InfiniHost™ PCI-X Low Profile RoHS HCA Adapter Cards User's Manual

P/N: MHET2X-1SC, MHET2X-1TC, MHET2X-2SC, MHET2X-2TC

Rev 1.11

InfiniHost(TM) PCI-X Low Profile RoHS HCA Adapter Cards User's Manual

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Mellanox Technologies, Inc.
2900 Stender Way
Santa Clara, CA 95054
U.S.A.
www.Mellanox.com

Tel: (408) 970-3400
Fax: (408) 970-3403

Mellanox Technologies Ltd
PO Box 586 Hermon Building
Yokneam 20692
Israel

Tel: +972-4-909-7200
Fax: +972-4-959-3245

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Revision History

Table 1 - Revision History

Rev	Date	Comments/Changes
1.11	December 20, 2006	Added EMC VCCI statements to Appendix A, "Specifications," on page 25
1.10	Nomber 27, 2006	Added EMC Class B statements to Appendix A, "Specifications," on page 25
1.00	November 2, 2006	First version of the User's Manual

About this Manual

This card *User's Manual* describes Mellanox Technologies InfiniHost™ PCI/PCI-X RoHS-compliant HCA 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 PCI/PCI-X HCA cards listed in "Overview" on page 11.

The manual assumes basic familiarity with the InfiniBand™ architecture specification.

Related Documentation

Table 2 - Documents List

InfiniHost™ Programmer's Reference Manual Document no. 2111PM	Reference describing the interface used by developers to write a driver for Mem-free Mellanox InfiniHost™ devices.
InfiniHost™ MT23108 Hardware Reference Manual Document no. 2112HM	Reference for hardware engineers responsible for designing systems and boards incorporating InfiniHost™ components.
Mellanox Firmware Tools (MFT) User's Manual Document no. 2204UG	User's Manual describing the set of MFT firmware management tools for a single InfiniBand node. See www.mellanox.com under Firmware downloads or Management Tools.
InfiniBand Administration (IBADM) Package User's Manual Document no. 2130UM	User's Manual describing the utilities included in the IBADM tools package for system administration of an InfiniBand cluster. See www.mellanox.com under Management Tools.

Online Resources

- Mellanox Technologies Web pages: http://www.mellanox.com
- Mellanox Technologies Document Distribution System (DDS): http://docs.mellanox.com (requires a customer login account)

Document Conventions

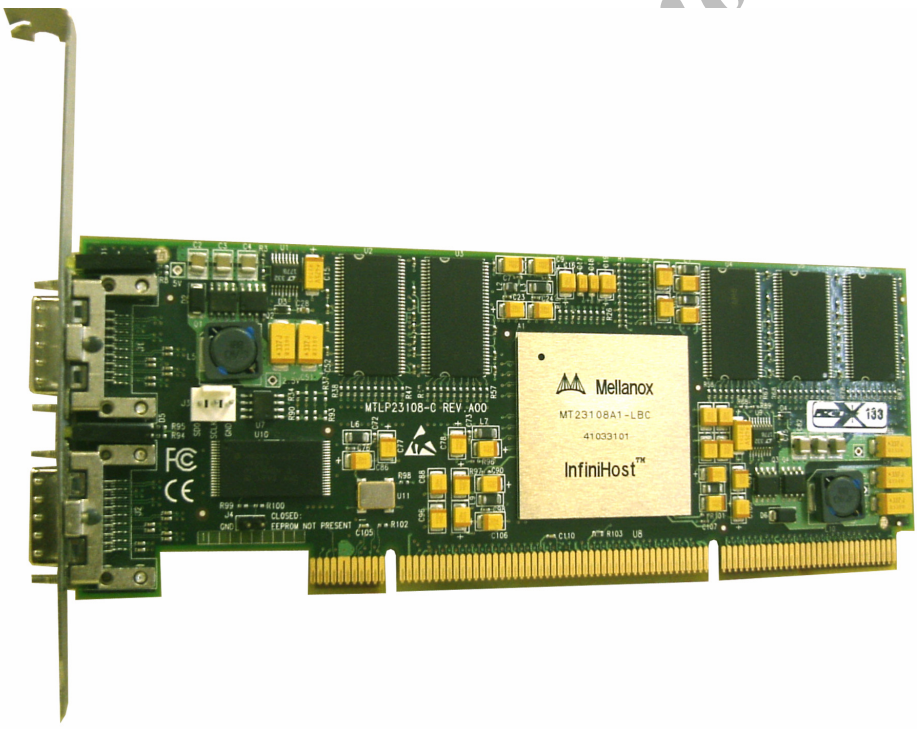
When discussing memory sizes, MB and MBytes are used in this document to mean size in mega bytes. The use of Mb (small b) indicates size in mega bits.

1 Overview

This document is a *User's Manual* for Mellanox Technologies host channel adapter (HCA) cards based on the MT23108 InfiniHost™ HCA IC device. Each of the cards described has the following features:

- IBTA v1.2 compliant
- Two 4X InfiniBand copper ports for connecting InfiniBand traffic (4X IB connectors)
- Each IB port supports a 10Gb/s transmission rate (Single Data Rate or SDR)
- Each IB port includes a 'media detect circuit' supporting external InfiniBand fiber solutions
- PCI 2.2 and PCI-X 1.0 specifications compliant with a standard 3.3 Volt PCI-X edge connector
- On-board DDR SDRAM memory: 128MByte or 256MByte
- EU Restriction of Hazardous Substances (RoHS) compliant

Figure 1: MHET2X-1TC HCA Card



1.1 List of HCA Cards

Table 3 lists the HCA cards described in this manual.

Table 3 - HCA Cards List

Ordering Part Number (OPN)	IB Port Speed	On-board Memory Size	Short / Tall Bracket	RoHS Compliance
MHET2X-1SC	10Gb/s (SDR)	128 MByte	Short	RoHS-R5
MHET2X-1TC			Tall	
MHET2X-2SC		256 MByte	Short	
MHET2X-2TC			Tall	

1.2 Mellanox HCA Cards Part Numbering Key

Table 4 describes the Mellanox Technologies HCA cards part numbering key.

