ConnectX®-2 VPI Single Port QSFP IB and Ethernet Card User's Manual

P/N: MHQH19B-XTR, MHRH19B-XTR, MHQH19B-XNR
Rev 1.0

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ConnectX-2 VPI Adapter Card User’s Manual

Document Number: 3184

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Revision History

This document was printed on 11/9/09 .

Table 1 - Revision History Table

Date	Rev	Comments/Changes
Nov. 2009	1.0	Initial Release

About this Manual

This *User's Manual* describes Mellanox Technologies ConnectX®-2 IB and Ethernet PCI Express x8 adapter cards. It provides details as to the interfaces of the board, specifications, required software and firmware for operating the board, and relevant documentation.

Intended Audience

This manual is intended for the installer and user of these cards.

The manual assumes basic familiarity with InfiniBand® and Ethernet networks and architecture specifications.

Related Documentation

Table 2 - Documents List

Mellanox Firmware Tools (MFT) User's Manual Document no. 2204UG	User's Manual describing the set of MFT firmware management tools for a single node. See http://www.mellanox.com > Downloads > Firmware Tools
IBTA Specification Release 1.2.1	InfiniBand Architecture Specification
IEEE Std 802.3 Specification	This is the IEEE Ethernet specification http://standards.ieee.org/getieee802
PCI Express 2.0 Specifications	Industry Standard PCI Express 2.0 Card Electromechanical Specification, Rev 1.3.

Online Resources

- Mellanox Technologies Web pages: http://www.mellanox.com
- Mellanox Technologies Firmware download Web page:
  http://www.mellanox.com => Downloads => Firmware

Document Conventions

When discussing memory sizes, MB and MBytes are used in this document to mean size in mega bytes. The use of Mb or Mbits (small b) indicates size in mega bits.

1 Overview

This document is a *User's Manual* for Mellanox Technologies VPI adapter cards based on the ConnectX®-2 integrated circuit device. The cards described in this manual have the following main features:

- IBTA v1.2.1 compliant
- IEEE Std 802.3 compliant
- QSFP port
- Compliant with QSFP MSA spec Rev. 1.0
- Compatible with copper cables and optical cables with the use of QSFP connectors
- PCI Express 2.0 (1.1 compatible) through an x8 edge connector up to 5GT/s
- Media detect circuit' with powered connector support for the use of active cables and external PHY fiber solutions
- EU Restriction of Hazardous Substances (RoHS) compliant
- DDR/QDR:20Gb/s (DDR) or 40Gb/s (QDR)
- 40 Gb/s Ethernet
- Two bracket heights: short or tall

1.1 Adapter Cards

Table 3 lists the VPI adapter cards described in this manual.

Table 3 - VPI Cards

Ordering Part Number (OPN)	PCI Express SERDES Speed	Data Transmis-sion Rate/ # of ports	Short / Tall Bracket	RoHS	Adapter IC Part Number
MHRH19B-XTR	PCIe Gen2 5.0 GT/s	20 Gb/s DDR 1 port	Tall	R-6	MT25408B0-FCCR-SE
MHQH19B-XTR	PCIe Gen2 5.0 GT/s	40 Gb/s QDR 1 port	Tall	R-6	MT25408B0-FCCR-SE
MHQH19B-XNR	PCIe Gen2 5.0 GT/s	40 Gb/s QDR 1 port	Tall	R-6	MT25408B0-FCCR-SE

Figure 1: Component Side [1]

1) The NICs have a similar form and fit. The main visible difference is in the bracket height.
2) These cards are RoHS -R6 compliant (Lead Free).

1.2 Mellanox Part Numbering Legend

Table 4 describes the Mellanox Technologies adapter cards part numbering legend.

Table 4 - Mellanox Cards Part Numbering Key

Adapter Card OPN MHTS#I-XBR	Field	Decoder
M	Mellanox Technolo-gies	
H	Adapter Type	H = InfiniBand Host Channel Adapter, N = Ethernet Network Interface Card,
T	Media	E = CX4 SDR, G = CX4 DDR, J = CX4 QDR, Q = QSFP QDR, R = QSFP DDR, T = UTP, Z = one SFP+ connector and one QSFP connector

