow Blink.
3. When all links to active blades have been made, the green OK indicator transitions to Steady On.
4. In the ILOM interfaces, the Ready to Remove status shows Not Ready.

---

## 2.3 Verify Installation on Linux

- To determine whether the IB NEM is visible to the Linux OS, enter the `lspci` command.

Output similar to the following appears.

```
> lspci
00:00.0 Memory controller: nVidia Corporation CK804 Memory
Controller (rev a3)
00:01.0 ISA bridge: nVidia Corporation CK804 ISA Bridge (rev a3)
...
01:01.0 SCSI storage controller: LSI Logic / Symbios Logic SAS1064
PCI-X Fusion-MPT SAS (rev 02)02:00.0 Ethernet controller: Intel
Corporation 82571EB Gigabit Ethernet Controller (rev 06)
02:00.1 Ethernet controller: Intel Corporation 82571EB Gigabit
Ethernet Controller (rev 06)
80:00.0 Memory controller: nVidia Corporation CK804 Memory
Controller (rev a3)
80:01.0 Memory controller: nVidia Corporation CK804 Memory
Controller (rev a3)
80:0e.0 PCI bridge: nVidia Corporation CK804 PCIE Bridge (rev a3)
0a:00.0 InfiniBand: Mellanox Technologies Unknown device 634a (rev
a0)
```

The last entry in the sample output (InfiniBand: Mellanox Technologies) verifies the hardware installation and confirms the IB NEM's availability to the Linux host.

---

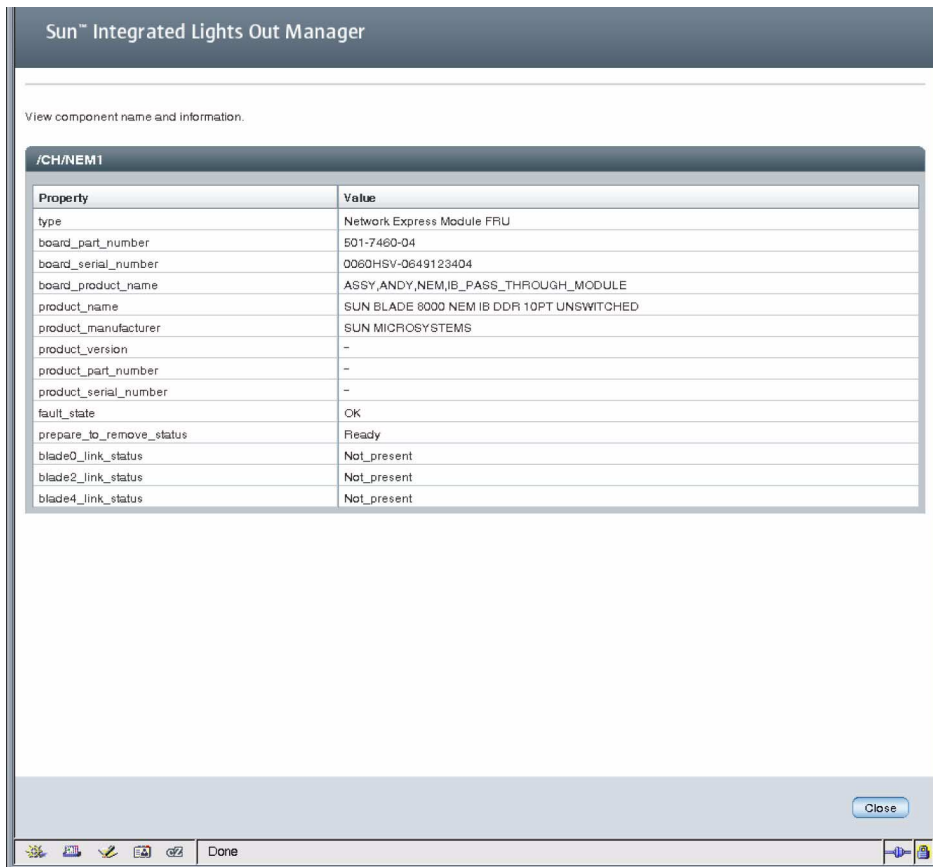
## 2.4 Troubleshooting a Hot-Remove Operation

Because IB NEMs are shared resources, all Sun Blade Server Modules must respond favorably to the PCI hot-remove request. However, a blade might not relinquish the link to a IB NEM if, for instance, there are busy NFS mounted volumes, file transfers, and so on.

To determine the state of the IB NEM-to-blade connections, you can use the ILOM web interface or the ILOM command-line interface, as described in the following procedures.