Table 4 - Mellanox HCA Cards Part Numbering Key

HCA Card OPN MHTS#I-XBR	Field	Decoder	Example: MHET2X-2TC (Tall Bracket w/ 256MB Memory)
M	Mellanox Technologies		M
H	HCA	H=HCA Card, S= Express Card (SIOM)	H
T	Media	C=Cu SDR, E=Cu SDR + Fiber Adapter, G=Cu DDR + Fiber Adapter (currently SDR only), F=Fiber SDR	E
S	HCA IC	T= InfiniHost™, A= InfiniHost™ III Ex, S= InfiniHost™ III Lx	T
#	# IB ports	1=1, 2=2, … A=10, B=11, … <limit to one character>	2
I	Interface	X=PCI-X, 4=PCIe x4, 8=PCIe x8	X
-	Separator		-
X	Memory Size	X=MemFree, 1=128MB, 2=256MB, 3=512MB	2
B	Bracket	S=Short, T=Tall, N=None	T
R	RoHS	<blank> = non RoHS C=RoHS w/ Exemption, R=RoHS Lead-Free	C

2 HCA Card Installation

2.1 Installation Instructions

The HCA cards listed in Table 3 on page 12 are standard PCI/PCI-X cards with a standard PCI-X edge connector. Please consult the host machine documentation for instructions on how to install a PCI/PCI-X card.

2.2 Safety Warnings

Installation Instructions:

Make sure you read all installation instructions before connecting the equipment to the power source.

Over-temperature:

The HCA card should not be operated in an area with an ambient temperature exceeding the maximum recommended temperature of 55°C. Moreover, it requires an air flow of 200LFM at this maximum ambient temperature.

During Lightning:

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

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/instructions.

Equipment Disposal:

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

3 Updating HCA Card Firmware

Each HCA 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 through the "Firmware" downloads link. The HCA firmware download pages include the following firmware update options:

- Single HCA card firmware update
- InfiniBand cluster firmware update
- Customized firmware (.mlx, .ini) firmware update - OEMs Only

3.1 Single HCA Card Firmware Update

Firmware can be updated on the standalone 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 single HCA card firmware update page. See http://www.mellanox.com under "Firmware".

A firmware binaries table lists a binary file per HCA card. The file name of each such binary is composed by combining the firmware name, the firmware release version, and the card part number. See Table 5.

Table 5 - Firmware Images for InfiniHost™ PCI-X HCA Cards

Firmware Image Name	PCI DevID (Decimal)	Example
fw-23108	23108	*fw-23108_3_5_000-MHET2X-1SC_A1.bin.zip* is the firmware binary of firmware fw-23108 version 3.5.000 for the RoHS-compliant HCA card MHET2X-1SC Rev A1.

3.2 HCA Card Firmware Update as Part of a Cluster Firmware Update

If the HCA card is part of an InfiniBand cluster, its firmware can be updated as part of the entire cluster firmware update using the ***ibfwmgr*** tool of the IB administration (IBADM) tools package. IBADM is available for download as part of IB stack distributions such as IB Gold and OFED[1] available via http://www.mellanox.com. See "Firmware" downloads under the same Web page for cluster update instructions.

3.3 Customized HCA Card Firmware Update (OEM Only)

Note: The procedure described in this section is normally *not* needed and applies to OEMs only.

To create a customized firmware binary, the firmware image in MLX format needs to be downloaded along with the *MFT* tools package. See http://www.mellanox.com under 'Firmware Downloads' for customized firmware update instructions.

1. Currently, only the Linux distributions support updating firmware for an entire InfiniBand cluster.

4 Adapter Card Interfaces

4.1 I/O Interfaces

The HCA board includes the following interfaces:

- Two 4X InfiniBand Copper Connectors
- PCI-X 64 bit 66/133 MHz Edge Connector
- I/O Panel LEDs
- I2C

4.1.1 InfiniBand Interface

The HCA provides two 4X InfiniBand v1.1 connectors to the MT23108 for external copper cables. The MT23108 device is compliant with the IBTA specification 1.1. The MT23108 device has two 4X ports A and B, which connect to 4X copper connectors 1 and 2, respectively. The MT23108 has eight internal SerDes.

4.1.2 PCI-X Interface

The PCI-X bus is a PCI-X version 1.0a compliant 64 bit 66/133MHz interface. The MT23108 can be either a master initiating the PCI bus operations or a slave responding to PCI bus operations. The PCI/PCI-X bus can connect to either a host CPU in an HCA application or to an I/O device (such as Gigabit Ethernet) when used as a Target Channel Adapter.

4.1.2.1 PCI-X Board Features

- Low profile, short PCI expansion board (2.5 x 6.6 inches)
- 3.3V and 5V, up to 133 MHz

4.1.3 LED Assignment

The board has only four LEDs located on the I/O panel. The physical link illuminates once VAPI is started and a physical connection is made between two nodes. The logical link (yellow LED) illuminates once the InfiniBand network is discovered over the physical link. If the LEDs are not active, either the physical or the logical (or both) connections have not been established.

Table 6 - LEDs

Port 1	LED Name
	Physical Link - Green
	Logical Link- Yellow
Port 2	**LED Name**
	Physical Link - Green
	Logical Link - Yellow

4.1.4 I2C Interface

A three pin header (reference name J3 in Figure 2 on page 17) is provided as the I2C interface.

4.2 Power

The HCA board is a 3.3 V compliant design (3.3 V only). The board receives 3.3V and, 5V power from the PCI-X Edge connector. All other required power is generated by on-board switch mode regulators. For power consumption, see Appendix A, “Specifications,” on page 25.

4.3 Memory

The HCA supports multiple memory devices on board through the DDR SDRAM, Flash and I2C interfaces.

4.3.1 DDR SDRAM

The HCA board is designed with multiple memory configurations to be placed on the board. The board is compliant with the JEDEC standard "JESD79" Double Data Rate (DDR) SDRAM Specification. The board is generally populated with unbuffered 128, 256 or 512MB ECC 133/266 or 166/333 MHz memory (configurations can vary).

Memory speed and size are encoded in the standard Mellanox Ordering Part Number (OPN). Custom part numbers may be different. An example would be the MHXL-CF128-T: this is an HCA board with a 166MHz 128MB DDR memory.