Table 4 - Mellanox Cards Part Numbering Key

Adapter Card OPN MHTS#I-XBR	Field	Decoder
S	Silicon	H = ConnectX®, S = InfiniHost III Lx®, T= InfiniHost®,A = InfiniHost III Ex, S = InfiniHost III Lx, T = InfiniHost
#	# ports	1 = 1, 2 = 2,
I	Host Interface	X = PCI-X, 4 = PCIe x4, 8 = PCIe x8, 9 = PCIe (SerDes @ 5.0 GT/s)
G	Generation	<blank> = Initial product generation
-	Separator	
X	Memory Size	X = MemFree, 1=128MB, 2=256MB, 3=512MB
B	Bracket	S = Short, T = Tall, N = None
R	RoHS	<blank> = non RoHS, C = RoHS R-5 w/ Exemption, R = RoHS R-6 Lead-Free

For example, the part number MHQH19B-XTR describes Mellanox Technologies' ConnectX® IB HCA card with dual CX4 ports, a PCIe2.0 x8 5.0GT/s interface, no on-board memory (mem-free), a short PCI bracket, and RoHS R5 compliance. Using the legend,

- field M = M to indicate a Mellanox Technologies product,
- field H = H to indicate an InfiniBand Adapter Card,
- field T = Q to indicate QSFP QDR,
- field S = H to indicate the ConnectX family,
- field # = 1 to indicate one port,
- field I = 9 to indicate PCI Express 2.0 x8 running at 5.0GT/s,
- field G = B to indicate Generation B
- field X = X to indicate no on-board memory,
- field B = T to indicate a tall bracket, and
- field R = R to indicate RoHS R6 (with no exemptions) compliance

1.3 Finding the GUID/MAC and Serial Number on the Adapter Cards

All Mellanox adapter cards have a label on the printed side of the adapter card that has the card serial number, the card MAC for Ethernet protocol, and the card GUID for InfiniBand protocol. VPI Cards have both a MAC and a GUID.

Figure 2: Card Product Label

2 VPI Adapter Card Installation

2.1 Hardware and Software Requirements

Before installing the adapter card, please make sure that the system meets the hardware and software requirements listed in Table 5. Refer to Chapter 3,“Driver Software and Firmware” on page 16 for download and installation instructions.

Table 5 - Hardware and Software Requirements

Requirement	Description
Hardware	PCI Express x8 or x16 slots

Software Operating Systems/Distributions	• For Windows
	  • IB see http://www.mellanox.com => Downloads => InfiniBand VPI SW/ Windows Drivers
	  • Ethernet see http://www.mellanox.com => Downloads => Ethernet SW/ Drivers
	• For Linux, both the InfiniBand and Ethernet drivers are in the Mellanox OpenFabrics Enterprise Distribution (OFED) software package available via the Mellanox OpenFabrics Web site http://www.mellanox.com => Downloads => InfiniBand/VPI SW/ Linux Drivers

2.2 Installation Instructions

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

2.2.1 Installation Instructions as per Host Machine

The adapter cards listed in Table 3 on page 8 are standard PCI Express cards, each with a standard x8 edge connector. Please consult the host machine documentation for instructions on how to install a PCI Express card.

2.3 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: 55°C (131°F).
To guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

3. During Lightning - Electrical Hazard

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

4. Copper Cable Connecting/Disconnecting

Copper 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.

5. Equipment Installation

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

6. Equipment Disposal

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

7. Local and National Electrical Codes

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

8. Exposure to Radiation

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

CLASS 1 LASER PRODUCT and reference to the most recent laser standards IEC 60 825-1:1993 + A1:1997 + A2:2001 and EN 60825-1:1994+A1:1996+ A2:2001

2.3.1 Cable Installation

All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The GREEN LED indicator 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 the other end of the connector plugged into a functioning port). After plugging in a cable, lock the connector using the latching mechanism particular to the cable ven-

dor. When a logical connection is made the YELLOW LED will come on. When data is being transferred the YELLOW LED will blink.

Note: When installing cables make sure that the latches engage.

Note: Always install and remove cables by pushing or pulling the cable and connector in a straight line with the card.