### 2.4.1 Troubleshoot Using the ILOM Web Interface

- 1. To verify IB NEM-to-blade connections, log in to the ILOM web interface for the CMM.**  
The ILOM Version Information page appears.
- 2. In the left navigation pane, select CMM.**  
The ILOM Version Information page appears.
- 3. Select the System Information tab and then select the Components tab.**  
The Component Management page appears.
- 4. Click on the IB NEM component name.**  
A page displaying properties and values for the selected IB NEM appears.



As shown, the system responds with `bladen_link_status` entries for each blade (where  $n$  is the blade module number). Any blade not reporting a `Not_present` status needs intervention from the host OS on that blade. This intervention from the host OS depends entirely on the OS that is active on the blade. Each supported OS has a different method for managing attached devices.

5. Perform the appropriate host OS procedure for releasing the IB NEM from the blade.
6. Re-execute the steps in [Section 2.1.1, "Replace IB NEM in a Powered-On Chassis"](#) on page 2-2.

## 2.4.2 Troubleshoot Using the ILOM CLI

1. To verify IB NEM-to-blade connections, log in to the ILOM CLI.
2. Enter the following command, where *n* is the number of the IB NEM in question.

```
> show /CH/NEMn
Targets:
SERVICE
OK2RM
LOCATE
OK
ATTN_BTN
LOCATE_BTN
T_AMB
T_CORE

Properties:
type = Network ExpressModule FRU
board_part_number = 501-7460-04
board_serial_number = 0060HSV-0649123404
board_product_name = ASSY,ANDY,NEM,IB_PASS_THROUGH_MODULE
product_name = SUN Blade 6000 NEM IB DDR 10PT UNSWITCHED
product_manufacturer = SUN MICROSYSTEMS
product_version = (none)
product_part_number = (none)
product_serial_number = (none)
fault_state = OK
clear_fault_action = (none)
prepare_to_remove_status = Ready
prepare_to_remove_action = (none)
return_to_service_action = (none)
blade0_link_status = Not_present
blade2_link_status = Not_present
blade4_link_status = Not_present
```

As shown, the system responds with `bladen_link_status` entries for each blade (where *n* is the blade module number). Any blade not reporting a `Not_present` status needs intervention from the host OS on that blade. This intervention from the host OS depends entirely on the OS that is active on the blade. Each supported OS has a different method for managing attached devices.

3. Perform the appropriate host OS procedure for releasing the IB NEM from the blade.
4. Re-execute the steps in [Section 2.1.1, "Replace IB NEM in a Powered-On Chassis"](#) on page 2-2.

# InfiniBand Software Overview

---

InfiniBand is a network architecture that is designed for the large-scale interconnection of computing and I/O nodes through a high-speed switched fabric. To operate InfiniBand on a Sun Blade 6048 Series Modular System, you need an InfiniBand HCA (provided by the IB NEM) and an InfiniBand software stack.

This chapter provides an overview and installation instructions for the InfiniBand software stack for the Linux and Windows operating systems.

Consult the *Sun Blade 6048 Series Product Notes* for the most recent information about supported operating systems, firmware and software updates, and other issues not covered in the main product documentation.

This chapter contains the following sections:

- [Section 3.1, “InfiniBand Software for Linux” on page 3-1](#)
- [Section 3.2, “Running OpenSM” on page 3-14](#)

---

## 3.1 InfiniBand Software for Linux

If you have installed CentOS 4.4 (Final), RHEL4 u4, RHEL4 u5 or RHEL5 u1 on a Sun Blade Server Module and you have installed the bundled drivers, you do not need to install or configure additional drivers to support the IB NEM. The bundled drivers support basic IB NEM operation.

Specifically, CentOS 4.4 contains support in the kernel for HCA hardware produced by Mellanox (mthca driver). The kernel also includes core InfiniBand modules, which provide the interface between the lower-level hardware driver and the upper-layer InfiniBand protocol drivers and provide user space access to InfiniBand hardware.

The kernel also includes the Sockets Direct Protocol (SDP) driver, IP over Infiniband (IPoIB), and the SCSI RDMA Protocol (SRP) driver.

CentOS 4.4 includes the following user space packages:

