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InfiniScale® III 16+8 Port 20Gb/s InfiniBand Switch for Dell PowerEdge M1000e-series Blade Enclosures User Manual

PN: M2401G

Rev 1.7

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InfiniScale® III 16+8 Port 20Gb/s InfiniBand Switch for Dell PowerEdge M1000e-series Blade Enclosures User Manual

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About this Manual

This manual describes the installation and basic use of the Mellanox M2401G 16+8 Port 20Gb/s InfiniBand Switch for Dell PowerEdge M1000e-series Blade Enclosures.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up the switch platforms listed above.

The manual assumes familiarity with the InfiniBand® Architecture Specification.

Related Documentation

The documentation set accompanying the Mellanox M2401G includes the following:

Table 1 - Reference Documents

<i>InfiniBand Architecture Specification Volume 1 Release 1.2.1 and Volume 2 release 1.2.1</i>	InfiniBand architecture specification descriptions
<i>Mellanox OFED Stack</i>	The Mellanox OFED stack provides a tool set to manage InfiniBand fabric clusters. The stack with user's manual can be downloaded at: http://www.mellanox.com > Downloads > InfiniBand SW/Drivers, Be sure to download the stack that matches your OS.
<i>Mellanox Firmware Tools (MFT) User's Manual Document # 2329</i>	The MFT (Mellanox Firmware Tools) package is a set of firmware tools. The manual supplied with this package provides an overview of the firmware its installation and replacement. The MFT can be downloaded with its documentation at: http://www.mellanox.com > Downloads > Firmware Tools

Online Resources

- Mellanox Technologies Web pages: <http://www.mellanox.com>
- Dell Support Web pages: <http://support.dell.com>

Conventions

Throughout this manual, the name M2401G and the term switch are used to describe the 16+8 port 20Gb/s InfiniBand switch for the Dell M1000e, unless explicitly indicated otherwise.

Revision History

Table 2 - Revision History Table

Date	Revision	Description
Mar. 2009	Rev 1.7	Added Dell flat black Logo
Dec. 2008	Rev 1.6	Minor fixes to Rev 1.5
Dec. 2008	Rev 1.5	Minor fixes to Rev 1.4 Added Instructions for Reprogramming Over the InfiniBand Network
Nov. 2008	Rev 1.4	Added Dell logo and Dell 3rd party info statement Replaced Mellanox address Fixed Links to new web site
Aug. 2008	Rev 1.3	Added Certs and Link to FW
Aug. 2008	Rev 1.2	Added appendix with safety warnings in French for Canada Certification
July 2008	Rev 1.1	Fixed Max Ambient Temperature
June 2008	Rev 1.0	First Draft

1 Overview

The Mellanox M2401G 20Gb/s InfiniBand Switch Blade for Dell PowerEdge M1000e-series Blade Enclosures provides a high bandwidth, low latency, low power fabric for Enterprise Data Center and High-Performance Computing environments. Based on the third generation InfiniScale® III InfiniBand switch device, the platform delivers an ideal balance between cost and performance. When used in conjunction with ConnectX® InfiniBand dual port I/O cards clustered data bases, parallelized applications and transactional services applications will achieve significant performance improvements resulting in reduced completion time and lower cost per operation.

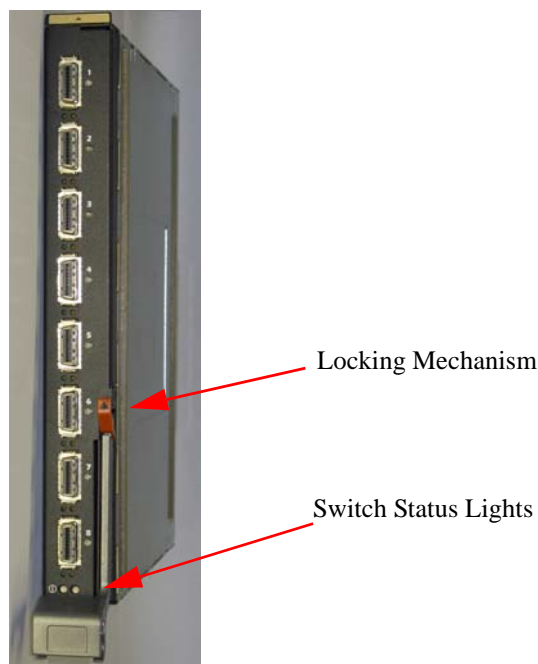
The switch platform comes pre-installed with all necessary firmware, and configured for standard operation within an InfiniBand fabric, and requires an InfiniBand compliant Subnet Manager running from one of the hosts. All that is required for normal operation is to follow the usual precautions for installation and connection from the switch to the HCAs or other switches. Once connected, the Subnet Management software automatically configures and begins utilizing the switch.