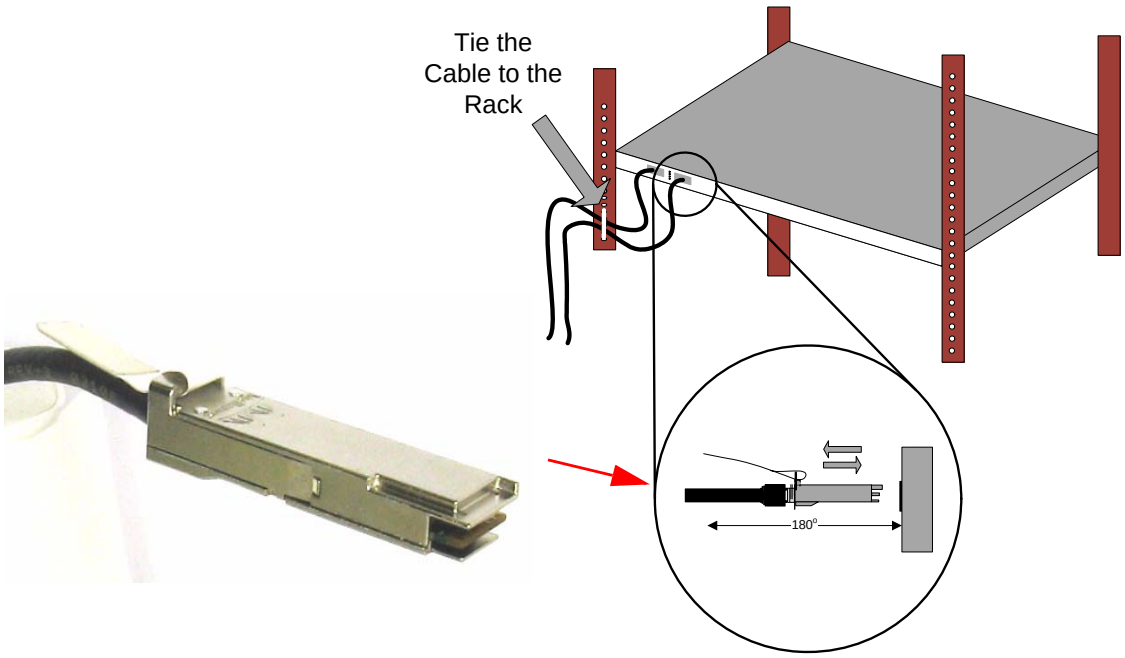
To remove a cable, disengage the locks and slowly pull the connector away from the port receptacle. Both LED indicators will turn off when the cable is unseated.

Cables, especially long copper cables, can weigh a substantial amount. Make sure that the weight of the cable is supported on its own and is not hanging from the adapter card.

2.3.1.1 Inserting a Cable into the Adapter Card

1. Support the weight of the cable before connecting the cable to the adapter card. Do this by using a cable holder or tying the cable to the rack.
2. Determine the correct orientation of the connector to the card before inserting the connector. Do not try and insert the connector up side down. This may damage the adapter card.
3. Insert the connector into the adapter card. Be careful to insert the connector straight into the cage. Do not apply any torque, up or down, to the connector cage in the adapter card.
4. Make sure that the connector locks in place.

Figure 3: Connector Orientation



2.3.1.2 Removing a Cable from the Adapter Card

1. Pull on the latch release mechanism thereby unlatching the connector and pull the connector out of the cage.
2. Do not apply torque to the connector when removing it from the adapter card.
3. Remove any cable supports that were used to support the cable's weight.

3 Driver Software and Firmware

3.1 Driver Software

For Linux, download and install the latest OpenFabrics Enterprise Distribution (OFED) software package available via the Mellanox OpenFabrics Web site at:
http://www.mellanox.com => Downloads => InfiniBand/VPI SW/Drivers. Follow the installation instructions included in the download package.

3.2 Updating Adapter Card Firmware

Each card is shipped with the latest version of qualified firmware at the time of manufacturing. Firmware is updated occasionally, and the most recent firmware can be obtained from
http://www.mellanox.com => Downloads => Firmware.

3.3 Single Adapter Card Firmware Update

Firmware can be updated on the stand alone single card using the **flint** tool of the *Mellanox Firmware Tools (MFT)* package. This package is available for download, along with its user's manual, from the Mellanox Firmware Tools page. See http://www.mellanox.com => Downloads => Firmware Tools.

A firmware binaries table lists a binary file per adaptecard. The file name of each such binary is composed by combining the firmware name, the firmware release version, and the card part number. Please contact Mellanox or your assigned Field Application Engineer if you cannot find the firmware binary for your adapter card. This may happen if the product is not yet available for general distribution.

4 Adapter Card Interfaces

4.1 I/O Interfaces

Each adapter card includes the following interfaces:

- QSFP Connector
- PCI Express x8 edge connector
- I/O panel LEDs
- I^2C compatible connector (for debug)

4.1.1 InfiniBand Interface

The ConnectX-2 VPI device (MT25408B0) is compliant with the *InfiniBand Architecture Specification, Release 1.2.1.* It has a compliant 4X InfiniBand port, with four Tx/Rx pairs of SerDes. Each of the VPI adapter cards (listed in Table 3 on page 8) based on this device provides access to its port by means of a QSFP connector for external InfiniBand cables.