- `kernel-ib`. Base package that is required to support all other packages. Includes the files necessary to configure the kernel portion of the `openib` stack, create the proper `udev` rules, add the `init` script that allows the kernel modules to be selectively loaded at boot up, and so on.
- `dapl`. RDMA API that supports the DAT 1.2 specification.
- `ibibcm`. InfiniBand Connection Management API.
- `libibcommon`. Common utility functions for the IB diagnostic and management tools.
- `libibmad`. Low-layer IB functions for use by the IB diagnostic and management programs, including MAD, SA, SMP, and other basic IB functions.
- `libibumad`. User MAD library functions that sit on top of the user MAD modules in the kernel. Used by the IB diagnostic and management tools, including OpenSM.
- `libibverbs`. Library that allows user space processes to use InfiniBand "verbs" as described in the InfiniBand Architecture Specification.
- `libibverbs-utils`. Useful subnet and device diagnostic utilities.
- `libmthca`. Device-specific user space driver for Mellanox HCAs (MT23108 InfiniHost and MT25208 InfiniHost III Ex) for use with the `libibverbs` library.
- `libipathverbs`. Device-specific driver for Pathscale HCAs for use with `libibverbs` (only available on x86\_64 and ia64 systems).
- `librdmacm`. RDMA Connection Management (`cm`) library.
- `libsdp`. Driver that enables a sockets application to use InfiniBand Sockets Direct Protocol (SDP) instead of TCP transparently and without recompiling the application.
- `openib-diags`. Diagnostic programs and scripts that diagnose the IB subnet.
- `opensm`. Subnet manager software for InfiniBand networks.
- `opensm-libs`. Shared libraries for InfiniBand user space access.
- `perftest`. InfiniBand performance tests.
- `srptools`. In conjunction with the kernel `ib_srp` driver, allows discovery and use of SCSI class devices via the SCSI RDMA Protocol over InfiniBand.
- `mstflint`. Tool to query and update firmware flash memory attached to Mellanox InfiniBand HCAs.

The packages selected to support any given configuration will vary. [TABLE 3-1](#) lists the packages considered the absolute minimum needed to support the environment described in this guide.



**TABLE 3-1** Required Packages for InfiniBand Support

| Package      | Command Enabled | Description                             |
|--------------|-----------------|---|
| kernel-ib    | openibd         | IB master control script                |
| openib-diags | ibstat          | IB utility to display HCAs              |
| openib-diags | ibnetdiscover   | IB utility to probe and show the fabric |
| mstflint     | mstflint        | Mellanox utility to update HCA FLASHRAM |
| libibcommon  | NA              | IB support package                      |
| libibmad     | NA              | IB support package                      |
| libibumad    | NA              | IB support package                      |

If you elected not to install these packages when installing CentOS 4.4, or if you want to upgrade your drivers, you can install these packages at any time from the OS distribution source or by downloading the required files from [OpenFabrics.org](http://OpenFabrics.org). For information on both of these procedures, see [Section 3.1.2, “Installing the InfiniBand Drivers on Linux”](#) on page 3-4.

## 3.1.1 OpenFabrics Enterprise Distribution 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 and your current vendors.

The OpenFabrics organization is the Open Software solution in the InfiniBand software space and 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.

[TABLE 3-2](#) lists the tested Linux platforms and the corresponding OFED release.

**TABLE 3-2** Linux Platform OFED Release

| Linux Platform             | OFED Release                       |
|----------------------------|------------------------------------|
| CentOS Release 4.4 (Final) | Sun has tested OFED Release 1.2.5. |

OFED contains the following components:

- OpenFabrics core and Upper Layer Protocols (ULPs):
  - HCA drivers

- Core
- ULPs, including: IPoIB, SDP, SRP Initiator, iSER Host, RDS and uDAPL
- OpenFabrics utilities:
  - OpenSM (InfiniBand subnet manager)
  - Diagnostic tools
  - Performance tests
- Message Passing Interface (MPI):
  - OSU MPI stack supporting the InfiniBand interface
  - Open MPI stack supporting the InfiniBand interface
  - MPI benchmark tests (OSU BW/LAT, Pallas, Presta)
- Sources of all software modules (under conditions mentioned in the modules' LICENSE files)
- Documentation

## 3.1.2 Installing the InfiniBand Drivers on Linux

If you did not install the InfiniBand drivers when installing the Linux OS, you can install them at any time from the OS distribution source or by downloading the necessary files from OpenFabrics.org.

To do so, choose one of the following procedures:

- [Section 3.1.2.1, “Install IB Drivers From Linux Distribution Source” on page 3-4](#)
- [Section 3.1.2.2, “Install the OFED Package” on page 3-7](#)

If you need to determine whether or not the drivers are already installed, see [Section 3.1.2.3, “Verify Driver Installation on Linux” on page 3-11](#).

### 3.1.2.1 Install IB Drivers From Linux Distribution Source

To install the InfiniBand drivers, you need access to the Red Hat Package Manager (RPM) files. Access to these files is dependent on your individual installation configuration (net boot, CD/DVD boot, .iso files, and so on). When you decide on the appropriate access method and package selection, you can add the packages to the KickStart configuration file for automatic inclusion in future installations.

---

**Note** – All packages have a `.i386.rpm` extension (as shown in the following procedure). On a 64-bit system, all packages have a `.x86_64.rpm` extension instead.