It is recommended that Mellanox OpenFabrics software package be installed on all nodes connected to the M2401G. The software package provides a subnet manager and network management tools as well as connectivity software for servers and storage, and is available on the Mellanox web site. See “Cluster Management and Firmware” on page 14. for more information.

Basic installation, hot-swapping components and hardware maintenance is covered in “**Installation and Basic Operation**” on page 9.

The M2401G switch has a Hot Swap controller and a PSOC Management IC.

Figure 1: Switch Front Panel and Locking Mechanism



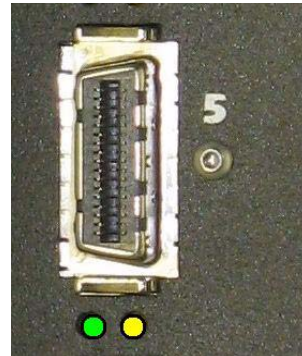
1.1 InfiniBand Connectors

InfiniBand connectivity has 8 microGiGa connectors through the front panel. The remaining 16 interfaces are through the AirMax Midplane Connector out the back of the switch. Figure 1 shows the front 8 ports.

Each of the InfiniBand ports has two LEDs located next to the connector. The green LED, when lit, indicates that a valid physical connection to the other system (switch or HCA port) exists. The yellow LED when lit, indicates that the Subnet Manager is running and a valid data link exists. The yellow LED illuminates when the InfiniBand network is discovered over the physical link. A valid data activity link without data transfer is designated by a constant yellow LED indication. A valid data activity link with data transfer is designated by a blinking yellow LED indication. If the LEDs are not active, either the physical link or the logical link (or both) connections have not been established.

Figure 2: Physical and Logical Link Indication LEDs

LED Name	Connection Status
Physical Link - Green	Off – No Physical Link ON – Physical Link
Data Activity - Yellow	Blinking – indicates Data Transfer Constant on – indicates Link exists with no Data Transfer taking place Off with green LED lit – indicates that the Subnet Manager may not be running



1.2 Switch Status Lights

The switch Status lights indicate whether the switch is receiving power from the chassis, and the state of the switch.

Figure 3: Indicator LEDs

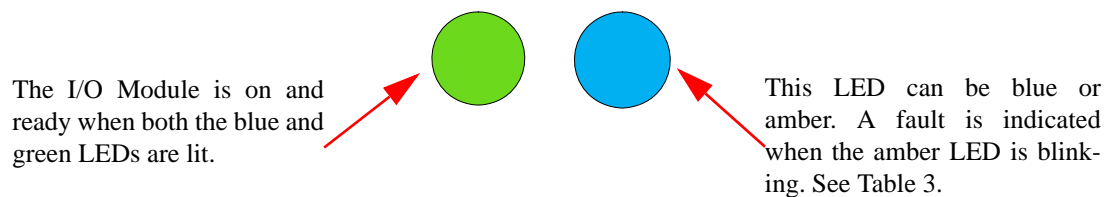








Table 3 - IOM states and LED configurations:

LED			Switch Status
Indication	Green	Status	
	OFF	OFF	OFF
	ON	OFF	Boot in Progress Switch not ready
 Blinking Blue	ON	BLINKING BLUE	The CMC is identifying the newly installed switch
	ON	ON BLUE	Switch is on and operating Normally
	ON	ON or BLINKING AMBER	Fault in System Self-diagnosed
	OFF	ON or BLINKING AMBER	Fault in System CMC-detected

2 Installation and Basic Operation

Installation and initialization of the switch platform are straightforward processes, requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment. The switch platform does not require any programming or configuration to operate as a basic InfiniBand switch and includes all of the necessary functionality to operate with external standard InfiniBand Subnet Management software.

This section describes the installation process and basic operation of the switch platform. Please first read the warnings sub-section carefully before carrying on with installation procedures.



Suitable electrical, mechanical and fire enclosure shall be provided by the end user.