4.3.2 FLASH ROM

The HCA board supports 4MB of FLASH ROM space via the CPU interface of the MT23108. The details of the FLASH supported are:

- 8 bit data
- 19 bit address
- Programming via the CPU bus

The FLASH, Am29LV033C, provided in the HCA kit has the following characteristics:

- 32 Mb Uniform (4MB)
- 90 ns access time

4.3.3 EEPROM

The board incorporates an EEPROM that is accessible through an I2C interface. The EEPROM is used for storing the Vital Product Data (VPD). VPD format adheres to the *PCI Local Bus specification rev 2.3* VPD definition (see Chapter 6 on page 19). EEPROM capacity is 64K Byte.

4.4 Jumper Configuration

Table 7 - Jumper Configuration

Ref. #	Name	Description	Option	Default Configuration	Comments
J4	FLASH	FLASH Present / Not-present	No Shorting Block (Default): FLASH Present Shorting Block present: FLASH Not present 	No Shorting Block	Header 1x2

Note: See Figure 2, “HCA Card Mechanical Drawing and Dimensions (mm),” on page 17 for the Jumper location.

5 Mechanical Information

5.1 Air Flow Requirement

Per the PCI/PCI-X specifications, all the HCA cards covered in this *User's Manual* require an airflow of 200 LFM at 55°C ambient temperature.

5.2 Board Mechanical Drawings and Dimensions

All the HCA cards covered in this *User's Manual* have the same mechanical drawing and share the same dimensions as depicted in Figure 2, except for the bracket length: short or tall.

Figure 2: HCA Cards Mechanical Drawing and Dimensions (mm)

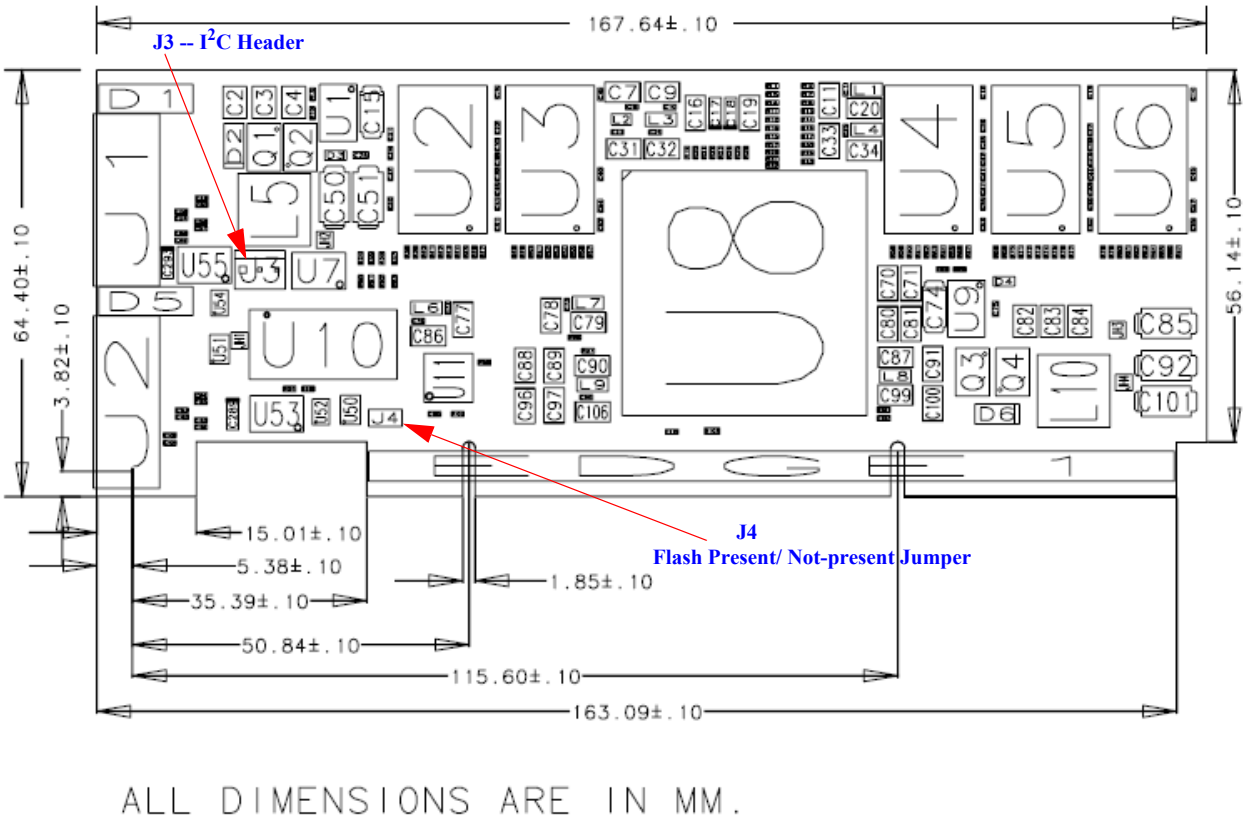
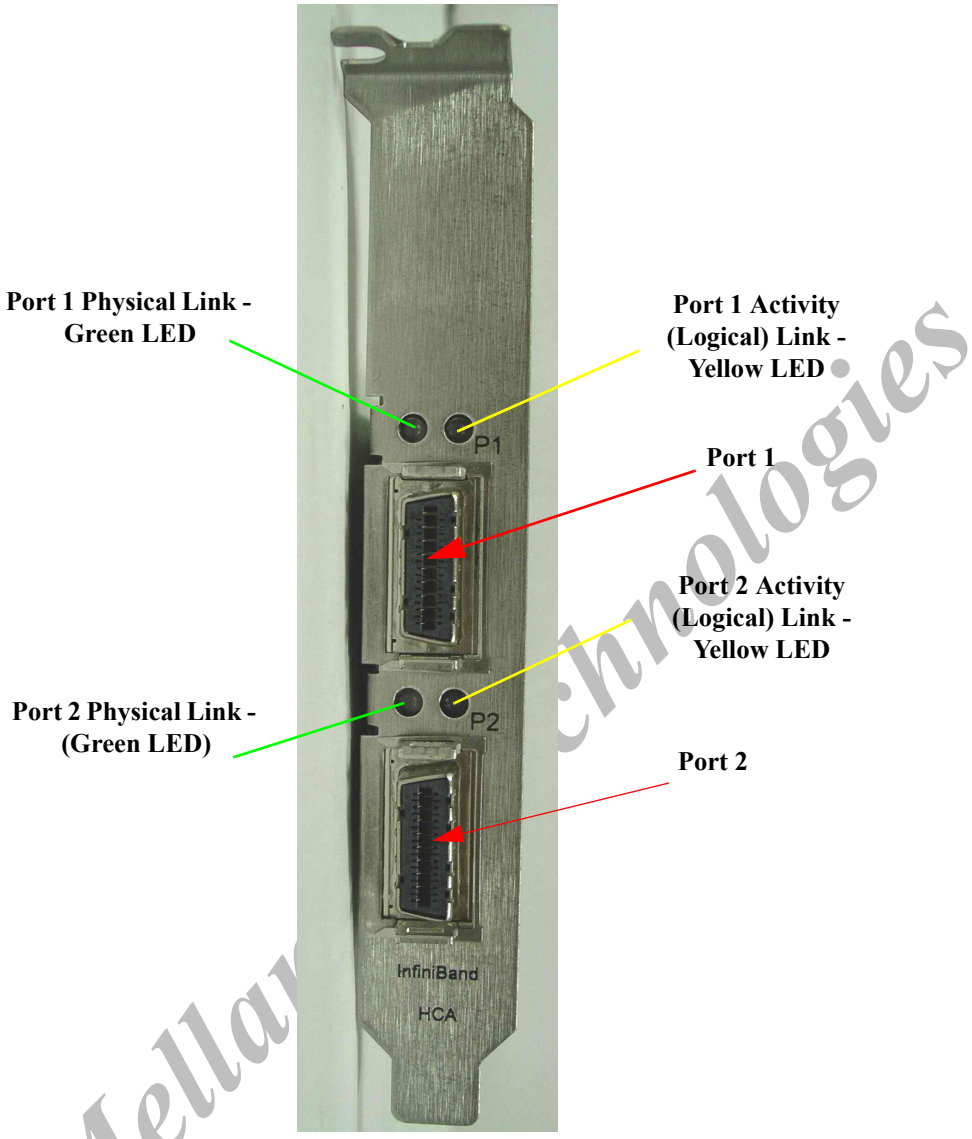