This port utilizes . a 'media detect circuit' that supports active copper cables and fiber solutions to be connected to the InfiniBand port connectors.

4.1.2 Ethernet Interface

The ConnectX®-2 device is compliant with the *IEEE Std 802.3ae 10 Gigabit Ethernet.* Each of the cards (listed in Table 3 on page 8) based on this device provides access to the Ethernet port by means of copper or optical cables.

4.1.3 PCI Express Interface

The ConnectX-2 adapter cards support PCI Express 2.0 (1.1 compatible) through an x8 edge connector. The device can be either a master initiating the PCI Express bus operations or a slave responding to PCI bus operations.

4.1.4 LED Assignment

The board has I/O LEDs located on the I/O panel. The green LED, when lit, indicates that the driver is running and a valid physical connection between nodes exists. If the green LED is blinking, it indicates a problem with the physical link. The yellow LED when lit, indicates a valid data activity link, this is the logical link. The yellow LED illuminates when the 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 4: Physical and Logical Link Indications

Table 6 - LEDs

LED Name
Physical Link - Green Constant on indicates a good physical link Blinking indicates a problem with the Physical link
Data Activity - Yellow Blinking indicates Data Transfer Constant on indicates no Data Transfer

Note: The short bracket has the same port and LED footprint as the tall bracket.

4.1.5 I²C Compatible Interface

A three-pin header on the card is provided as the I²C compatible interface. See Figure 8,“Schematic of the ConnectX-2 Single Port Adapter Card with QSFP Connector” for the location on the board.

Figure 5: I²C Connector

4.2 Power

All adapter cards receive 12V and 3.3V power from the PCI Express Edge connector. All other required power voltages are generated by on-board switch mode regulators. See “Specifications” on page 24.

4.3 Memory

The adapter cards support multiple memory devices through the PCI Flash, and I2C-compatible interfaces. The card utilizes the PCI Express interface to store and access fabric and/or connection information and packet data on the system memory.

4.3.1 Flash

Each of the adapter cards include one 16MB SPI Flash device accessible via the Flash interface of the MT25408 ConnectX-2 VPI device.

There is a jumper on each adapter card that indicates to the device whether an on-board Flash device is to be used. Table 7 provides information on this jumper. See Figure 8,"Schematic of the ConnectX-2 Single Port Adapter Card with QSFP Connector" for the jumper location.

Table 7 - Jumper Configuration

Description	Option	Card Default Configuration	Comments
Flash present/ not present	connection open – Flash present connection shorted – Flash not present ***Figure 6: Flash Jumper*** 	connection open – Flash present	Header 1x2

4.3.2 EEPROM

Each board incorporates an EEPROM that is accessible through the I2C-compatible interface. The EEPROM is used for storing the Vital Product Data (VPD). The VPD format adheres to the *PCI Local Bus Specification Rev 2.3* VPD definition. The EEPROM capacity is 4Kb.

4.4 VPD Layout for these Adapter Cards

- The PCI VPD (Vital Product Data) layout, for each of the described Mellanox Technologies VPI adapter cards comply with the format defined in the *PCI 2.3 Specification, Appendix I*. All adapter cards have the same PCI VPD layout.

Table 8 - VPD Layout for MHQH19-X[STN]R

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length [7:0] LSB	0xB		
2	Length [15:8] MSB	0x0		
3	Data	KESTREL QDR	STR	
14	Large Resource Type VPD-R Tag (0x10)	0x90		
15	Length [7:0] LSB	0x4F		
16	Length [15:8] MSB	0x00		
17	VPD Keyword	PN	STR	Add in Card Part Number
19	Length	0x15		
20	PN	PN	%STR_SPC	
41	VPD Keyword	EC	STR	Engineering Change Level of the card (rev)

Table 8 - VPD Layout for MHQH19-X[STN]R

Offset (Decimal)	Item	Value	Format	Description
43	Length	0x2		
44	Revision	RV	%STR	PCB revision
46	VPD Keyword	SN	STR	Serial Number
48	Length	0x18		
49	SerialNumber		%STR_SPC	“00..00XXXX..XX”
73	VPD Keyword	V0	STR	Misc Information
75	Length	0x10		
76	Data	PCIe Gen2 x8	STR_SPC	
92	VPD Keyword	RV	STR	
94	Length	0x1		
95	Data	0,94	%CS0	
96	Large Resource Type VPD-W Tag (0x11)	0x91		
97	Length [7:0] LSB	0x9D		
98	Length [15:8] MSB	0x00		
99	VPD Keyword	V1	STR	EFI Driver version
101	Length	0x6		
102	Data	N/A	STR_SPC	
108	VPD Keyword	YA	STR	Asset Tag
110	Length	0x20		
111	Data	N/A	STR_SPC	“N/A”
143	VPD Keyword	RW	STR	Remaining read/write area
145	Length	0x6E		
146	Data		STR_ZERO	Reserved (0x00)
256	Small Resource Type END Tag (0x11)	0x78		

