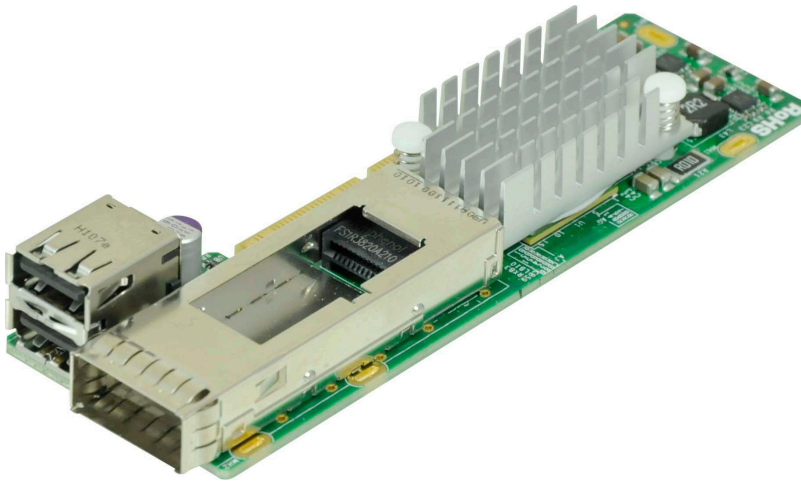
SUPER®

AOC-CIBF-M1



User's Guide

Revision 1.0

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WARNING: Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.

User's Guide Revision 1.0

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Preface

About this User's Guide

This user's guide is written for system integrators, PC technicians and knowledgeable PC users. It provides information for the installation and use of the AOC-CIBF-M1 add-on card.

About this Add-on Card

The AOC-CIBF-m1 is the most compact, powerful InfiniBand adapter on the market. Based on Mellanox ConnectX-3 with Virtual Protocol Interconnect (VPI), it provides the most high performance, flexible interconnect solution for servers used in enterprise data centers and high performance computing. The AOC-CIBF-m1 simplifies system development by providing both InfiniBand (56Gb/s) and Ethernet (40Gb/s) support in one hardware design. The AOC-CIBF-m1 is designed in a small microLP form factor to fit within Supermicro Twin server systems.

An Important Note to the User

All images and layouts shown in this user's guide are based upon the latest PCB Revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this user's guide.

Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the motherboard to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, You can also request a RMA authorization online (http://www.supermicro.com).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

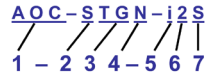
Conventions Used in the User's Guide

Pay special attention to the following symbols for proper system installation and to prevent damage to the system or injury to yourself:

Warning: Important information given to ensure proper system installation or to prevent damage to the components or injury to yourself.

Note: Additional information given to differentiate between various models or provides information for correct system setup.

Naming Convention



Character	Representation	Options
1st	Product Family	**AOC**: Add On Card
2nd	Form Factor	**U**: UIO, **S**: Standard, **P**: Proprietary, **C**: MicroLP
3rd	Product Type/Speed	**G**: GbE (1Gb/s), **TG**: 10GbE (10Gb/s) , **IBF**: IB FDR (56Gb/s) **IBQ**: IB QDR (40Gb/s), **INF**: InfiniBand DDR (20Gb/s)
4th	Chipset Model (Optional)	**N**: Niantec (82599ES), **P**: Powerville (i350)
5th	Chipset Manufacturer	**i**: Intel, **m**: Mellanox
6th	Number of Ports	**1:** 1 port, **2**: 2 ports, **4**: 4 ports
7th	Connector Type (Optional)	**S**: SFP+, **T**: 10GBase-T