Figure 3 shows the common I/O panel of all the tall-bracket HCA cards covered in this *User's Manual*. Both IB ports are shown along with the physical and activity link LEDs.

Note: Short brackets have the same port and LED footprints as tall brackets. See Appendix C, "Instructions for Replacing a Tall Bracket with a Short Bracket on HCA Cards," on page 31.

Figure 3: I/O Panel with Dual Ports and LEDs (Tall Bracket)



6 Vital Product Data (VPD) Format

The PCI VPD (Vital Product Data) layout for each of the described Mellanox Technologies HCA cards complies with the format defined in the *PCI 2.3 Specification, Appendix I.* All HCA cards share the same PCI VPD layout (i.e., have the same items), however, the "Offset" of each item and/or its "Value" may be different from one card's VPD to another.

The PCI VPD layout for each HCA card is provided in the following sections:

6.1 PCI VPD Layout for MHET2X-1SC

Note: "A1" was used as the HCA card (upper level) revision. Later revisions of the HCA card will have the same format.

Table 8 - VPD Format for MHET2X-1SC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length	0xA		
3	Data	"Cougar cub"	Alphanumeric	
13	Large Resource Type VPD-R Tag (0x10)	0x90		
14	Length	0x4F		
16	VPD Keyword	"PN"	Numbers	Add in Card Part Number
18	Length	0x15		
19	Data	"MHET2X-1SC"		
40	VPD Keyword	"EC"	Alphanumeric	Engineering Change Level of the card (rev)
42	Length	0x2		
43	Data	"A1"		Upper level revision
45	VPD Keyword	"SN"	Alphanumeric	Serial Number
47	Length	0x18		
48	Data	"MTYYWWF-SSSSS"		

Table 8 - VPD Format for MHET2X-1SC

Offset (Decimal)	Item	Value	Format	Description
72	VPD Keyword	“V0”		Currently not in use
74	Length	0x10		
75	Data	“N/A”		
91	VPD Keyword	“RV”		
93	Length	0x1		
94	Data	Checksum		
95	Large Resource Type VPD-W Tag (0x11)	0x91		
96	Length	0x9D		
98	VPD Keyword	“V1”		EFI Driver version
100	Length	0x6		
101	Data	“N/A”	Number	
107	VPD Keyword	“YA”		Asset Tag
109	Length	0x20		
110	Data	“N/A”	Alphanumeric	“N/A”
142	VPD Keyword	“RW”		Remaining read/write area
144	Length	0x6e		
145	Data	Reserved (0x00)		
255	Small Resource Type END Tag (0x11)	0x78		
256	Mellanox Read Only Mask	0x0....0	Numbers	
356	Mellanox Read/Write Mask	0x1...1	Numbers	
511	Mellanox Read Only Mask	0x0	Numbers	

6.2 PCI VPD Layout for MHET2X-1TC

Note: “A1” was used as the HCA card (upper level) revision. Later revisions of the HCA card will have the same format.

