Eight 4X SDR InfiniBand Port Switch Platform User's Manual

Part Number: F-X430066

Rev 1.01

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Revision History

Table 1 - Revision History Table

Revision & Date	Description
1.01 March 2006	Added warnings to Section 2.2.2, "Power Connections and Initial Power On," on page 14
1.00 February 2006	First version

About this Manual

This manual provides an overview of the Eight 4X SDR InfiniBand Port Switch system and guidelines for its operation. Specifically, it covers the following product:

Table 1 - Switch Products Covered in this User's Manual

Product Number	Description
F-X430066	Eight 4X InfiniBand Port Switch Platform

Intended Audience

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

The manual assumes familiarity with the InfiniBand™ architecture specification.

1 Overview

This *User's Manual* provides an overview of the Eight 4X InfiniBand Port Switch System based on Mellanox Technologies' MT43132 InfiniScale switch device.

The switch platform comes pre-installed with all necessary firmware and configuration for standard operation in an InfiniBand fabric running an InfiniBand compliant Subnet Management software in the subnet. All that is required for normal operation is to follow the usual precautions for installation and connection to the fabric. Once connected, the Subnet Management software automatically configures and begins utilizing the switch.

Basic installation and hardware maintenance is covered in "Installation and Basic Operation" on page 12.

Maintenance and configuration of the switch is done In-Band through the InfiniBand fabric using the IBADM tools package. This package provides the ability to monitor the temperature, voltage, port utilization, and other status parameters in the switch. To upgrade switch firmware, the MFT package is required. See "Management Tools Overview" on page 16.

2 Installation and Basic Operation

2.1 Switch Platform Hardware Overview

Figure 1 shows the front and rear panel views of the Eight 4X Ports Switch System, including the I^2C connector and status LEDs.