2.1 Installation Safety Warnings

1. Installation Instructions

Read all installation instructions before connecting the equipment to the power source.



2. Over-temperature

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: °C (°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.



3. Stacking the Chassis

The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.



4. During Lightning - Electrical Hazard

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.



5. Copper InfiniBand Cable Connecting/Disconnecting

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings and instructions.



6. Rack Mounting and Servicing

When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.



7. Equipment Installation

This equipment should be installed, replaced, or serviced only by trained and qualified personnel.



8. Equipment Disposal



Disposal of this equipment should be in accordance to all national laws and regulations.

9. Local and National Electrical Codes

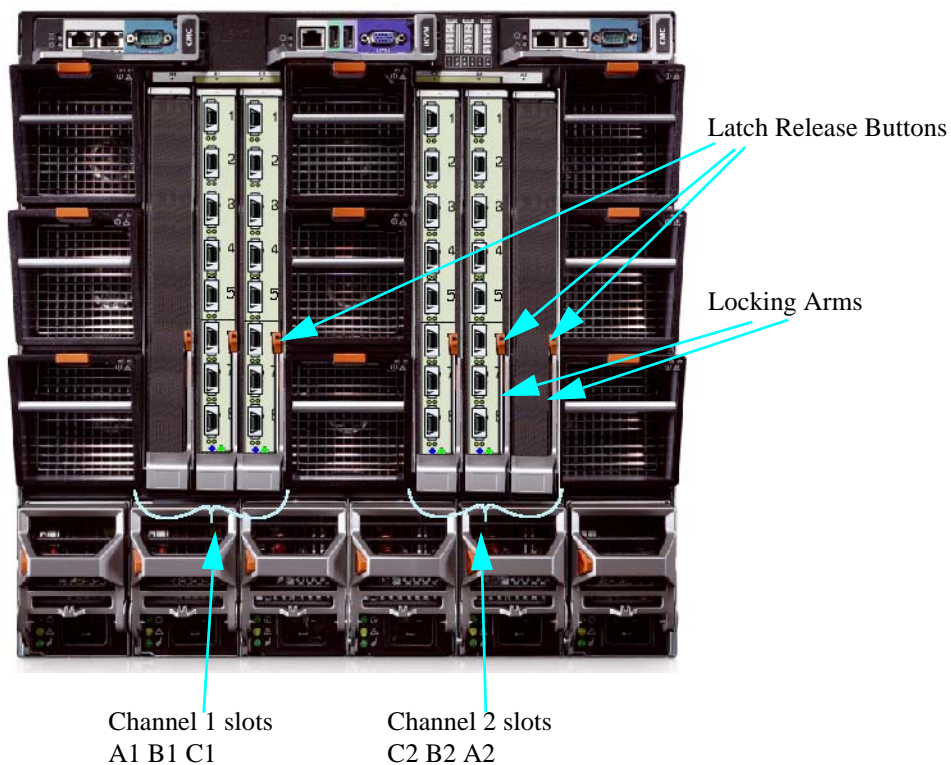


This equipment should be installed in compliance with local and national electrical codes.

2.2 Mechanical Installation

These switches are hot pluggable. It is not necessary to power down the Dell Chassis to install a new switch or to replace an old switch with a new one.

Figure 4: Rear View of the Dell PowerEdge M1000e Chassis



Note: M2401G blades are not allowed in the Fabric A slots.

2.2.1 Removing an Old Switch From the Chassis

1. Remove any locking cables or screws that secure the old switch into the chassis.
2. Disconnect all of the InfiniBand cables from the front of the switch to be removed.

3. Unlock the switch from the chassis by pushing the red latch release button.
4. Pull the locking arm down to a position perpendicular to the front of the chassis.
5. Pull the switch out of the chassis using the locking arm.
6. Install either a new switch or a blank IOM within one minute.

2.2.2 Removing a Blank Cover Plate From the Chassis

1. Remove any locking cables or screws that secure the blank cover plate into the chassis.
2. Unlock the blank cover plate by pushing the red latch release button.
3. Pull the locking arm down to a position perpendicular to the front of the chassis.
4. Pull the cover plate out of the chassis using the locking arm.
5. Install either a new switch or reinstall a blank IOM within one minute.

2.2.3 Installing the Mellanox M2401G Switch Into the Dell Chassis

Note: Make sure the Chassis is stable on a solid floor and that the Chassis is filled from the bottom up. This will keep the center of gravity as low as possible reducing risk of tipping.