Table 9 - VPD Format for MHET2X-1TC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length	0xA		
3	Data	“Cougar cub”	Alphanumeric	

Table 9 - VPD Format for MHET2X-1TC

Offset (Decimal)	Item	Value	Format	Description
13	Large Resource Type VPD-R Tag (0x10)	0x90		
14	Length	0x4F		
16	VPD Keyword	"PN"	Numbers	Add in Card Part Number
18	Length	0x15		
19	Data	"MHET2X-1TC"		
40	VPD Keyword	"EC"	Alphanumeric	Engineering Change Level of the card (rev)
42	Length	0x2		
43	Data	"A1"		Upper level revision
45	VPD Keyword	"SN"	Alphanumeric	Serial Number
47	Length	0x18		
48	Data	"MTYYWWF-SSSSS"		
72	VPD Keyword	"V0"		Currently not in use
74	Length	0x10		
75	Data	"N/A"		
91	VPD Keyword	"RV"		
93	Length	0x1		
94	Data	Checksum		
95	Large Resource Type VPD-W Tag (0x11)	0x91		
96	Length	0x9D		
98	VPD Keyword	"V1"		EFI Driver version
100	Length	0x6		
101	Data	"N/A"	Number	
107	VPD Keyword	"YA"		Asset Tag
109	Length	0x20		
110	Data	"N/A"	Alphanumeric	"N/A"
142	VPD Keyword	"RW"		Remaining read/write area
144	Length	0x6e		
145	Data	Reserved (0x00)		
255	Small Resource Type END Tag (0x11)	0x78		
256	Mellanox Read Only Mask	0x0....0	Numbers	
356	Mellanox Read/Write Mask	0x1...1	Numbers	

Table 9 - VPD Format for MHET2X-1TC

Offset (Decimal)	Item	Value	Format	Description
511	Mellanox Read Only Mask	0x0	Numbers	

6.3 PCI VPD Layout for MHET2X-2SC

Note: “A1” was used as the HCA card (upper level) revision. Later revisions of the HCA card will have the same format.

Table 10 - VPD Format for MHET2X-2SC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length	0xA		
3	Data	“Cougar cub”	Alphanumeric	
13	Large Resource Type VPD-R Tag (0x10)	0x90		
14	Length	0x4F		
16	VPD Keyword	“PN”	Numbers	Add in Card Part Number
18	Length	0x15		
19	Data	“MHET2X-2SC”		
40	VPD Keyword	“EC”	Alphanumeric	Engineering Change Level of the card (rev)
42	Length	0x2		
43	Data	“A1”		Upper level revision
45	VPD Keyword	“SN”	Alphanumeric	Serial Number
47	Length	0x18		
48	Data	“MTYYWWF-SSSSS”		
72	VPD Keyword	“V0”		Currently not in use
74	Length	0x10		
75	Data	“N/A”		
91	VPD Keyword	“RV”		
93	Length	0x1		
94	Data	Checksum		
95	Large Resource Type VPD-W Tag (0x11)	0x91		
96	Length	0x9D		

Table 10 - VPD Format for MHET2X-2SC

Offset (Decimal)	Item	Value	Format	Description
98	VPD Keyword	"V1"		EFI Driver version
100	Length	0x6		
101	Data	"N/A"	Number	
107	VPD Keyword	"YA"		Asset Tag
109	Length	0x20		
110	Data	"N/A"	Alphanumeric	"N/A"
142	VPD Keyword	"RW"		Remaining read/write area
144	Length	0x6e		
145	Data	Reserved (0x00)		
255	Small Resource Type END Tag (0x11)	0x78		
256	Mellanox Read Only Mask	0x0....0	Numbers	
356	Mellanox Read/Write Mask	0x1...1	Numbers	
511	Mellanox Read Only Mask	0x0	Numbers	

6.4 PCI VPD Layout for MHET2X-2TC

Note: "A1" was used as the HCA card (upper level) revision. Later revisions of the HCA card will have the same format.

Table 11 - VPD Format for MHET2X-2TC

Offset (Decimal)	Item	Value	Format	Description
0	Large Resource Type ID String Tag (0x02)	0x82		
1	Length	0xA		
3	Data	"Cougar cub"	Alphanumeric	
13	Large Resource Type VPD-R Tag (0x10)	0x90		
14	Length	0x4F		
16	VPD Keyword	"PN"	Numbers	Add in Card Part Number
18	Length	0x15		
19	Data	"MHET2X-2TC"		
40	VPD Keyword	"EC"	Alphanumeric	Engineering Change Level of the card (rev)
42	Length	0x2		

Table 11 - VPD Format for MHET2X-2TC

Offset (Decimal)	Item	Value	Format	Description
43	Data	“A1”		Upper level revision
45	VPD Keyword	“SN”	Alphanumeric	Serial Number
47	Length	0x18		
48	Data	“MTYYWWF-SSSSS”		
72	VPD Keyword	“V0”		Currently not in use
74	Length	0x10		
75	Data	“N/A”		
91	VPD Keyword	“RV”		
93	Length	0x1		
94	Data	Checksum		
95	Large Resource Type VPD-W Tag (0x11)	0x91		
96	Length	0x9D		
98	VPD Keyword	“V1”		EFI Driver version
100	Length	0x6		
101	Data	“N/A”	Number	
107	VPD Keyword	“YA”		Asset Tag
109	Length	0x20		
110	Data	“N/A”	Alphanumeric	“N/A”
142	VPD Keyword	“RW”		Remaining read/write area
144	Length	0x6e		
145	Data	Reserved (0x00)		
255	Small Resource Type END Tag (0x11)	0x78		
256	Mellanox Read Only Mask	0x0....0	Numbers	
356	Mellanox Read/Write Mask	0x1...1	Numbers	
511	Mellanox Read Only Mask	0x0	Numbers	

Appendix A: Specifications

A.1 EMC Certification Statements

Table 12 lists the approved EMC certification status per HCA card in different regions of the world.

Table 12 - HCA Cards EMC Certification Status

HCA Card P/N	FCC Class (USA)	EN Class (Europe)	ICES Class (Canada)
MHET2X-1SC	B	B	B
MHET2X-1TC	B	B	B
MHET2X-2SC	B	B	B
MHET2X-2TC	B	B	B

A.1.1 FCC Statements (USA)

Class B 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

Statement

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

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

A.1.2 EN Statements (Europe)

EN55022 Class B Statement:

No statement is required for Class B products.

A.1.3 ICES Statements (Canada)

Class B Statement:

"This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada."

A.1.4 VCCI Statements (Japan)

Class B 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Ｂ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

(Translation - "This is a Class B product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to instruction manual.")

A.2 HCA Cards Specifications

Table 13 lists the specifications for the HCA cards.