SMC Networking Add-on Cards

Model	*Type*	*Form Factor*	*Interface*	*Controller*	*Connection*	*Dimension (without Brackets) (H x L)*
SG-i2	GbE	Standard LP	PCI-E x4	Intel® 82575EB	2 RJ45 (1Gb/port)	5.2" (13.2cm) x 2.5" (6.4cm)
SG-i4	GbE	Standard LP	PCI-E x8	Intel® 82576EB	4 RJ45 (1Gb/port)	5.8" (14.7cm) x 2.5" (6.4cm)
SGP-i4	GbE	Standard LP	PCI-E x4	Intel® i350	4 RJ45 (1Gb/port)	3.9" (9.9cm) x 2.5" (6.4cm)
STG-i2T	10GbE	Standard LP	PCI-E x8	Intel® X540	2 RJ45 (10Gb/port)	5.4" (13.7cm) x 2.5" (6.4cm)
STGN-i2S	10GbE	Standard LP	PCI-E x8	Intel® 82599ES	2 SFP+ (10Gb/port)	5.4" (13.7cm) x 2.5" (6.4cm)
STG-i2	10GbE	Standard LP	PCI-E x8	Intel® 82598EB	2 CX4 (10Gb/port)	5.6" (14.1cm) x 2.5" (6.4cm)
PG-i2+	GbE	Proprietary LP	PCI-E x4	Intel® 82576EB	2 RJ45 (1Gb/port)	3.8" (9.6cm) x 2.5" (6.4cm)
UG-i4	GbE	UIO FH	PCI-E x8	Intel® 82571EB	4 RJ45 (1Gb/port)	6.6" (16.7cm) x 3.9" (9.8cm)
UTG-i2	10GbE	UIO FH	PCI-E x8	Intel® 82598EB	2 CX4 (10Gb/port)	6.6" (16.7cm) x 3.9" (9.8cm)
UIBF-m1	FDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	5.6" (14.0cm) x 2.5" (6.4cm)
UINF-m2	DDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	2 CX4 (20Gb/port)	5.5" (14.0cm) x 2.5" (6.4cm)
UIBQ-m1	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	1 QSFP (40Gb/port)	5.6" (14.3cm) x 2.5" (6.4cm)
UIBQ-m2	QDR IB	UIO LP	PCI-E x8	Mellanox® ConnectX-2	2 QSFP (40Gb/port)	5.6" (14.3cm) x 2.5" (6.4cm)
CGP-i2	GbE	MicroLP	PCI-E x4	Intel® i350	2 RJ45 (1Gb/port	4.5" (11.3cm) x 1.3" (3.4cm)
CG-i2	GbE	MicroLP	PCI-E x4	Intel® 82580	2 RJ45 (1Gb/port)	4.5" (11.3cm) x 1.3" (3.4cm)
CIBF-m1	FDR IB	MicroLP	PCI-E x8	Mellanox® ConnectX-3	1 QSFP (56Gb/port)	4.5" (11.3cm) x 1.3" (3.4cm)
CTG-i1S	10GbE	MicroLP	PCI-E x8	Intel® 82599EN	1 SFP+ (10Gb/port)	4.5" (11.3cm) x 1.3" (3.4cm)

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Table of Contents

Chapter 1

Overview

1-1 Overview

Congratulations on purchasing your add-on card from an acknowledged leader in the industry. Supermicro products are designed with the utmost attention to detail to provide you with the highest standards in quality and performance. For product support and updates, please refer to our website at http://www.supermicro.com/products/nfo/networking.cfm#adapter.

1-2 Key Features

The key features of this add-on card include the following:

- Single QSFP (Quad Small Form Factor Pluggable) Connector
- MicroLP Form Factor
- PCI Express 3.0 (up to 8GT/s)
- Virtual Protocol Interconnect (VPI)
- Up to 56Gbps InfiniBand or 40Gbps Ethernet
- CPU offload of transport operations
- Application offload
- GPU communication acceleration
- End-to-end QoS and congestion control
- Hardware-based I/O virtualization
- Ethernet encapsulation (EoIB)
- RoHS compliant 6/6

1-3 Specifications

General

- Mellanox® ConnectX-3 FDR controller
- Compact size microLP form factor
- Single QSFP port and dual USB 2.0 ports
- PCI-E 3.0 x8 (8GT/s) interface

Connectivity

- Interoperable with InfiniBand or 10/40GbE switches
- Passive copper cable with ESD protection
- Powered connectors for optical and active cable support

InfiniBand

- IBTA Specification 1.2.1 compliant
- Hardware-based congestion control
- 16 million I/O channels
- 256 to 4Kbyte MTU, 1Gbyte messages

Enhanced InfiniBand

- Hardware-based reliable transport
- Collective operations offloads
- GPU communication acceleration
- Hardware-based reliable multicast
- Extended Reliable Connected transport
- Enhanced Atomic operations

Ethernet

- IEEE Std 802.3ae 10 Gigabit Ethernet
- IEEE Std 802.3ba 40 Gigabit Ethernet
- IEEE Std 802.3ad Link Aggregation and Failover
- IEEE Std 802.3az Energy Efficient Ethernet
- IEEE Std 802.1Q, .1p VLAN tags and priority

- IEEE Std 802.1Qau Congestion Notification
- IEEE P802.1Qaz D0.2 ETS
- IEEE P802.1Qbb D1.0 Priority-based Flow Control
- Jumbo frame support (9.6KB)