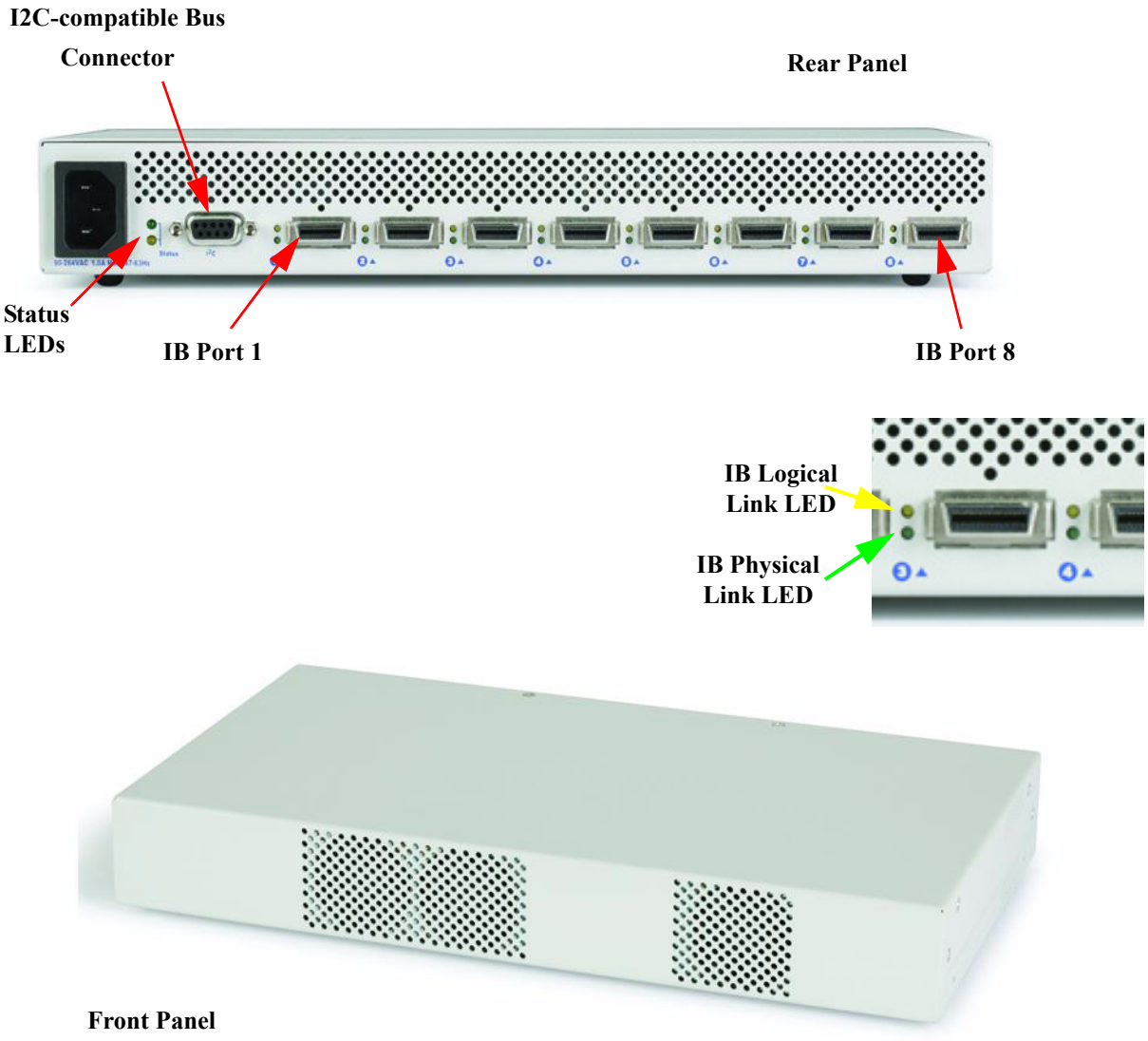


Figure 1: Switch Front and Rear Panels

2.1.1 InfiniBand Connectors

All InfiniBand connectivity is via the rear panel. Figure 1 shows the eight 4X InfiniBand port connectors. Each port also includes power supply functionality to support fiber media adapters.

2.1.2 InfiniBand Port LEDs

Two IB port LEDs are located to the left of each IB port connector on the rear panel (see Figure 1 on page 12). The lower (Green) LED is the IB port Physical link LED, and the upper (Yellow) LED is the IB port Logical link LED (Activity LED).

Physical Link LED (Green) indications:

- Steady On: The Physical link is established
- Off: Physical link error, poor connection quality, or no physical connection

Activity LED (Yellow) indications:

- Steady On: The Logical link is up but there is no data transfer
- Blinking: Data is being transferred to/from the switch port across the cable wires
- Off: The Logical link is down

2.1.3 System Status Indicators

Two system status indicators are located on the left of the rear panel and are labeled "Status" (see Figure 1 on page 12). The following status conditions are possible:

1. **SYSTEM STATUS OK:** Green ON, Yellow OFF
2. **TEMPERATURE ALARM:** Yellow ON
3. **SYSTEM OFF:** Green OFF, Yellow OFF
4. **POWER CIRCUIT ERROR:** Green OFF, Yellow OFF (with the power cord connected to power)

2.1.4 I^2C-compatible Bus Connector

The I^2C-compatible Bus connector is for factory and development use only.

The connector is a female 9 pin D-Type connector. Table 1 shows the pinout functions:

Table 1 - I2C-compatible Bus Connector Pinout Functions

Pin Number	Function
1-5	GND
6	SDA
8	SCL
7, 9	Not Connected

2.2 Switch Platform Installation and 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.

2.2.1 Mechanical Installation

The switch platform is packaged in a 1U chassis. See Table 2, “Switch Platform Mechanical and Environmental Requirements (Worst Case, Fully Populated Chassis)”. If the switch is to be mounted in a standard 19” rack it will require an adapter. Two ear brackets are included (but not assembled) in the packing box of the switch system, which can be assembled on the sides of the chassis acting as the 19” rack adapter, and include rack mounting holes which conform to the IEA-310 standard for such a rack. See “Rack Adapter Installation Instructions” on page 21.

Note: The installer should use a rack cable to support the mechanical and environmental characteristics of a fully populated switch Chassis as listed in Table 2.

Table 2 - Switch Platform Mechanical and Environmental Requirements (Worst Case, Fully Populated Chassis)

Rack Height	Rack Width	Rack Depth	Weight	Power	Ambient Temp.
1U	12.4” (315mm) **w/o Rack Adapter** 19” (EIA-310) (483mm) **w/ Rack Adapter**	6.9” (175mm)	7.7lb (3.5Kg)	45W Single 100-240 VAC 50-60Hz Input	Max: 50ºC Min: 0ºC

Proper ventilation should also be guaranteed 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.