Note: The M2401G IOMs are only to be installed in Fabric B or Fabric C slots, and at least one blade must have a matching ConnectX I/O card installed to support data flow. Within each fabric type, you must install a module in the fabric's channel 1 slot before installing a module in the fabric's channel 2 slot. For example, you must install a module in slot C1 before installing a module in slot C2. Modules may be installed in Fabric B and C independently (you do not need to install modules in Fabric B before installing modules in Fabric C slots). Refer to the Dell PowerEdge M1000e Hardware Owners Manual for more information.

1. Follow the instructions in Section 2.2.1 or Section 2.2.2 to remove an old switch or a Blank cover plate.
2. On the new switch, push the red latch release button.
3. Pull the lever forward until the lever is perpendicular to the front panel.
4. Push the switch into the slot until the latching mechanism is against the bar.
5. Push the lever on the latching mechanism up, making sure that the latching mechanism catches the locking bar. The lever should now be parallel to the front panel.
6. Check the indicator lights to make sure the switch has power.

The installer should use a rack cable to support the mechanical and environmental characteristics of a fully populated switch platform Chassis.



The rack mounting is designed to fit the PowerEdge M1000e Chassis. Take precautions to guarantee proper ventilation for air intake at the front of the chassis and exhaust at the rear in order to maintain good airflow at ambient temperature. Cable routing in particular should not impede the air exhaust from the chassis.

2.3 Power Connections and Initial Power On

Caution: The switch platform will automatically power up when AC power is applied. There is no power switch. Immediately upon closing the latching mechanism check to make sure that the green switch LED is lit.

2.4 InfiniBand Cable Installation

All cables can be inserted or removed with the unit power on. To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The green LED indicator below each port will light when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with a functioning port plugged into the other end of the connector). After plugging in a cable, lock the connector using the latching mechanism particular to the cable vendor. The yellow LED will light if the subnet manager is running (non blinking indicating that no data is being transferred yet). When a logical connection is made the yellow LED will blink signifying data is being transferred.

To remove, disengage the locks and slowly pull the connector away from the port receptacle. Both LED indicators will turn off when the cable is unseated.

Care should be taken not to impede the air exhaust flow through the chassis.

Note: Cable lengths should be used which allow for routing horizontally around to the side of the chassis before bending upward or downward in the rack.

3 Cluster Management and Firmware

3.1 Network Management and Clustering Software

Download and install, on all nodes, the Mellanox OpenFabric software package for Linux, Windows, or other operating systems from the Mellanox software website:

<http://www.mellanox.com> > Downloads > InfiniBand SW/Drivers

This software package provides connectivity for server and storage systems utilizing High Performance Computing (HPC) or enterprise data center (EDC) applications across an InfiniBand fabric. It also provides a Subnet Manager for simple network configuration and network administration and diagnostic tools for network management.

3.2 Updating Firmware

The switch is delivered with the latest Firmware available at the time of production. New firmware versions will be posted on the Mellanox firmware download page. Firmware can be updated in-band using the Mellanox Firmware Tools (MFT).

You will need the Mellanox Firmware Tools package available in MLNX_OFED to update firmware for this switch. It also can be downloaded from:

<http://www.mellanox.com> > Downloads > Firmware Tools

The latest firmware can be found at:

<http://www.mellanox.com> >Support >Dell

3.2.1 Instructions for Reprogramming Over the InfiniBand Network

To update an MT47396 InfiniScale III switch devices having a specific GUID (for example, 0x00000006660abcd0) or LID, the following are the recommended steps to update the device firmware.

1. Make sure all subnet ports are in the active state. One way to check this is to run opensm, the Subnet Manager.

```
[root@mymach]> /etc/init.d/opensmd start
opensm start      [ OK ]
```