Hardware-based I/O Virtualization

- Single Root IOV
- Address translation and protection
- Dedicated adapter resources
- Multiple queues per virtual machine
- Enhanced QoS for vNICs
- VMware NetQueue support

Manageability Features

- Additional CPU Offloads
- RDMA over Converged Ethernet
- TCP/UDP/IP stateless offload
- Intelligent interrupt coalescence

Flexboot™ Technology

- Remote boot over InfiniBand
- Remote boot over Ethernet
- Remote boot over iSCI

Protocol Support

- Open MPI, OSU MVAPICH, Intel MPE, MS MPI, PLATFORM MPI
- TCP,UDP, EoIB, IPoIB, SDP, RDS
- SRP, iSER, NFS RDMA
- uDAPL

Operating Systems/Distributions

- Novell SLES, Red Hat Enterprise Linux (RHEL), and other Linux distributions
- Microsoft Windows Server 2008/CCS 2003, HPC Server 2008
- OpenFabrics Enterprise Distribution (OFED)
- OpenFabrics Windows Distribution (WinOF)
- VMware ESX Server 3.5, vSphere 4.0/4.1

Physical Dimensions

- Card PCB dimensions (without end brackets): 12.32cm (4.85in) x 3.90cm (1.54in) (LxW)

Operating Condition

- Operating temperature: 0°C to 55°C (32°F to 131°F)

Compliance/Environmental

- RoHS Compliant 6/6, Pb Free

Supported Platforms

- Supermicro Twin Server Systems with microLP expansion slot (see table below)

		MicroLP Add-On Card			
Type	System	AOC-CG-i2	AOC-CGP-i2	AOC-CIBF-m1	AOC-CTG-i1S
Microcloud	5037MC-H8TRF	√ (1)			
	5037MR-H8TRF		√ (1)		
2U Twin²+	2027TR-H70RF+		√ (1)	√ (1)	√ (1)
	2027TR-H71RF+		√ (1)	√ (1)	√ (1)
	2027TR-HTRF+		√ (1)	√ (1)	√ (1)
	6027TR-H70RF+		√ (1)	√ (1)	√ (1)
	6027TR-H71RF+		√ (1)	√ (1)	√ (1)
	6027TR-HTRF+		√ (1)	√ (1)	√ (1)
2U Twin+	6027TR-D70RF+		√ (2)	√ (2)	√ (2)
	6027TR-D71RF+		√ (2)	√ (2)	√ (2)
	6027TR-DTRF+		√ (2)	√ (2)	√ (2)
	2027TR-D70RF+		√ (2)	√ (2)	√ (2)
Fat Twin (8 Nodes)	F617R2-R72+		√ (1)	√ (1)	√ (1)
	F617R2-RT+		√ (1)	√ (1)	√ (1)
Fat Twin (4 Nodes)	F627R3-R72B+		√ (2)	√ (2)	√ (2)
	F627R3-RTB+		√ (2)	√ (2)	√ (2)

Notes: (1) = 1U Bracket. (2) = 2U Bracket.

This product is only available as an integrated solution with Supermicro server systems. For the most current product information, visit: www.supermicro.com.