---

1. Enter the `rpm -ivh` command for each InfiniBand package that you need to install.

Packages must be installed in the following order:

- `libibcommon`
- `libibumad`
- `libibmad`
- `openib-diags`
- `mstflint`
- `perftest`

The following example shows the installation of one package (`libibcommon`) and the resulting dialog:

```
> rpm -ivh libibcommon-1.0-1.i386.rpm
warning: libibcommon-1.0-1.i386.rpm: V3 DSA signature: NOKEY, key
ID db42a60e
Preparing...      ##### [100%]
1:libibcommon    ##### [100%]
> rpm -ivh libibumad-1.0-1.i386.rpm
.
.
.
```

2. If you are running the CSH or TCSH shell, enter the `rehash` command to rebuild the shell's view of available executables.

**3. Enter the `ibstat` command to verify that the OS sees the IB NEM.**

```
> ibstat
CA 'mlx4_0'
  CA type: MT25418
  Number of ports: 2
  Firmware version: 2.2.0
  Hardware version: 0
  Node GUID: 0x00144fa435cc0004
  System image GUID: 0x00144fa435cc0007
  Port 1
    State: Active
    Physical state: LinkUp
    Rate: 20
    Base lid: 7
    LMC: 0
    SM lid: 17
    Capability mask: 0x02510868
    Port GUID: 0x00144fa435cc0005
  Port 2
    State: Active
    Physical state: LinkUp
    Rate: 20
    Base lid: 8
    LMC: 0
    SM lid: 17
    Capability mask: 0x02510868
    Port GUID: 0x00144fa435cc0006
#
```

**4. (Optional) You can enter the `ibnetdiscover` command to verify the presence of an operational IB fabric.**

For an example of the output of this command, see [Section 3.1.2.3, “Verify Driver Installation on Linux”](#) on page 3-11.

**5. (Optional) You can check the status of the `ib0` network interface to determine whether the `ib_ipoib` driver is installed.**

For details on this step, see [Section 4.1.1, “Install IPoIB Driver”](#) on page 4-2.

## 3.1.2.2 Install the OFED Package

1. On the Sun Blade Server Module, log in as `root` and copy the required files (OFED1.2.5.tgz **in this example**) from the following location:

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

---

**Note** – You need write access to the files to execute the install script.

---

2. From `root`, extract the files by entering the following command:  
> `tar -zxvf /OFED-1.2.5.tgz`
3. From the `OFED-1.2.5` directory, initiate the installation process by entering the following command:  
> `./install.sh`
4. When the InfiniBand OFED Distribution Software Installation menu appears, enter option 2 (Install OFED Software).
5. When the Select OFED Software menu appears, enter option 3 (All packages).
6. When you are asked if you wish to create/install an MPI RPM with `gcc`, enter `Y`.

```
The following compilers on your system can be used to build/install
MPI: gcc
Do you wish to create/install an MPI RPM with gcc? [Y/n]:
```

7. When you are asked if you wish to create/install an openmpi RPM with gcc, enter Y.

```
The following compilers on your system can be used to build/install
openmpi: gcc
Do you wish to create/install an openmpi RPM with gcc? [Y/n]:
```

The installation script then lists the OFED packages that it will build. See the following sample output.

```
Following is the list of OFED packages that you have chosen (some
may have been added by the installation program due to package
dependencies):
ib_ipath
ib_ipoib
...
mpitests
ibutils

WARNING: This installation program will remove any previously
installed IB packages on your machine.

Do you want to continue? [Y/n]:
```

8. Enter Y to continue.

You are prompted to configure InfiniBand IP support.

9. Enter Y when asked if you want to include IPoIB configuration files.

```
Do you want to include IPoIB configuration files (ifcfg-ib*)? [Y/n]:
```

10. Press Enter to accept the default when prompted to enter a temporary directory for OFED.

```
RPM build process requires a temporary directory.
Please enter the temporary directory [/var/tmp/OFED]:
```

11. Press Enter to accept the default when prompted for the OFED installation directory.

Please enter the OFED installation directory [/usr/local/ofed]:

At this point, the installer begins compiling InfiniBand packages. The process of building packages takes approximately 15–20 minutes.

The system displays output like the following:

```
The MPI_COMPILER_openmpi variable is not defined. Trying the
default compiler: gcc

The following compilers will be used to build the openmpi RPMs: gcc

Checking dependencies. Please wait ...

Building InfiniBand Software RPMs. Please wait...

Building openib RPMs. Please wait...
.
.
.
33 packages were built

Build process finished ...
```

Installation then begins. You see the following message.

```
Removing previous InfiniBand Software installation
Running /bin/rpm -e libibverbs libibverbs-devel
libibverbs-utils...
```

The actual installation takes about one minute.