2. Make sure the local ports are active by running 'ibv_devinfo'.

3. Obtain the device LID. There are two ways to do that:

I. Using the “mst ib add” command:

The “mst ib add” runs the ibdiagnet tool to discover the InfiniBand fabric and then lists the discovered IB nodes as an mst device under /dev/mst/ directory. These devices can be used for access by other MFT tools.

```
[root@mymach]> mst ib add
-I- Running ibdiagnet to discover the fabric ...
Loading IBDIAGNET from: /usr/local/lib/ibdiagnet1.2
-W- Topology file is not specified.
```

```

    Reports regarding cluster links will use direct routes.
Loading IBDM from: /usr/local/lib/ibdm1.2
-I- Using port 1 as the local port.
-I- Discovering ... 3 nodes (2 Switches & 1 CA-s) discovered.
-I-----
-I- Bad GUIDs/LIDs Info
-I-----
-I- skip option set. no report will be issued
-I-----
-I- Links With Logical State = INIT
-I-----
-I- skip option set. no report will be issued
-I-----
-I- PM Counters Info
-I-----
-I- skip option set. no report will be issued
-I-----
-I- Fabric Partitions Report (see ibdiagnet.pkey for a full hosts list)
-I-----
-I- skip option set. no report will be issued
-I-----
-I- IPoIB Subnets Check
-I-----32
-I- skip option set. no report will be issued

-I-----
-I- Bad Links Info
-I-----
-I- No bad link were found
-----
-I- Stages Status Report:
    STAGE                Errors  Warnings
    Bad GUIDs/LIDs Check    0      0
    Link State Active Check  0      0
    Performance Counters Report  0      0
    Partitions Check        0      0
    IPoIB Subnets Check    0      0
Please see /tmp/ibdiagnet.log for complete log
-----
-I- Done. Run time was 1 seconds.
-I- Added 3 in-band devices
[root@mymach]>

```

To list the discovered mst inband devices run “mst status”.

```

[root@mymach]> mst status
MST modules:
-----
    MST PCI module loaded
    MST PCI configuration module loaded
...
Inband devices:
-----
/dev/mst/CA_MT25418_sw005_HCA-1_lid-0x0001
/dev/mst/SW_MT47396_lid-0x0011
/dev/mst/SW_MT48438_lid-0x0003
[root@mymach]>

```

II. Using the ibnetdiscover tool:

Run:

```
[root@mymach]# ibnetdiscover | grep 00000006660abcd0 | grep -w Switch
Switch 24 "S-00000006660abcd0" "MT47396 Infiniscale-III Mellanox Technologies"
base port 0 lid 17 lmc 0
```

Note: The resulting LID is given as a decimal number.

4. Run mlxburn with the LID retrieved in step #3 above to perform the In-Band burning operation.

Burn the InfiniScale III switch:

```
[root@mymach]> mlxburn -dev /dev/mst/SW_MT47396_lid-0x0011 -fw ./IS3FW.BIN
-I- Reading PSID from board
-I- Using auto detected configuration file ./MT34000LE-A00.INI (PSID =
MT_0070000001)
-I- Generating image ... MFT User's Manual
33
Rev 1.01 Mellanox Technologies
- Checking primary image - OK
  Current FW Version: 1.0.0
  New FW Version: 1.0.0
- Burning secondary image - OK
- Verifying secondary image - OK
- Burning primary image - OK
- Verifying primary image - OK
-I- Image burn completed successfully.
```


4 Troubleshooting

As soon as a switch is plugged in make sure that the power LED comes on.

The power LED for the switch does not come on:

1. Check that the chassis has power.
2. Remove and reinstall the switch.

The status LED for the switch is blinking amber:

1. remove the switch from the chassis and re-insert it (verify that the switch is all the way in the chassis and the lever is firmly closed).
2. If the amber LED continues to blink, replace the switch.

The link LED for the InfiniBand connector does not come on:

1. Check that both ends of the cable are connected.
2. Check that the locks on the ends are secured.
3. Make sure that the latest FW version is installed on both the I/O card and the switch.
4. Make sure that at least one blade has a matching I/O card installed to support data flow.
5. If media adapters are used check that the all connections are good, tight, and secure.

The activity LED does not come on:

Check that the Subnet Manager has been started.

The power LED for the switch shuts off:

1. Check that there is adequate ventilation.
2. Make sure that there is nothing blocking the front or rear ventilation openings of the chassis.