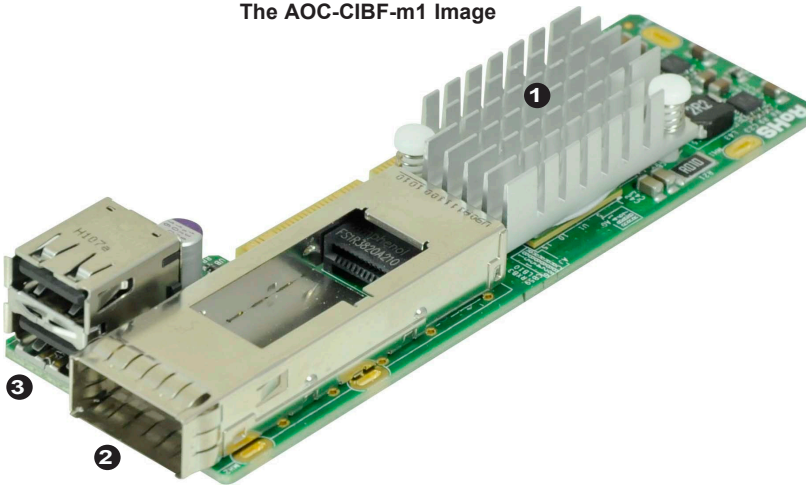
Notes

Chapter 2

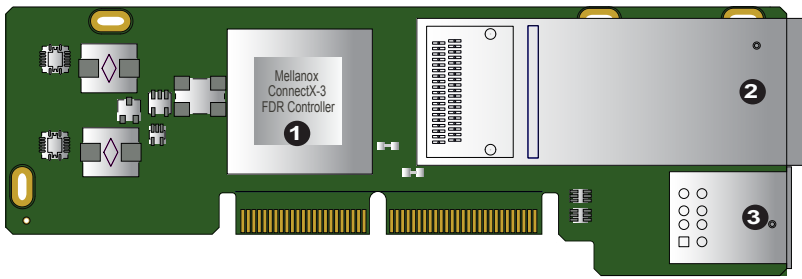
Hardware Components

2-1 Add-On Card Image and Layout

The AOC-CIBF-m1 Image



The AOC-CIBF-m1 Layout



2-2 Major Components

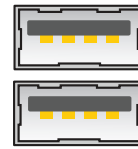
The following major components are installed on the AOC-CIBF-m1:

1. Mellanox ConnectX-3 FDR Controller
2. QSFP (Quad Small Form Factor Pluggable) Port
3. Dual USB 2.0 Ports

2-3 Connectors and PCB LEDs

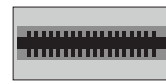
USB Ports

Two USB 2.0 ports are located on the add-on card. Refer to the add-on card layout on page 2-1 for the the location of the USB ports.



QSFP Port

A single QSFP port is located on the add-on card. Connect a QSFP cable to the port to provide Infiniband (56Gb/s) and Ethernet (40Gbp/s) communication. Refer to the add-on card layout on Page 2-1 for the location of the QSPF port.



QSFP PCB LEDs

There are two LEDs located on the PCB between the QSFP port and the Mellanox controller (refer to the add-on card layout on Page 2-1 for the location of the LEDs). A blinking yellow LED indicates activity. A solid green, yellow or off LED indicates the type of link-up connection. See the table to the right for more information.

QSFP PCB LEDs

LED	Color	Definition
Activity	Yellow (Blinking)	Port activity
Link	Yellow	Logical Link-up
	Green	Physical Link-up
	Off	No Connection

Chapter 3

Installation

3-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your add-on card, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the add-on card from the antistatic bag.
- Handle the add-on card by its edges only; do not touch its components, or peripheral chips.
- Put the add-on card back into the antistatic bags when not in use.
- For grounding purposes, make sure that your system chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the add-on card.

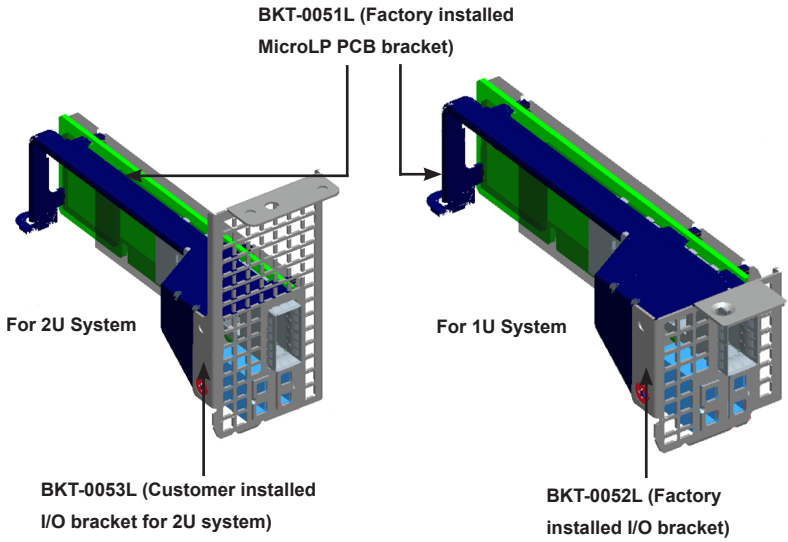
Unpacking

The add-on card is shipped in antistatic packaging to avoid static damage. When unpacking your component or your system, make sure that the person handling it is static protected.

Warning: To avoid damaging your components and to ensure proper installation, be sure to always connect the power cord last, and always remove it before adding, removing or changing any hardware components.

3-2 Add-On Card Brackets

The add-on card ships with a PCB bracket that is pre-installed at the factory. For 1U systems, an I/O bracket is also pre-installed on the card. For 2U systems, the I\O bracket is bundled with the card and must be installed by the customer. See the drawings below for bracket details.



3-3 Before Installation

To install the add-on card properly, be sure to follow the instructions below.