Table 9 - VPD Layout for MHRH[12]9-X[STN]R

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length [7:0] LSB	0xA		
2	Length [15:8] MSB	0x0		
3	Data	FALCON DDR	STR	
13	Large Resource Type VPD-R Tag (0x10)	0x90		
14	Length [7:0] LSB	0x4F		
15	Length [15:8] MSB	0x00		

Table 9 - VPD Layout for MHRH[12]9-X[STN]R

Offset (Decimal)	Item	Value	Format	Description
16	VPD Keyword	PN	STR	Add in Card Part Number
18	Length	0x15		
19	PN	PN	%STR_SPC	
40	VPD Keyword	EC	STR	Engineering Change Level of the card (rev)
42	Length	0x2		
43	Revision	RV	%STR	PCB revision
45	VPD Keyword	SN	STR	Serial Number
47	Length	0x18		
48	SerialNumber		%STR_SPC	"00..00XXXX..XX"
72	VPD Keyword	V0	STR	Misc Information
74	Length	0x10		
75	Data	PCIe Gen2 x8	STR_SPC	
91	VPD Keyword	RV	STR	
93	Length	0x1		
94	Data	0,93	%CS0	
95	Large Resource Type VPD-W Tag (0x11)	0x91		
96	Length [7:0] LSB	0x9D		
97	Length [15:8] MSB	0x00		
98	VPD Keyword	V1	STR	EFI Driver version
100	Length	0x6		
101	Data	N/A	STR_SPC	
107	VPD Keyword	YA	STR	Asset Tag
109	Length	0x20		
110	Data	N/A	STR_SPC	"N/A"
142	VPD Keyword	RW	STR	Remaining read/write area
144	Length	0x6E		
145	Data		STR_ZERO	Reserved (0x00)
255	Small Resource Type END Tag (0x11)	0x78		

5 Replacing a Tall Bracket With a Short Bracket

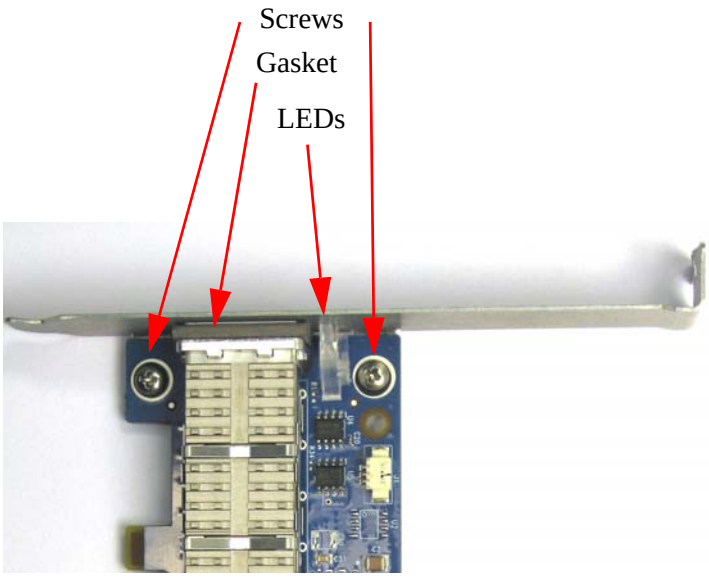
This section provides instructions on how to remove the tall bracket of a standard Mellanox Technologies adapter card and replace it with a short one.

To replace the bracket you will need the following parts:

- the new bracket of the proper height
- one new square gasket
- the 2 screws saved from the removal of the bracket
- the 2 fiber washers saved from the removal of the bracket

5.1 Remove the Existing Bracket from the Adapter Card

Figure 7: Adapter Card



1. Remove the two screws holding the bracket in place.
2. The bracket comes loose from the card.

   Note: Be careful not to put stress on the LEDs.