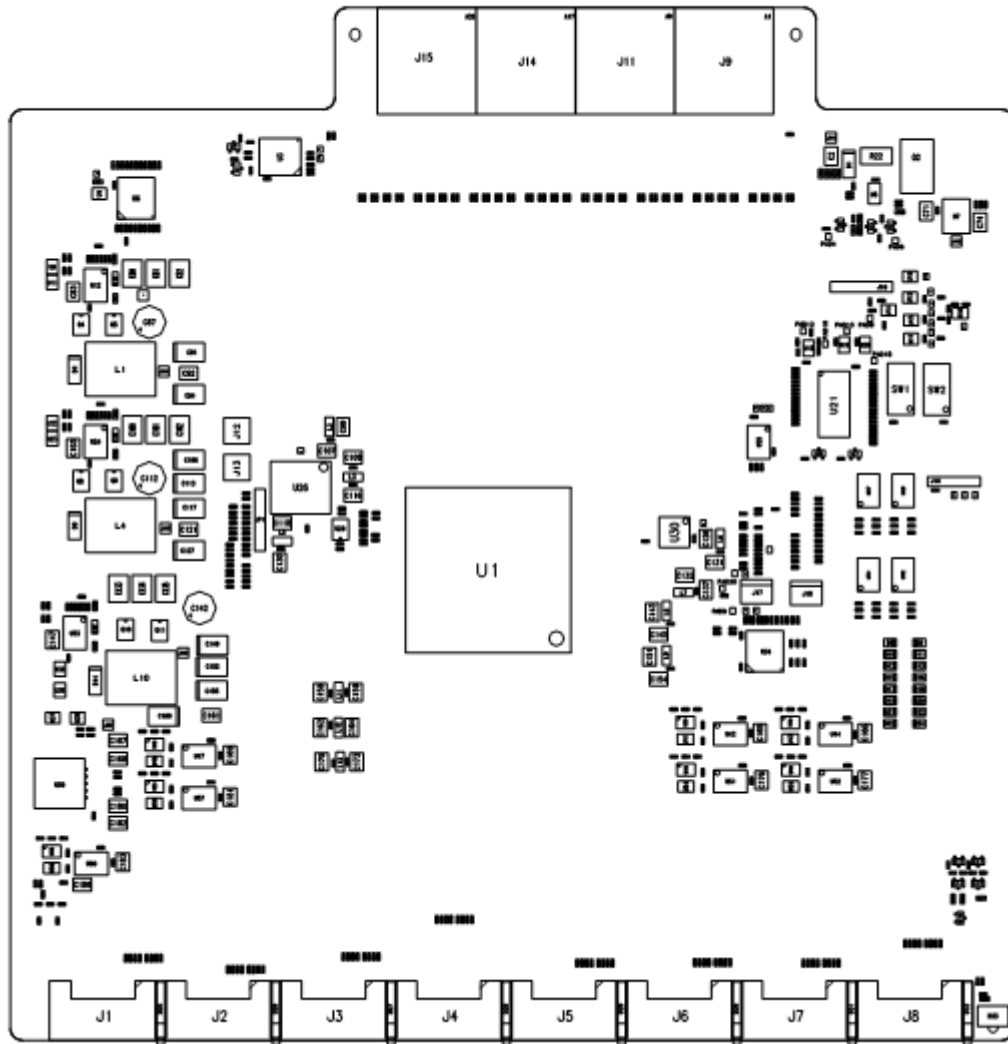
Appendix A: Specifications

Table 4 - M2401G Specification Data

Physical		Power and Environmental	
H x W x D:	1.16 x 10.04 inches 272.50 x 29.45 x 255.20 mm	Maximum Power:	50W
Weight:	1.5 Kg fully configured	Dissipated Power:	33.5W
Mounting:	Vertically mounted rack	Power through connector:	1.65 W per port
SerDes Speeds	10, 20 Gb/s per port	Temperature:	0° to 45° Celsius
Connectors:	microGiGaCN 8 external CX4 connectors 4x4 internal backplane connectors	Humidity:	10% - 90% non-condensing
		Altitude:	
		Shock:	
		Vibration:	
Protocol Support		Regulatory Compliance	
InfiniBand:	Auto-Negotiation of 10Gb/s or 20Gb/s	Safety:	US/Canada: cTUVus EU: IEC60950 International: CB
QoS:	8 InfiniBand Virtual Lanes for all ports	EMC:	USA: FCC, Class A Canada: ICES, Class A EU: CE Mark (EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3) Japan: VCCI, Class A Korea: RRL (MIC), Class A Australia/New Zealand: C-Tick Class A
Management:	Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management	ENVIRONMENTAL	EU: IEC 60068-2-64: Random Vibration EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test
Scalability and Performance		Reliability, Availability and Serviceability Features	
Switching Performance:	Simultaneous wire-speed any port to any port		
Addressing:	48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet		
Switching Capacity	960 Gb/s		

Appendix B: Mechanical Drawing

Figure 4 Mechanical Drawing of the Switch



Appendix C: EMC Certification Statements

C.1: FCC Statements (USA)

Class A Statements:

§ 15.21

Statement

Warning! Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Mellanox Technologies) could void the user's authority to operate the equipment.