1. Power down the system.
2. Remove the power cord from the wall socket.
3. Use industry standard anti-static equipment (such as gloves or wrist strap) and follow the instructions listed on Page 3-1 to avoid damage caused by ESD.
4. Familiarize yourself with the server, motherboard, and/or chassis documentation.
5. Confirm that your operating system includes the latest updates and hotfixes.

3-4 Installing the Add-on Card

Follow the steps below to install the add-on card into your system.

1. Remove the server cover and, if necessary, set aside any screws for later use.

2. Remove the add-on card slot cover. If the case requires a screw, place the screw aside for later use.

3. Position the add-on card in the slot directly over the connector, and gently push down on both sides of the card until it slides into the PCI connector.

4. Secure the add-on card to the chassis. If required, use the screw that you previously removed.

5. Attach any necessary external cables to the add-on card.

6. Replace the chassis cover.

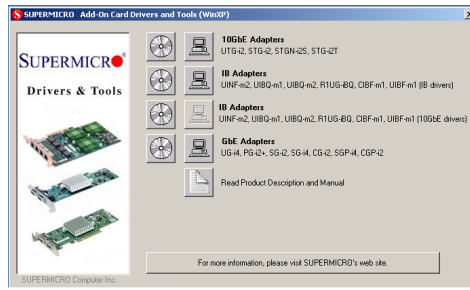
7. Plug the power cord into the wall socket, and power up the system.

3-5 Installing the Windows Operating System

Follow the steps below to install the drivers needed for your Windows OS support. The controller comes with a driver on the CD-ROM CDR-NIC.

1. Run the CDR-NIC. (If you do not have a product CD-ROM, download drivers from the Supermicro Support Website and then transfer them to your system.)

2. When the SUPERMICRO window appears, click on the computer icon next to the product model.



Note: If the *FOUND NEW HARDWARE WIZARD* screen displays on your system, click CANCEL.

3. Click on INSTALL DRIVERS AND SOFTWARE.

4. Follow the prompts to complete the installation.

3-6 Installing Drivers and Firmware

Use the procedures below to install both drivers and firmware for the AOC-CIBF-m1 add-on card for both Linux and Windows.

Linux Drivers

Use the following procedures for installing AOC-CIBF-m1 drivers for the Linux operating system.

Installing InfiniBand Drivers for the Linux Operating System

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory: Mellanox > InfiniBand > Linux.

2. Choose the *InfiniBand Linux* driver package file.

3. Install the driver by entering the following commands:

```
tar xzvf OFED-<ver>.tgz

cd OFED-<ver>

./install.pl
```

This installs the Linux drivers to your system.

Installing 10G Drivers for the Linux Operating System

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory: Mellanox > ConnectX_EN > Linux.

2. Choose the *10G Linux* driver package file.

3. Install the driver by entering the following commands:

```
tar xzvf mlnx_en-<ver>.tgz

cd mlnx_en-<ver>

./install.sh
```

This installs the 10G drivers to your system.

Windows Drivers

Use the following procedures for installing AOC-CIBF-m1 add-on card drivers for the Windows operating system.

Installing InfiniBand Drivers for the Windows Operating System

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory: Mellanox > InfiniBand > Windows.
2. Choose the desired InfiniBand Windows driver package file.
3. Double-click to run and install the driver package file.

Installing 10G Drivers for the Windows Operating System

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory: Mellanox > ConnectX_EN > Windows.
2. Choose the desired 10G Windows driver package file.
3. Double-click to run and install the driver package file.

Firmware Update Procedures

Use the following procedures for updating the AOC-CIBF-m1 add-on card firmware for both the Linux and Windows operating systems.

Updating Firmware for the Linux Operating System

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory: Mellanox > Firmware_Tool > Linux.
2. Choose the *MFT Linux* package file and untar the package file.
3. Install the package by entering the following command:

```
cd mft-<ver>
./install.sh
```

4. Install the firmware by the following commands:

```
mst start
mst status    *write down the pci_cr0 device name*
flint -d <pci_cr0 device name> -i <firmware file name>.bin b
```

Updating Firmware for the Windows Operating System

1. From the CDR-NIC LAN driver CD or FTP site, go to the following directory: Mellanox > Firmware_Tool > Windows
2. Choose the desired MFT Windows package file.
3. Double-click to run and install the MFT package file.
4. Open the DOS command prompt and locate the MFT folder.
5. Install the firmware by entering the following commands:

```
mst start
mst status    *write down the pci_cr0 device name*
flint -d <pci_cr0 device name> -i <firmware file name>.bin b
```

(Disclaimer Continued)

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