Assuming the IB NEM hardware is installed (and, therefore, an InfiniBand HCA is present), you are prompted to configure InfiniBand IP support.

## 12. Enter Y in response to the following prompt:

Do you want to configure IPoIB interfaces [Y/n]?

The default IPoIB interface configuration is based on DHCP. A special patch for DHCP is required for supporting IPoIB. The patch is available under:

OFED-1.0/docs/dhcp

If you do not have DHCP, you must change this configuration in the following steps.

The system next displays the current configuration.

**13. When asked if you want to change the configuration as displayed, enter y.**

```
The current IPOIB configuration for ib0 is:
DEVICE=ib0
BOOTPROTO=dhcp
ONBOOT=yes
Do you want to change this configuration? [y/N]:
```

The configuration script guides you through the changes one at a time. See the following as an example.

```
Enter an IP Address:10.0.0.52
Enter the Netmask: 255.255.255.0
Enter the Network:10.0.0.0
Enter the Broadcast Address:10.0.0.255
Start Device On Boot? [Y/n]:Y
```

Selected configuration:

```
IPADDR=10.0.0.52
NETMASK=255.255.255.0
NETWORK=10.0.0.0
BROADCAST=10.0.0.255
ONBOOT=yes
```

```
Do you want to save the selected configuration? [Y/n]:
```

**14. Enter Y to save the configuration.**

If you have entered a valid IP configuration for `ib0`, you are now properly configured for IPoIB operations.

**15. Iterate the InfiniBand configuration over all InfiniBand interfaces.**

You must enter a valid IP configuration for each network interface.

Once all IPoIB interfaces have been configured, you are prompted as follows to configure OpenSM for the blade.

```
Do you want to configure OpenSM [Y/n]?
```

**16. Enter n to complete this part of the installation.**

You should see a message like the following:

```
Installation finished successfully...
Press Enter to continue...
```

For information on OpenSM, see [Section 3.2, "Running OpenSM"](#) on page 3-14.



### 17. Press Enter.

The InfiniBand OFED Distribution Software Installation Menu is displayed.

### 18. Enter Q to exit.

The Sun Blade Server Module is configured now to start up the InfiniBand software on reboot (ONBOOT=yes).

If this is not the desired behavior, you can edit the `/etc/infiniband/openib.conf` file, changing ONBOOT to equal no. You can also manually control basic InfiniBand behavior by entering the following command:

```
/etc/init.d/openibd { start | stop | status }
```

After successful installation, reboot the Server Module. After reboot, the Server Module should appear as a functional member of the InfiniBand fabric.

## 3.1.2.3 Verify Driver Installation on Linux

### 1. Verify that the Linux software driver is installed and attached to the IB NEM by entering the `openibd status` command.

---

**Note** – When using the `openibd` command, enter the entire path as shown in the example.

---

The following example shows the IB driver installed, running, and presenting one IB HCA channel or network device (`ibn`) to the OS. In the example, the Linux network device appears as `ib0`.

```
> /etc/init.d/openibd status
    HCA driver loaded
Configured devices:
ib0
Currently active devices:
ib0
    The following modules are also loaded:
ib_cm
ip_ipoib
.
.
.
```

## 2. To view details of operational status, enter the `ibstat` command.

The following example shows one operational IB port into the IB fabric (or network). The `LinkUp` state indicates active participation in an IB fabric. The port is present as `lid 69` and it is being managed by `lid 2`.

```
> ibstat
CA 'mthca0'
  CA type: MT25204
  Number of ports: 1
  Firmware version: 1.1.0
  Hardware version: a0
  Node GUID: 0x001b00000ca72620
  System image GUID: 0x001b00000ca72623
  Port 1
    State: Active
    Physical state: LinkUp
    Rate: 20
    Base lid: 69
    LMC: 0
    SM lid: 2
    Capability mask: 0x02510a68
    Port GUID: 0x001b00000ca72621
```