§15.105(a)

Statement

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 not installed and used in accordance with the instruction manual, 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.

C.1.1 EN Statements (Europe)

EN55022 Class A Statement:

Warning! This is a class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

C.1.2 ICES Statements (Canada)

Class A Statement:

**“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.”**

C.1.3 VCCI Statements (Japan)

Class A Statement:

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。

(Translation - "This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.")

C.1.4 MIC Certification (Korea)

Korea's "Regulation for Certification of Information and Communication Equipment," requires EMC testing and certification for many electronic products. Korean EMC certifications are issued by Radio Research Laboratory (RRL), which is organized under the Ministry of Information and Communications (MIC). EMC testing includes electromagnetic emissions (EMI) and susceptibility (EMS). Certified equipment is labeled with the MIC mark and certification number.

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Translation:

Class A Device This device is registered for EMC requirements for industrial use. The seller or buyer should be aware of this. If this type was sold or purchased by mistake, it should be replaced with a residential-use type.

Appendix D: InfiniBand Connector Pinout

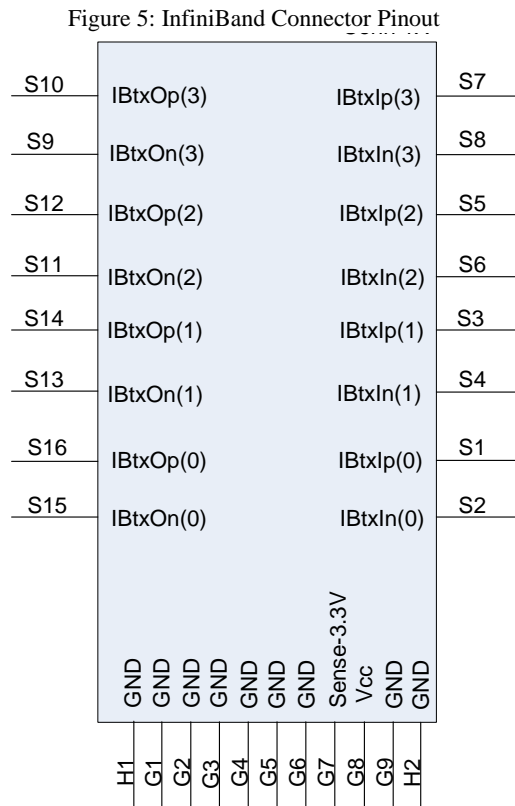


Table 5 - Connector Pin to Signal Name Correspondence

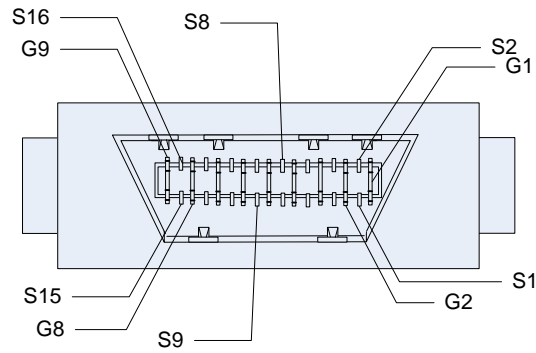
Connector Pin Number	Connector Pin Name	Signal Name
S1	IBtxIp(0)	IB_Px_R1_P
S2	IBtxIn(0)	IB_Px_R1_N
S3	IBtxIp(1)	IB_Px_R2_P
S4	IBtxIn(1)	IB_Px_R2_N
S5	IBtxIp(2)	IB_Px_R3_P
S6	IBtxIn(2)	IB_Px_R3_N
S7	IBtxIp(3)	IB_Px_R4_P
S8	IBtxIn(3)	IB_Px_R4_N
S9	IBtxOn(3)	IB_Px_T4_N
S10	IBtxOp(3)	IB_Px_T4_P
S11	IBtxOn(2)	IB_Px_T3_N

Table 5 - Connector Pin to Signal Name Correspondence

Connector Pin Number	Connector Pin Name	Signal Name
S12	IBtxOp(2)	IB_Px_T3_P
S13	IBtxOn(1)	IB_Px_T2_N
S14	IBtxOp(1)	IB_Px_T2_P
S15	IBtxOn(0)	IB_Px_T1_N
S16	IBtxOp(0)	IB_Px_T1_P
G1-G6, G9, H1-H2	Signal Ground	
G7	Sense-3.3V	
G8	Vcc	

Px in the signal name signifies Port # x. This switch has 8 external ports.