Note that the switch platform can be either front or rear mounted. The notion of “front” and “rear” is arbitrary; however, “rear” is used consistently in this manual to refer to the side of the chassis with the InfiniBand connectors.

2.2.2 Power Connections and Initial Power On

Warning: The switch platform will automatically power on when AC power is applied. There is no power switch. Make sure the power cable is properly plugged into the system before connecting to power.

Warning: The switch platform must be connected to an earthed mains socket-outlet.

Warning: In Norway, this system should be connected to the IT power distribution system *only*.

The input voltage is auto-adjusting for a 100-240 VAC, 50-60Hz power connection. The power cord should be a standard 3-wire AC power cord including a safety ground and rated for 2A or higher.

2.2.3 InfiniBand Copper Cable Installation

The switch platform uses industry standard 4X InfiniBand cables which are available from several vendors. The standard 4X cables support full-duplex 10Gb/s wire speed for all switch platform ports. All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector onto the port receptacle until the connector is firmly seated. The GREEN LED indicator to the left of 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. 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.

Warning:

Care should be taken not to impede the air exhaust flow through the ventilation next to the InfiniBand ports. 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.

2.2.3.1 Cable Length Support And IB Port Configuration

The switch platform is configured to drive cables up-to 20 meters long. This configuration allows maximum flexibility in building a robust IB cluster.

The selected configuration and cables should meet the required BER specified in the *InfiniBand Architecture Specification, Volume 2, release 1.2*.

3 Management Tools Overview

3.1 Updating Firmware

In order to update switch firmware, the MFT tools package is needed by Mellanox Technologies. To download this package, visit http://www.mellanox.com/support/switch_firmware_table.php. Make sure to also download the MFT User's Manual and Release Notes. Specifically, the 'spark' tool of the MFT package is required for firmware updates. Please see the MFT User's Manual for details.

The most updated firmware is also available for download from the same web page above. Please find the 'Custom Switch based on Mellanox's MT43132 InfiniScale switch device' entry in the firmware table.

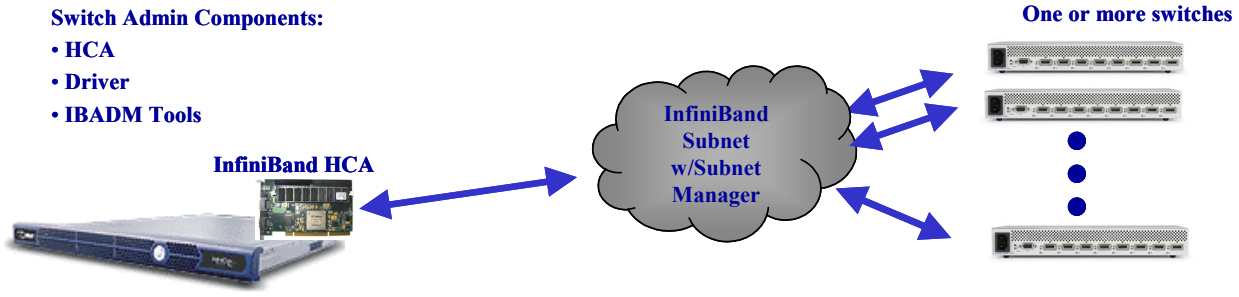
3.2 IB Administration

To monitor status conditions in the switch platform, the IBADM tools package is needed (by Mellanox Technologies). IBADM enables the system administrator to manage one or more switch platforms from a single remote InfiniBand host. The features include the following:

- Full In-Band Management of Multiple Switch and HCA Systems from single host[1]
- Simple default configuration to get started quickly
- Name-based subnet browsing and topology verification
- Event monitoring of port statistics, link status and system status for all ports in the switch
- Checking and updating the firmware
- Intuitive CLI interface
- Extensible and customizable

The figure below shows the default configuration model for these tools:

Figure 2: Default Configuration Model (Example)



1. Firmware updates to this Eight 4X IB Port Switch System cannot be performed using ibfwmgr (the burning tool of IBADM package). See Section 3.1, "Updating Firmware," on page 16.