Table 13 - HCA Cards Specifications

Physical		**Power and Environmental**	
Size:	2.5in. x 6.6in. (6.4cm x 16.8cm)	Voltage:	5V, 3.3V
Air Flow:	200LFM @55°C	Maximum Power:	12W
4X 10Gb/s Connector:	InfiniBand (Copper, current rating: 0.5A max) with active media adapter support	Temperature:	0°C to 55°C
On-board Memory Size:	128MB (MHET2X-1SC/-1TC) / 256MB (MHET2X-2SC/-2TC)		
Protocol Support		**Regulatory**	

Table 13 - HCA Cards Specifications

Physical		**Power and Environmental**	
InfiniBand:	IBTA v1.2, Auto-Negotiation 10Gb/s, 2.5Gb/s	EMC:	FCC 47 CFR part 15:2005, subpart B, class B
QoS:	8 InfiniBand Virtual Lanes for each port		ICES-003:2004 Issue 4, class B
RDMA Support:	Yes, All Ports		
PCI:	2.2		VCCI V-3/2005.04, class B
PCI-X:	1.0		EN 55022:1998+A1:2000+A2:2003 class B, EN 61000-3-2:2000+A2:2005, EN61000-3-3:1995+A1:2000, EN 55024:1998 + A1(2001)+A2(2003) standards, harmonized under EMC Directive 89/336/EEC;
		Safety:	IEC/EN 60950-1:2001 ETSI EN 300 019-2-2
		Environmental:	IEC 60068-2- 64, 29, 32
		RoHS:	RoHS-R5

Appendix B: Interface Connectors Pinout

B.1 I²C-compatible Connector Pinout

Figure 4: I2C-compatible Connector

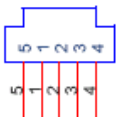


Table 14 - I2C-compatible Connector Pinout

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

B.2 InfiniBand Connector Pinout

Figure 5: InfiniBand 4X Port Connector

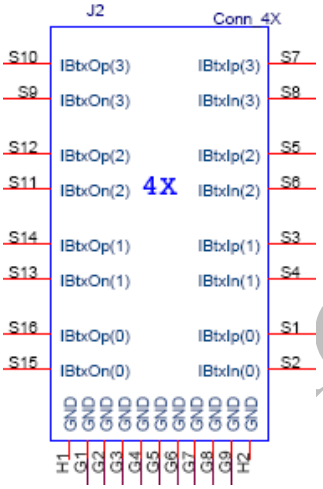


Table 15 - InfiniBand 4X Connector Pinout (Sheet 1 of 2)

Connector Pin Number	Connector Pin Name	IB Port A Signal Name	IB Port B Signal Name
S1	IBtxIp(0)	Rx_A1	Rx_B1
S2	IBtxIn(0)	Rx_A0	Rx_B0
S3	IBtxIp(1)	Rx_A3	Rx_B3
S4	IBtxIn(1)	Rx_A2	Rx_B2
S5	IBtxIp(2)	Rx_A5	Rx_B5
S6	IBtxIn(2)	Rx_A4	Rx_B4
S7	IBtxIp(3)	Rx_A7	Rx_B7
S8	IBtxIn(3)	Rx_A6	Rx_B6
S9	IBtxOn(3)	Tx_A6	Tx_B6
S10	IBtxOp(3)	Tx_A7	Tx_B7
S11	IBtxOn(2)	Tx_A4	Tx_B4
S12	IBtxOp(2)	Tx_A5	Tx_B5
S13	IBtxOn(1)	Tx_A2	Tx_B2
S14	IBtxOp(1)	Tx_A3	Tx_B3

Table 15 - InfiniBand 4X Connector Pinout (Sheet 2 of 2)

Connector Pin Number	Connector Pin Name	IB Port A Signal Name	IB Port B Signal Name
S15	IBtxOn(0)	Tx_A0	Tx_B0
S16	IBtxOp(0)	Tx_A1	Tx_B1
G1-G6, G9, H1-H2	Signal Ground	GND	GND
G7[1]	Sense-3.3V	SENSE_P1	SENSE_P2
G8	Vcc	MC_POWER_P1	MC_POWER_P2

1. The Sense-3.3V signal is used to enable the Vcc power supply pin (G8) used to provide power to the active media adapter.

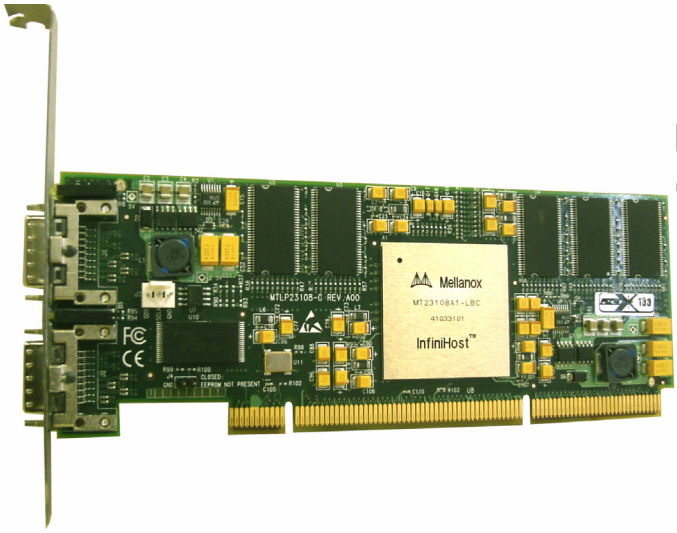
B.3 PCI-X Edge Connector Pinout

The HCA card uses a standard PCI-X 1.0 edge connector. See http://www.pcisig.com/specifications/.

Appendix C: Instructions for Replacing a Tall Bracket with a Short Bracket on HCA Cards

This appendix provides instructions on how to remove a tall bracket of an HCA card such as the one shown in Figure 6 and replace it with a short one.