Figure 6: Pinout Connector View



Appendix E: Avertissements de sécurité d'installation

1. Instructions d'installation



Lisez toutes les instructions d'installation avant de brancher le matériel à la source d'alimentation électrique.

2. Température excessive



Ce matériel ne doit pas fonctionner dans une zone avec une température ambiante dépassant le maximum recommandé de 45°C (113°F). En outre, pour garantir un bon écoulement de l'air, laissez au moins 8 cm (3 pouces) d'espace libre autour des ouvertures de ventilation.

3. Empilage du châssis



Le châssis ne doit pas être empilé sur un autre matériel. Si le châssis tombe, il peut provoquer des blessures corporelles et des dégradations de biens.

4. Orages – dangers électriques



Pendant un orage, il ne faut pas utiliser le matériel et il ne faut pas brancher ou débrancher les câbles.

5. Branchement/débranchement des câbles InfiniBand en cuivre



Les câbles InfiniBand en cuivre sont lourds et ne sont pas flexibles, il faut donc faire très attention en les branchant et en les débranchant des connecteurs. Consultez le fabricant des câbles pour connaître les mises en garde et les instructions spéciales.

6. Montage et entretien sur baie



Lorsque ce produit est monté ou entretenu sur baie, il faut prendre des précautions spéciales pour s'assurer que le système reste stable. En général, il faut remplir la baie avec du matériel de bas en haut.

7. Installation du matériel



Ce matériel ne doit être installé, remplacé ou entretenu que par du personnel formé et qualifié.

8. Elimination du matériel



L'élimination de ce matériel doit s'effectuer dans le respect de toutes les législations et réglementations nationales en vigueur.

9. Codes électriques locaux et nationaux



Ce matériel doit être installé dans le respect des codes électriques locaux et nationaux.

Appendix F: Installation - Sicherheitshinweise

1. Installationsanleitungen



Lesen Sie alle Installationsanleitungen, bevor Sie das Gerät an die Stromversorgung anschließen.

2. Übertemperatur



Dieses Gerät sollte nicht in einem Bereich mit einer Umgebungstemperatur über der maximal empfohlenen Temperatur von 45°C (113°F) betrieben werden. Außerdem sollten mindestens 8 cm (3 in.) Freiraum um die Belüftungsöffnungen sein, um einen einwandfreien Luftstrom zu gewährleisten.

3. Stapeln des Chassis



Das Chassis sollte nicht auf andere Geräte gestapelt werden. Wenn das Chassis herunterfällt, kann es zu Verletzungen und Beschädigungen an Geräten führen.

4. Bei Gewitter - Elektrische Gefahr



Arbeiten Sie während eines Gewitters und Blitzschlag nicht am Gerät, schließen Sie keine Kabel an oder ab.

5. Anschließen/Trennen von InfiniBand-Kupferkabel



InfiniBand-Kupferkabel sind schwer und nicht flexible. Deshalb müssen sie vorsichtig an die Anschlüsse angebracht bzw. davon getrennt werden. Lesen Sie die speziellen Warnungen und Anleitungen des Kabelherstellers.

6. Rack-Montage und Wartung



Wenn dieses Produkt in einem Rack montiert oder gewartet wird, sind besondere Vorsichtsmaßnahmen zu ergreifen, um die Stabilität des Systems zu gewährleisten. Im Allgemeinen sollten Sie das Gestell von unten nach oben mit Geräten füllen.

7. Geräteinstallation



Diese Gerät sollte nur von geschultem und qualifiziertem Personal installiert, ausgetauscht oder gewartet werden.

8. Geräteentsorgung



Die Entsorgung dieses Geräts sollte unter Beachtung aller nationalen Gesetze Bestimmungen erfolgen.

9. Regionale und nationale elektrische Bestimmungen



Dieses Gerät sollte unter Beachtung der regionalen und nationalen elektrischen Bestimmungen installiert werden.