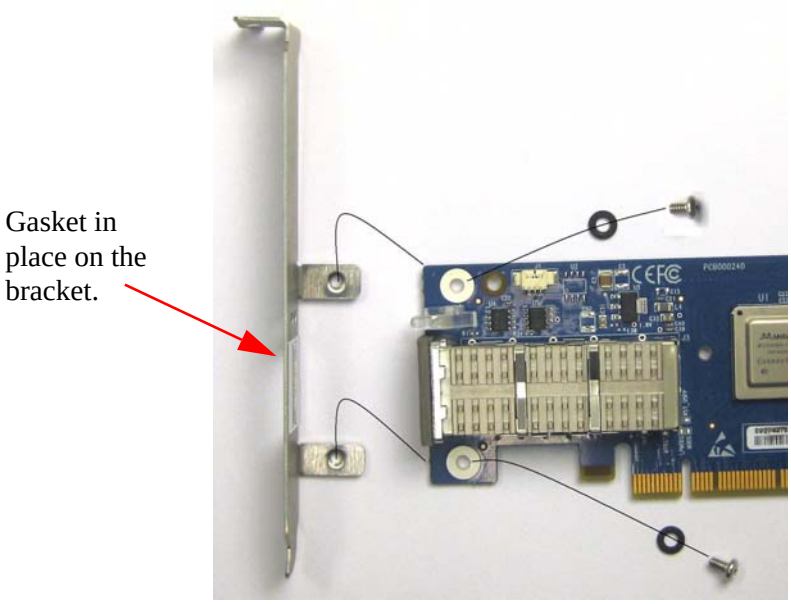
3. Save the two screws and the two fiber washers.

5.2 Installing the New Bracket

1. Remove the paper to expose the adhesive on the gasket.
2. Place the square gasket onto the new bracket. Make sure to correctly align the gasket with the hole in the bracket.
3. If the old gasket is still on the card, remove it before installing the new bracket. Make sure that only one gasket is used. Place the bracket onto the card until the screw holes line up.

Note: Do not force the bracket onto the card. You may have to gently push the LEDs using a small screwdriver to align the LEDs with the holes in the bracket.

4. Using the screws and washers saved from the procedure above step 1. place the screws and washers into the holes and screw them in snug.
5. Make sure that the LEDs are aligned onto the bracket holes.



6. Use a torque driver to apply up to 2 lbs-in torque on the screws.

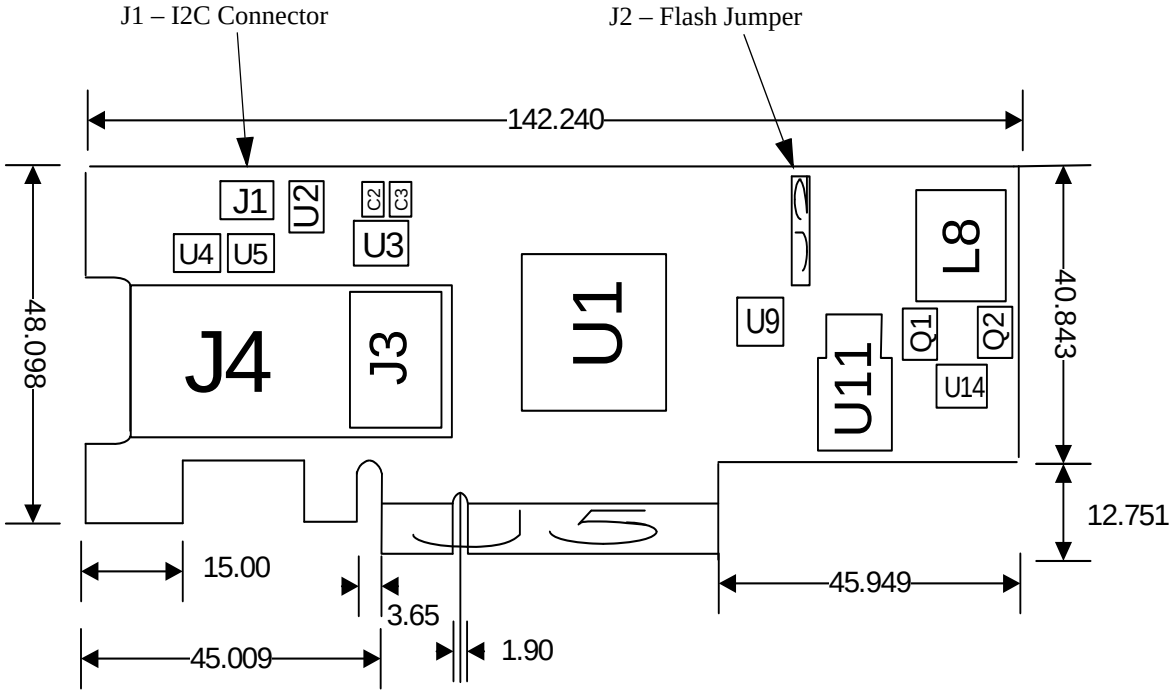
Appendix A: Specifications

A.1 Board Mechanical Drawing and Dimensions

All of the cards covered in this *User's Manual* have the same mechanical drawing and share the same dimensions as depicted in Figure 8.