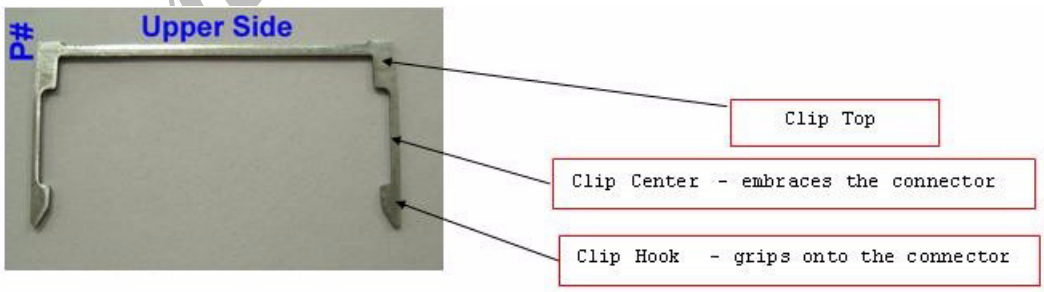
Figure 6: Tall Bracket of a Dual IB Port HCA Card



C.1 Removing Tall Bracket

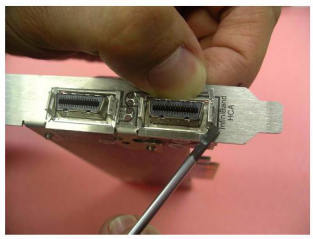
Step 1 - Remove connector clips. Figure 7 shows a connector retention clip and the designated names of its sections.

Figure 7: Connector Retention Clip

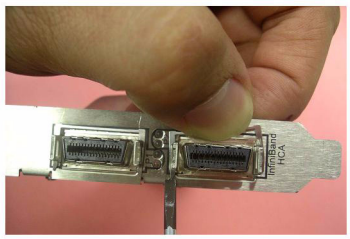


Using a small flat head screwdriver, gently push up one hook of a connector's clip toward the connector's top side as shown in Figure 8 (a) on page 32. Then push the other hook each of the two clip's hook towards the connector's top side - see Figure 8 (b). Finally, pull the clip away from its center - see Figure 8 (c).

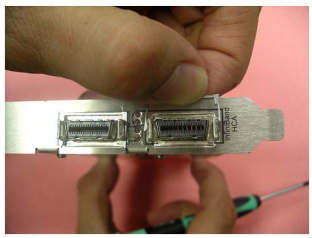
Figure 8: Extracting Connector Clip



(a) Gently Push One Hook of Clip



(b) Gently Push Other Hook of Clip



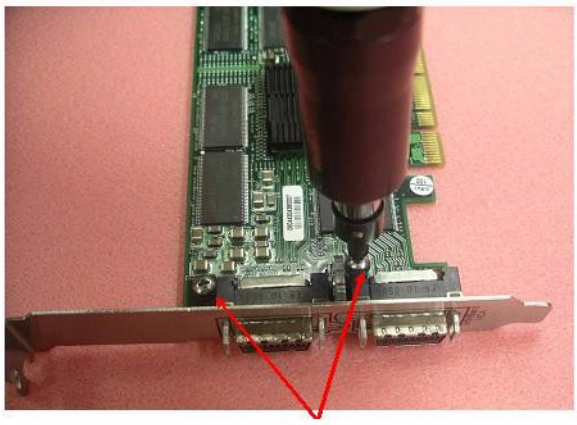
(c) Pull Clip Away

Repeat the above actions for the second connector's clip.

Note: The LED holes arrangement on the bracket photos appearing in this appendix may be different from their arrangement on the actual HCA cards brackets. Nevertheless, this difference bears no impact on the replacement instructions provided here.

Step 2 - Unscrew bracket screws. Unscrew both screws from the card using a torque screwdriver as shown in Figure 9.

Figure 9: Unscrew Bracket Screws



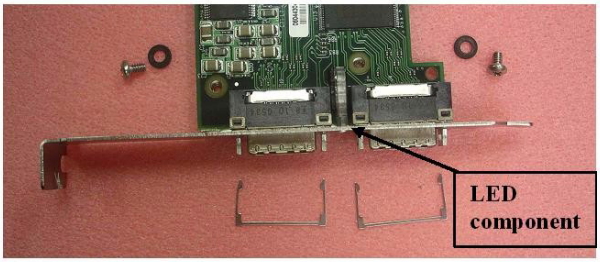
Step 3 - Detach bracket. Grip the bracket as shown in Figure 10 placing your thumb on the LED component. In a rotating move toward the component side of the card, slide the bracket out of the connectors (Figure 10 (c)).

> Gently hold your thumb on the LED component.

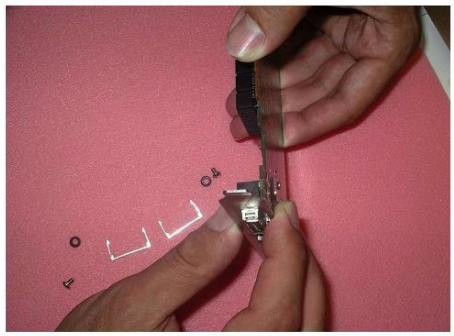
> At the same time extract the bracket as shown in image 18.

(Make sure to protect the LED while extracting the bracket).

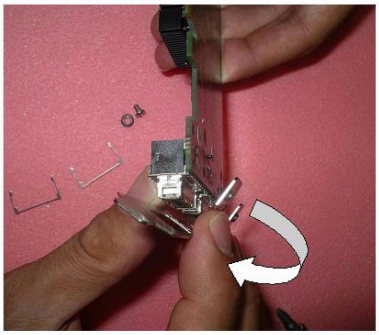
Figure 10: Detach the Bracket in a Rotating Move