3.2.1 IBADM Requirements

The general requirements for installing the IBADM software are listed below. Please see the IBADM release notes for details on platform, OS, Driver and Subnet Management support.

1. Computer Platform with an InfiniBand HCA card installed[1]
2. HCA Driver
3. InfiniBand Compliant Subnet Management. The Open Source SM (Eponyms) is supported.

3.2.2 How to Get IBADM

Please visit Mellanox Technologies's Documents Distribution System at http://docs.mellanox.com. The IBADM package is available for download under 'Code Releases/ Tools'. Note that access requires a customer login account. Consult your sales representative for details.

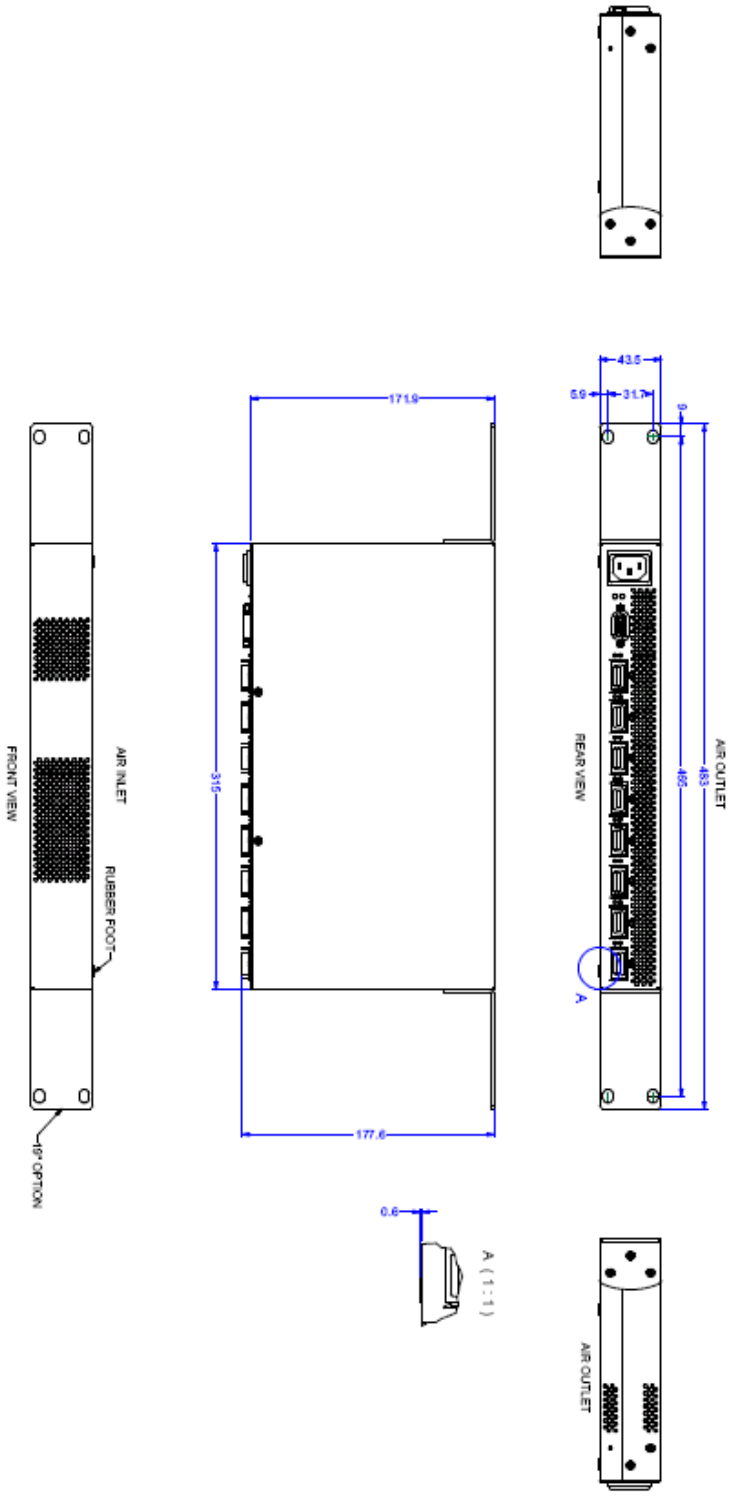
1. Any Mellanox Technologies HCA card can be used. Consult your sales representative for other possibilities.