Note: All dimensions are in millimeters.

Figure 8: Schematic of the ConnectX-2 Single Port Adapter Card with QSFP Connector



A.2 EMC Certification Statements

Table 10 lists the approved certification status per card in different regions of the world.

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Table 10 - Adapter Cards Certification Status

HCA Card P/N	FCC Class (USA)	EN Class (Europe)	ICES Class (Canada)	VCCI (Japan)
MHRH19B-XTR	A	A	A	A
MHQH19B-XTR	A	A	A	A

Table 10 - Adapter Cards Certification Status

HCA Card P/N	FCC Class (USA)	EN Class (Europe)	ICES Class (Canada)	VCCI (Japan)
MHQH19B-XNR	A	A	A	A

A.2.1 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.

A.2.2 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.

A.2.3 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."

A.2.4 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.")

A.3 MHQH19B-X[STN]R Specifications

Table 11 - Specifications for MHQH19B-X[ST]R

Physical		Power and Environmental	
Size:	2.54in x 6.60in (64.40mm x 167.65mm)	Voltage:	12V, 3.3V
		Typ. Power:	Passive Cables 7.7W Active Cables 9.7W
Air Flow:	200LFM @55°C	Maximum Power:	Passive Cables 8.9W Active Cables 12.4W
10Gb/s Connector:	QSFP		
		Temperature:	0°C to 55°C
Protocol Support		**Regulatory**	
InfiniBand:	IBTA v1.2.1, Auto-Negotiation (20Gb/s, 5Gb/s) or (10Gb/s, 2.5Gb/s)	EMC:	FCC 47 CFR part 15:2007, sub-part B class A; ICES-003:2004 issue 4, class A; VCCI V-3/2008.04 class A; AS/NZ CISPR 22-2006, class A. EN 55022:1998 + A1:2000 + A2: 2003 class A, EN 55024:1998 + A1:2001 + A2: 2003 EN 61000-3-2: 2006, EN 61000-3-3: 1995+A1:2001+A2:2005 standards harmonized under EMC Directive 2004/108/EC Article 6(2);
QoS:	8 InfiniBand Virtual Lanes for each port		
RDMA Support:	Yes, All Ports		
Data Rate:	QDR		
PCI Express	2.0 SERDES @ 5.0GT/s		
		Safety:	EN60950-1:2001 +A11:2004
		EMI:	CLASS 1 LASER PRODUCT IEC 60 825-1:1993 + A1:1997 + A2:2001 EN 60825-1:1994+A1:1996+ A2:2001"
		RoHS:	RoHS R6