(a) Card without Clips and Screws



(b) Grip the Card in Prep. for Detachment

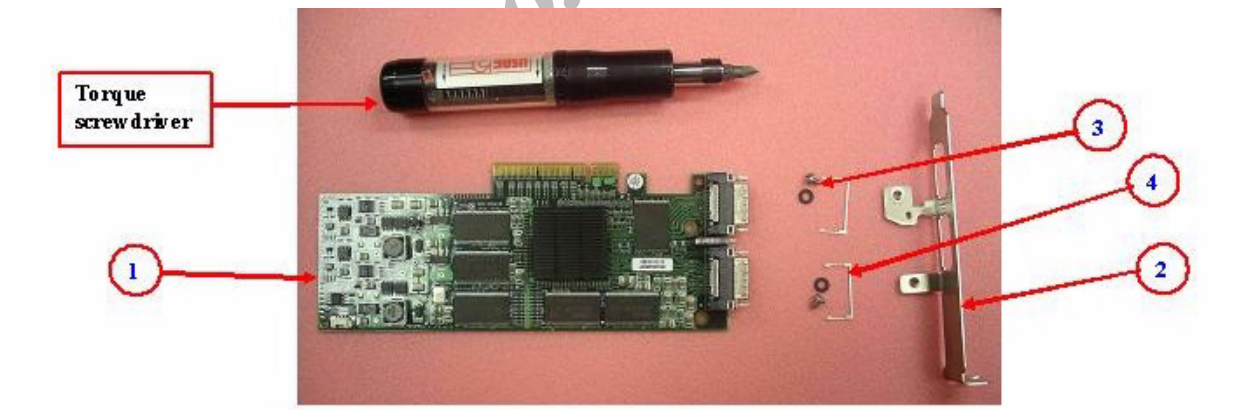


(c) Detach the Bracket in Rotating Move toward Component Side

C.2 Assembling Short Bracket

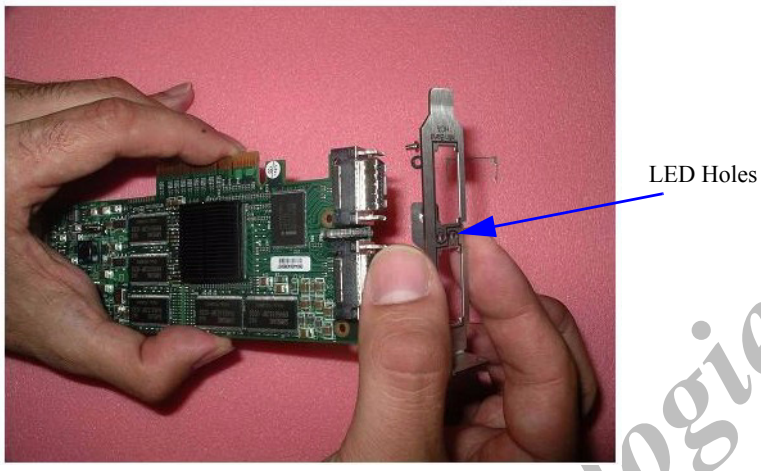
The short bracket can now be assembled onto the HCA card. See Figure 11.

Figure 11: HCA Card Ready for Short Bracket



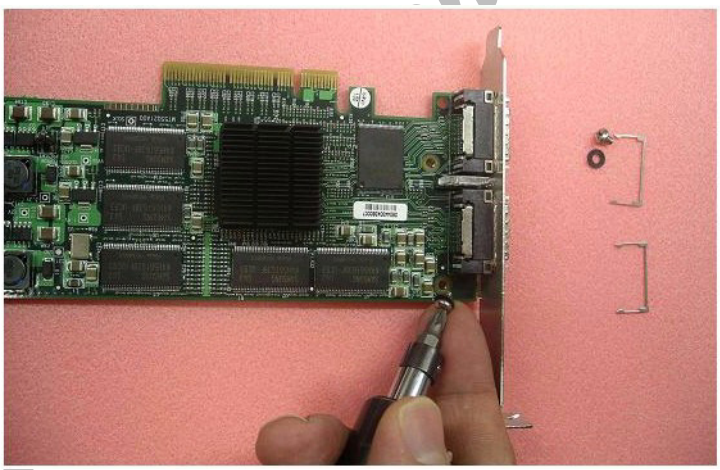
Step 1 - Place short bracket onto card. Gently place the bracket onto the card fitting the connectors through the bracket connector holes. Make sure the LEDs are aligned into their intended bracket holes.

Figure 12: Place Tall Bracket onto Card



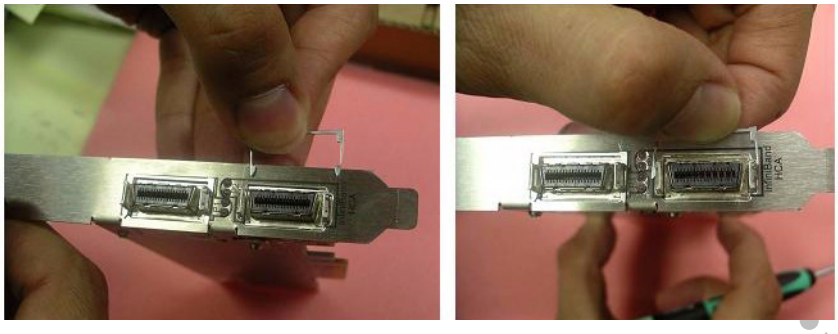
Step 2 - Attach short bracket to card. Insert a screw along with a washer into each of the two holes on the card intended for holding the bracket. Use a torque screwdriver to apply up to 2 lbs-in torque on each screw.

Figure 13: Attach Bracket onto Card using Screws



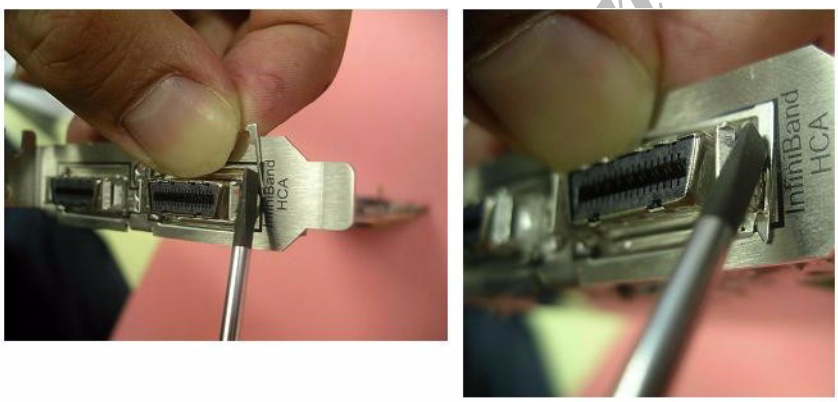
Step 3 - Install Connector Clips. Gently push one clip onto the connector. Make sure to slide both clip hooks (sides) around the connector evenly as shown in Figure 14.

Figure 14: Sliding Connector Clip Evenly



Use a small flat head screwdriver to gently slide the clip's hook towards the connector's base side as shown in Figure 15.

Figure 15: Fix Clip Hooks into Place Using Screwdriver



Repeat this step for the second clip. See Figure 16,"Assembled Short Bracket View".

Figure 16: Assembled Short Bracket View