You can also verify that the InfiniBand fabric is operational by entering the `ibnetdiscover` command. The output from this command lists all the nodes, as shown in the following sample output.

```
> ibnetdiscover
#
# Topology file: generated on Thu Jan 11 15:19:59 2007
#
# Max of 4 hops discovered
# Initiated from node 001b00000ca72620 port 001b00000ca72621

vendid=0x8f1
devid=0x5a31
sysimguid=0x8f10400411ef9
switchguid=0x8f10400411ef8

Switch 24 "S-0008f10400411ef8" # Switch port 0 lid 9
[21] "H-0002c90109761ea0" [2]
[12] "S-0005ad00000161ba" [5]
[7] "H-001b00000ca72630" [1]
[6] "H-001b00000ca72620" [1]
vendid=0x5ad
devid=0xa87c
sysimguid=0x5ad01010161b6
switchguid=0x5ad00000161ba
```

```
Switch 8 "S-0005ad00000161ba" # Switch - U3 port 0 lid 3
[4] " H-0005ad0000011310" [1]
[3] "S-0005ad00000161b6" [1]
[2] "S-0005ad00000161b6" [2]
[1] "S-0005ad00000161b8" [3]
[5] "S-0008f10400411ef8" [12]
.
.
.
vendid=0x2c9
devid=0x6274
sysimgguid=0x1b00000ca72633
caguid=0x1b00000ca72630
Ca 1 "H-001b00000ca72630" # 4x DDR IB 10-Port PCIe Network
ExpressModule
[1] "S-0008f10400411ef8" [7] # lid 68 lmc 0n
```

---

**Note** – The output from `ibnetdiscover` can be lengthy in a large IB fabric.

---

---

## 3.2 Running OpenSM

In the InfiniBand architecture, a subnet manager (SM) is required for the InfiniBand fabric to function properly. The SM discovers all the nodes on the fabric and assigns the local identifiers (LIDs) in the HCAs. The subnet manager also sets up the routing tables in the switches to support routing packets between nodes.

To meet these needs, OFED and the CentOS supply OpenSM, an open source subnet manager. OpenSM can initialize and configure the subnet as well as keep the subnet operational when the network topology and nodes change. OpenSM runs as a system daemon on at least one of the host machines in the InfiniBand fabric.

The OpenSM application also contains the subnet administrator (SA), an associated component that acts like a database and can be affected by end node requests. OpenSM supports querying as well as event forwarding. Applications send queries to the SA to discover the path records for remote nodes, which are needed to establish connections between endpoints on the fabric.

---

**Note** – Two instances of OpenSM running concurrently on the same port will result in a system crash.

---

For more information on OpenSM, see the README file for OFED on CentOS.

# Internet Protocol Over InfiniBand

---

This chapter describes configuration aspects of running the Internet Protocol over InfiniBand (IPoIB) and contains the following section:

- [Section 4.1, “Configuring IPoIB on Linux” on page 4-1](#)

---

## 4.1 Configuring IPoIB on Linux

You might decide to change your IPoIB configuration for a variety of reasons, including the installation of an additional IB NEM.

## 4.1.1 Install IPoIB Driver

1. Determine whether the IPoIB driver is already installed by entering the `lsmod | grep ib` command.

The output from this command shows all the IB drivers.

In the following sample output, note that the driver, `ib_ipoib`, is not listed.

```
> lsmod | grep ib
ib_sdp                45340 0
rdma_cm               26760 1 ib_sdp
ib_addr              10504 1 rdma_cm
ib_local_sa          14232 1 rdma_cm
findx                 6528 1 ib_local_sa
ib_ipath              70552 0
ipath_core            179652 1 ib_ipath
ib_mthca              139184 0
ib_uverbs             47536 0
ib_umad               19888 0
ib_ucm                21512 0
ib_sa                 18196 2 rdma_cm,ib_local_sa
ib_cm                 39952 2 rdma_cm,ib_ucm
ib_mad                43176 5 ib_local_sa,ib_mthca,ib_umad,ib_sa,ib_cm
ib_core               59520 11
ib_sdp,rdma_cm,ib_local_sa,ib_ipath,ib_mthca,ib_uverbs,ib_umad,
ib_ucm,ib_sa,ib_cm,ib_mad
```

2. To install the IPoIB driver, enter the `modprobe` command:

```
> modprobe ib_ipoib
```

3. Enter the `lsmod | grep ib` command again.

Note that `ib_ipoib` is now listed.

```
> lsmod | grep ib
ib_ipoib              59800 0
ib_sdp                45340 0
rdma_cm               26760 1 ib_sdp
ib_addr              10504 1 rdma_cm
ib_local_sa          14232 1 rdma_cm
.
.
.
ib_core               59520 11
ib_sdp,rdma_cm,ib_local_sa,ib_ipath,ib_mthca,ib_uverbs,ib_umad,
ib_ucm,ib_sa,ib_cm,ib_mad
```

#### 4. Enter the `ifconfig` command to check for network interface `ib0`.

```
> ifconfig ib0
ib0      Link
encap:UNSPEC HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
-00
        BROADCAST MULTICAST MTU:2044 Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:128
        RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

Network interface `ib0` is present but has no valid IP address.

To assign an address, see [Section 4.1.2, “Change IPoIB Configuration Without Rebooting”](#) on page 4-3.

## 4.1.2 Change IPoIB Configuration Without Rebooting

#### 1. Start the InfiniBand IP network by entering the `ifconfig` command and assigning a valid IP address for `ib0`.