Appendix A: Specification

Table 3 - Specification Data

Physical		**Power and Environmental**	
Size (HxDxW):	1U x 6.9" x 12.4" (43.6mm x 175mm x 315mm)	Input Voltage:	100-240 VAC 50-60Hz
Size with Rack Adapter	1U x 6.9" x 19" (43.6mm x 175mm x 482.6mm)	Maximum Power:	45W
Weight:	7.7lb (3.5kg)	Ambient Temperature:	0ºC to 50ºC
Mounting:	19" Rackmount	Humidity:	10% - 90% non-condensing
10Gb/s Connector:	InfiniBand	Altitude:	
		Shock:	
		Vibration:	
		Internal Voltage:	+5 VDC
Protocol Support		**Regulatory Compliance**	
InfiniBand:	10Gb/s	**Safety**	
QoS:	8 InfiniBand Virtual Lanes for all ports		
RDMA Support:	Yes, All Ports	**EMC**	
Management:	Performance, and Device management Agents for full InfiniBand In-Band Management		
Scalability and Performance		**Reliability, Availability and Serviceability Features**	
Switching Performance:	Simultaneous wire-speed any port to any port		
	48K Unicast Addresses Max. per Subnet	Hot-Swappable:	None
		N+1 Redundant:	None
Addressing:	16K Multicast Addresses per Subnet		

Appendix B: Mechanical Drawing



Appendix C: Rack Adapter Installation Instructions

C.1 Rack Adapter Assembly Parts

The rack adapter assembly parts are included in the switch packing box and are listed in Table 4:

Table 4 - Rack Adapter Assembly Parts

Item	Quantity	Notes
Mounting Ear	2	See Figure 3
Phillips 100° Flat Head, Passivated Stainless Steel UNC Screw 4-40 x ¼	2	Each mounting ear requires 3 screws. Two additional pairs of screws are to be found assembled on the switch chassis sides.

Figure 3: Switch, Mounting Ears, Screws

C.2 Assembling the Rack Adapter

STEP 1:

Remove the pair of screws from the two sides of the chassis where the rack adapter is to be installed. See Figure 4 on page 22.

Note: The rack adapter can be installed on the sides close to the front panel or to the rear panel.

Figure 4: Rear Panel Side with Ear Screws Removed

STEP 2:

Assemble the rack kit as shown in Figure 5.

Figure 5: Mounting Ear Assembled on Rear Panel Side

See also Figure 6,“View of Rack Adapter Assembled on Rear Panel Sides” and Figure 7, “View of Rack Adapter Assembled on Front Panel Sides,” on page 23.

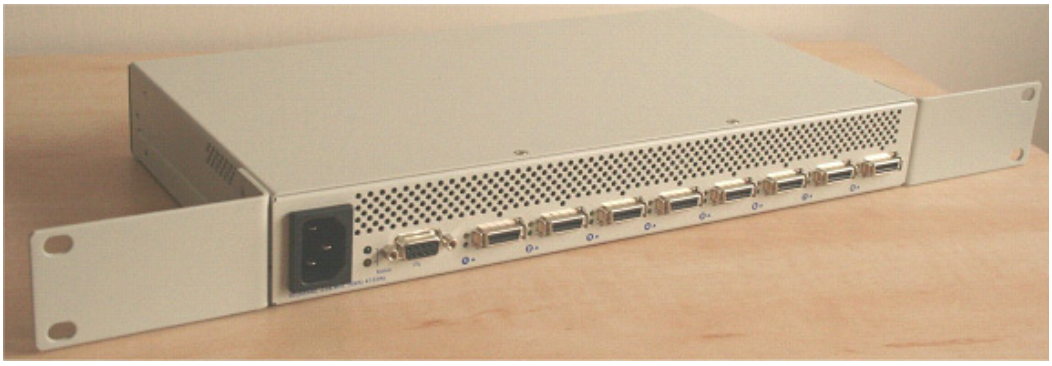


Figure 6: View of Rack Adapter Assembled on Rear Panel Sides

Figure 7: View of Rack Adapter Assembled on Front Panel Sides