Appendix B: Interface Connectors Pinout

B.1 I2C-Compatible Connector Pinout

Figure 7: Compatible Connector Plug and Pinout

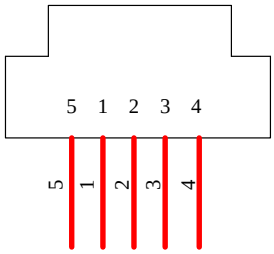


Table 12 - I2C-compatible Connector Pinout

Connector Pin Number	Signal Name
1	SPSDA
2	SPSCL
3	GND
4	NC
5	NC

B.2 PCI Express x8 Connector Pinout

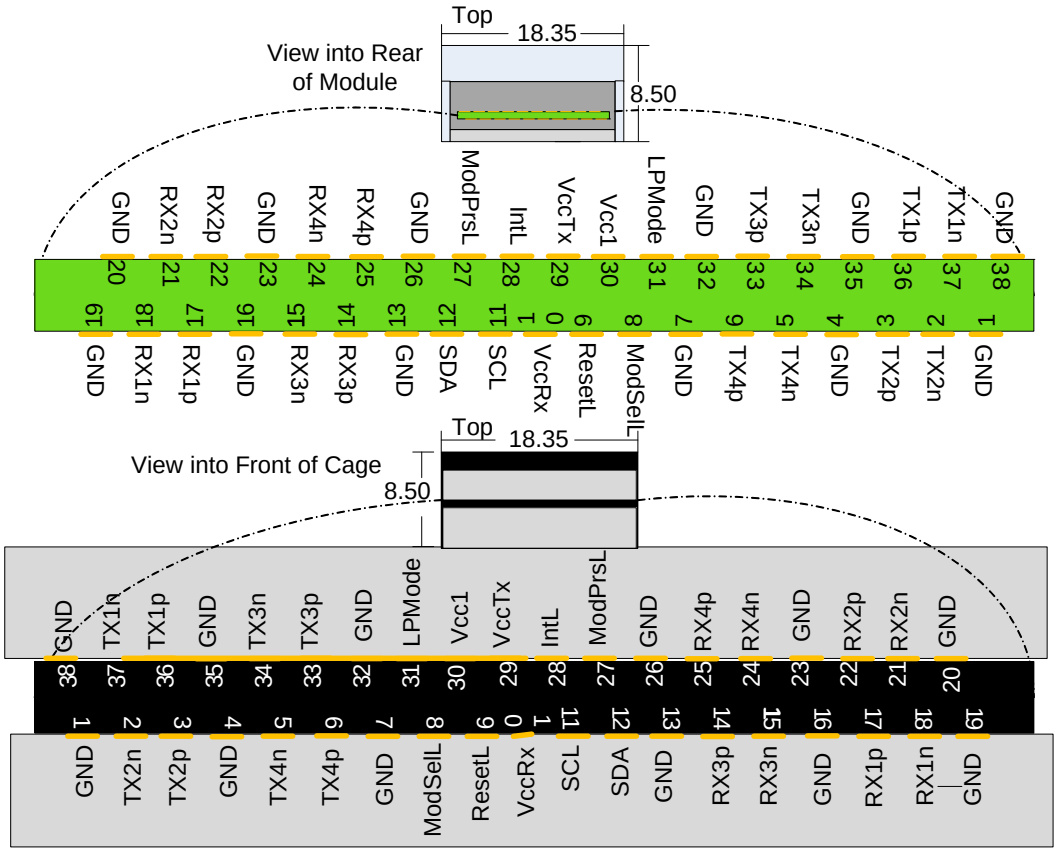
These cards use a standard PCI Express x8 edge connector and the PCI Express x8 standard pinout according to the PCI Express 2.0 specification.

B.3 QSFP Connector Pinout

Table 13 - Connector Pin Name and Number to Signal Name Correspondence

Connector Pin Number	Connector Pin Name	Port A Signal Name
1	GND	GND
2	TXN_2	Tx2n
3	TXP_2	Tx2p
4	GND	GND
5	TXN_4	Tx4n
6	TXP_4	Tx4p
7	GND	GND
8	ModSelL_Port0	ModSelL
9	ResetL_Port0	ResetL
10		VccRx
11	SCL	SCL
12	SDA	SDA
13	GND	GND
14	RXP_3	Rx3p
15	RXN_3	Rx3n
16	GND	GND
17	RXP_1	Rx1p
18	RXN_1	Rx1n
19	GND	GND
20	GND	GND
21	RXN_2	Rx2n
22	RXP_2	Rx2p
23	GND	GND
24	RXN_4	Rx4n
25	RXP_4	Rx4p
26	GND	GND
27	ModPrsl_Port0	Mod PrsL
28	IntL	IntL
29		VccTx
30		Vcc1
31	LPMode_Port0	LPMode
32	GND	GND
33	TXP_3	Tx3p
34	TXN_3	Tx3n
35	GND	GND
36	TXP_1	Tx1p
37	TXN_1	Tx1n
38	GND	GND

Figure 9: Connector and Cage Views



Appendix C: Avertissements de sécurité d'installation (Warnings in French)

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 55°C (131°F). Un flux d'air de 200LFM à cette température ambiante maximale est nécessaire. 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. Orages – dangers électriques

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

4. 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.

5. Installation du matériel

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

6. Elimination du matériel

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

7. Codes électriques locaux et nationaux

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

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

Appendix D: Sicherheitshinweise (Warnings in German)

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 °C (°F) betrieben werden. Es ist ein Luftstrom von 200 LFM bei maximaler Umgebungstemperatur erforderlich. Außerdem sollten mindestens 8 cm (3 in.) Freiraum um die Belüftungsöffnungen sein, um einen einwandfreien Luftstrom zu gewährleisten.

3. Bei Gewitter - Elektrische Gefahr

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

4. 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.

5. Geräteinstallation

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

6. Geräteentsorgung

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

7. Regionale und nationale elektrische Bestimmungen

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