```
> ifconfig ib0 10.0.0.50/24
ib0      Link
encap:UNSPEC HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
-00
        inet
addr:10.0.0.50 Bcast: 10.0.0.255 Mask:255.255.255.0
        UP BROADCAST RUNNING MULTICAST MTU:2044 Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:128
        RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

If `ib0` were unconfigured, it would appear without an IP address as shown in the following output.

```
> ifconfig ib0
ib0      Link encap:UNSPEC HWaddr
00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
        BROADCAST MULTICAST MTU:2044 Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:128
        RX bytes:0 (0.0 b) TX bytes:0 ( 0.0 b)
```

**2. Enter the `route` command to verify that the 10.0.0 subnet is available.**

The following output shows subnet 10.0.0 present and routed through ib0.

```
> route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Ifa
ce
10.0.0.0 * 255.255.255.0 U 0 0 0 ib0
10.8.134.0 * 255.255.255.0 0 0 0 eth
0
169.254.0.0 * 255.255.0.0 U 0 0 0 eth
0
default ban3rtr0d0 0.0.0.0 UG 0 0 0 eth
0
```

**3. As shown in the following example, you can enter the `ping` command to see another IPoIB node on the 10.0.0 subnet:**

```
> ping 10.0.0.79
PING 10.0.0.79 (10.0.0.79) 56(84) bytes of data.
64 bytes from 10.0.0.79: icmp_seq=0 ttl=255 time=1.82 ms
64 bytes from 10.0.0.79: icmp_seq=1 ttl=255 time=0.082 ms
64 bytes from 10.0.0.79: icmp_seq=2 ttl=255 time= 0.062 ms

--- 10.0.0.79 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2001ms
rtt min/avg/max/mdev = 0.062/0.655/1.823/0.825 ms, pipe 2
```

At this point, the IPoIB network is active and properly configured without rebooting.

## 4.1.3 Change IB Startup Behavior on Linux

To change the InfiniBand startup behavior, edit the `openib.conf` configuration file (full path: `/etc/infiniband/openib.conf`).

In the following example, `openib.conf` specifies that whenever the system boots, the InfiniBand services, IPoIB, and the SDP IP service are to start up automatically (`ONBOOT=yes`, `IPOIB_LOAD=yes`, `SDP_LOAD=yes`). However, `openib.conf` specifies that the SRP service is *not* to start up automatically (`SRP_LOAD=no`). You can alter any and all of these parameters.



## 1. Edit `ipoib.conf`.

```
# Start HCA driver upon boot
ONBOOT=yes
# Load UCM module
UCM_LOAD=no
# Load RDMA_CM module
RDMA_CM_LOAD=no
# Load RDMA_UCM module
RDMA_UCM_LOAD=no
# Load MTHCA
MTHCA_LOAD=yes
# Load IPATH
IPATH_LOAD=yes
# Load IPoIB
IPOIB_LOAD=yes
# Load SDP module
SDP_LOAD=yes
# Load SRP module
SRP_LOAD=no
# Load RDS module
RDS_LOAD=no
```

## 2. Create or edit the `ifcfg-ibn` file to configure an individual network interface.

For each InfiniBand network interface, you need a corresponding `/etc/sysconfig/network-scripts/` startup file (`ifcfg-ib0`). As an example, the startup file for `ib0`, might look something like the following.

```
more /etc/sysconfig/network-scripts/ifcfg-ib0
DEVICE=ib0
BOOTPROTO=static
IPADDR=10.0.0.50
NETMASK=255.255.255.0
NETWORK=10.0.0.0
BROADCAST=10.0.0.255
ONBOOT=yes
```

The `ONBOOT=yes` parameter indicates that the corresponding IP network interface is to automatically start up when the system boots. Specifying `ONBOOT=no` will "configure" the interface but not start it.

Generally, if you have enabled IPoIB services, the IB stack installation scripts automatically create the `ifcfg-ibn` configuration files for all IB network interfaces present. If you install a NEM *after* you have installed the IB stack, you need to manually create the `ifcfg-ibn` files for the newly installed network interfaces.



# Updating the Sun Blade 6048 Switched InfiniBand Network ExpressModule Firmware

---

This chapter provides information on updating the IB NEM firmware on Linux.

Consult the *Sun Blade 6048 Series Product Notes* for the most recent information about the availability of firmware updates.

This chapter contains the following sections:

- [Section 5.1, “Updating IB NEM Firmware for Linux” on page 5-1](#)

---

## 5.1 Updating IB NEM Firmware for Linux

The firmware version on your IB NEM should be ready to use and should not require updating. However, if you want to update the firmware for any reason, you need to use vendor-specific and (generally) OS-specific firmware updating tools.

For Linux (CentOS Release 4.4 (Final) or later), use the OFED `mstflint` tool to load new IB NEM firmware. The tool, `mstflint`, is available both as part of the bundled software and from the standard OFED stack.

Installed by default, `mstflint` is similar to the Mellanox `flint` tool with the following exception. You must identify the IB NEM in the PCI `bus:dev.fun` format to satisfy the `mstflint` command `-d` device syntax requirement.

## 5.1.1 Update IB NEM Firmware for Linux

### 1. Enter the `lspci` command to identify the IB NEM.

In the following example, the IB NEM (Mellanox InfiniBand: Mellanox Technologies) is configured as PCI bus number 81, device 00, function 0 (81:00.0), which is NEM slot 1 in a Sun Blade 6048 Modular System. On your system, you might see a different designation for the IB NEM.

```
> lspci
...
80:0e.0 PCI bridge: nVidia Corporation CK804 PCIE Bridge (rev a3)
81:00.0 InfiniBand: Mellanox Technologies MT25204 [InfiniBand:
Mellanox Technologies] (rev 20)
```

### 2. Enter the `mstflint -d` command in the `bus:dev.fun` format.

```
> mstflint -d 81:00.0 -i ibnem.bin burn
Current FW version on flash: 1.1.0
New FW version: 1.2.100

Burn image with the following GUIDs:
  Current GUIDs are:
    Node: 001b00000ca72680
    Port1: 001b00000ca72681
    Sys.Image: 01b00000ca72683

Read and verify Invariant Sector - OK
Read and verify PPS/SPS on flash - OK
Burning second FW image without signatures - OK
Restoring second signature -OK

Do you want to continue ? (y/n) [n] : y
```

---

**Note** – The GUIDs you see (Node, Port1, and Sys. Image) during the burn process differs from those shown in the example.

---

### 3. To burn the image, enter `y`.

### 4. As with any IB NEM FLASHRAM update, reset the Server Module (or at least the IB NEM) to load and execute the new firmware image.

5. After resetting the Server Module (or the IB NEM), enter the `ibstat` command to verify the new firmware version.

```
> ibstat
CA 'mthca0'
CA type: MT25204
  Number of ports: 1
  Firmware version: 1.1.0
  Hardware version: a0
  Node GUID: 0x001b00000ca72600
  System image GUID: 0x001b00000ca72603
  Port 1:
    State: Active
    Physical state: LinkUp
    Rate: 20
    Base lid: 70
    LMC: 0
    SM lid: 2
    Capability mask: 0x02510a68
    Port GUID: 0x001b00000ca72601
```

## 5.1.2 Update The IB NEM Integrated Switches' Firmware

Download and install on one node in the fabric the Mellanox Firmware Tools (MFT) that are available from <http://www.mellanox.com/>.

Use the command `install.sh --with-ibspark` to build and install the binary file that you need to update the Infiniscale-III devices.

### 1. Obtain the lids from the fabric for the Infiniscale-III devices.

```
# ibswitches  
Switch : 0x00144fa601e00050 ports 24 "MT47396 Infiniscale-III  
Mellanox Technologies" base port 0 lid 7 lmc 0
```

### 2. Use `ibspark` to update the Infiniscale-III device firmware.

```
# ibspark -d <lid from ibswitches> -i I3_fimrware.img b  
- Checking primary image - OK  
  
Current FW Version: 1.0.0  
New FW Version      1.0.4  
  
- Burning secondary image      - OK  
- Verifying secondary image    - OK  
- Burning primary image        - OK  
- Verifying primary image      - OK
```

# InfiniBand Cables

---

According to the InfiniBand specification, the link must transmit data with a bit error rate (BER) of at least  $10^{-12}$ . The BER can be guaranteed for DDR speed only when recommended cables are used for InfiniBand connections.

This appendix contains the following sections:

- [Section A.1, “Active and Passive DDR Copper Cables” on page A-1](#)

---

## A.1 Active and Passive DDR Copper Cables

The following table contains the list of recommended active and passive copper cables for the IB NEM.

**TABLE A-1** Active and Passive DDR Copper Cables

| Length and Type               | Part #    |
|-------------------------------|-----------|
| 3m Straight Through (Passive) | X2780-3M  |
| 5m Straight Through (Passive) | X2780-5M  |
| 7m Straight Through (Active)  | X2780-7M  |
| 11m Straight Through (Active) | X2780-11M |
| 15m Straight Through (Active) | X2780-15M |
| 8m DDR Splitter               | X2781-8M  |
| 12m DDR Splitter              | X2781-12M |
| 16m DDR Splitter              | X2781-16M |





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