PEM-FDR
56 Gb/s FDR InfiniBand card
User Guide
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About this guide

This user guide contains the information you need when installing and configuring the server management board.

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**
  This chapter describes the PEM-FDR Ethernet card features and the new technologies it supports.

- **Chapter 2: Firmware update**
  This chapter provides information in updating the firmware of PEM-FDR card.

- **Chapter 3: Driver installation**
  This chapter provides instructions in installing the PEM-FDR card's drivers on different operating systems.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS websites**
   The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**
   Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.
Conventions used in this guide
To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

**DANGER/WARNING**: Information to prevent injury to yourself when trying to complete a task.

**CAUTION**: Information to prevent damage to the components when trying to complete a task.

**IMPORTANT**: Instructions that you MUST follow to complete a task.

**NOTE**: Tips and additional information to help you complete a task.

**Typography**

| Bold text | Indicates a menu or an item to select. |
| Italics   | Used to emphasize a word or a phrase. |
| <Key>     | Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. |
|           | Example: <Enter> means that you must press the Enter or Return key. |
| <Key1>+<Key2>+<Key3> | If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). |
|           | Example: <Ctrl>+<Alt>+<Del> |
| Command   | Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. |
|           | Example: At the DOS prompt, type the command line: |
|           | format a: |
# PEM-FDR card specifications summary

<table>
<thead>
<tr>
<th>Feature</th>
<th>PEM-FDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>Mellanox ConnectX-3 FDR</td>
</tr>
<tr>
<td>Interface</td>
<td>PCI-E Gen3 x8</td>
</tr>
<tr>
<td>Port</td>
<td>QSFP</td>
</tr>
<tr>
<td>Data transfer rate</td>
<td>Up to 56 Gb/s FDR InfiniBand</td>
</tr>
<tr>
<td>Form factor</td>
<td>4.72 in. x 1.77 in. (lower than standard low profile)</td>
</tr>
</tbody>
</table>

* Specifications are subject to change without notice.
** Supports ASUS Z10, Z9, and P9 series motherboard/system.
Product introduction

This chapter provides information about the PEM-FDR card features and the new technologies it supports.
1.1 Welcome!

Thank you and congratulations for buying an ASUS® PEM-FDR card!
Before installing the 56 Gb/s FDR InfiniBand card, check the items in your package with the list below.

1.2 Package contents

Check your package for the following items.

<table>
<thead>
<tr>
<th></th>
<th>Standard Gift Box Pack</th>
<th>Standard Bulk Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support DVD</td>
<td>1</td>
<td>1 (per carton)</td>
</tr>
<tr>
<td>Full height bracket with screws</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Low profile bracket with screws</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Packaging Quantity</td>
<td>1 pc per carton</td>
<td>5 pcs per carton</td>
</tr>
</tbody>
</table>

If any of the above items is damaged or missing, contact your retailer.

The default small bracket for node is a proprietary bracket that supports ASUS Z10PH-D16 series, ES4000 G3 series, and RS720Q-E8 series models*. The complete and updated list of supported models are subject to change without prior notice.

1.3 System requirements

Check if your system meets the following requirements:

- ASUS motherboard/system* with a PCI Express x8 or x16 card slot
- Supported operating system:
  
  Windows® and Linux operating systems (refer to the ASUS website for the latest updates).

* Go to www.asus.com for the complete and updated list of supported motherboard/system models.

- Other requirements:
  
  Appropriate thermal solution
  
  Ensure to update your BIOS to the latest version before using PEM-FDR on ASUS Z9 or P9 series platform server motherboard or system.
1.4 Card layout

1. QSFP connector
2. PCI Express Gen3 x8 interface
3. MLED1
4. MLED2

LED indications

<table>
<thead>
<tr>
<th>MLED2</th>
<th>MLED1</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>No device</td>
</tr>
<tr>
<td>Orange</td>
<td>Green</td>
<td>Device plugged in; Ready</td>
</tr>
<tr>
<td>Orange Blinking</td>
<td>Green</td>
<td>Device plugged in; Data transmitting</td>
</tr>
</tbody>
</table>
1.5 Replacing the card bracket

The ASUS PEM-FDR card is bundled with a full-height bracket, a low-profile bracket, and an ASUS proprietary bracket. By default, the card is pre-installed with an ASUS proprietary bracket.

The proprietary bracket is a small bracket for node that supports ASUS Z10PH-D16 series, ES4000 G3 series, and RS720Q-E8 series models. The supported list of models are subject to change without prior notice.

To replace the card bracket:

1. Get the PEM-FDR card and place it on a stable and flat surface. Ensure that the printed circuit board (PCB) is facing down.

2. Remove the two screws that secures the PEM-FDR card to the card bracket then remove the card bracket.

3. Get the replacement card bracket.

4. Align and insert the PEM-FDR card into the mounting hole of the card bracket. Ensure that the screw holes on the PEM-FDR card matches the screw holes of the card bracket.

5. Replace the screws that you removed earlier in step 2.
Firmware update

This chapter provides information in updating the firmware of PEM-FDR card.
2.1 Updating the firmware

You can download the latest firmware of PEM-FDR at www.asus.com.

To update the firmware:

1. Unzip or extract the firmware file then copy it into a bootable USB device.
2. Go to the DOS prompt and key in the following command:
   ```
   mst start
   ```
3. Key in the following command:
   ```
   mst status
   ```
4. Key in the following command:
   ```
   flint -d [device name] -i [file name].bin -allow_psid_change -nofs burn
   ```

   Take note of the name of the device.
Ensure to key in the correct device name (A) and file name (B) of the firmware.

files on the USB device

5. When the firmware is successfully updated, reboot the system.
Driver installation

This chapter provides instructions in installing the PEM-FDR card's drivers on different operating systems.
3.1 Mellanox ConnectX-3 Infiniband driver installation

This section provides instructions on how install the Mellanox driver.

3.1.1 Windows® operating system

To install the Mellanox driver:

1. Restart the computer, then log on with Administrator privileges.
2. Insert the Mellanox Infiniband support DVD into the optical drive.
   The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.
3. Click Mellanox ConnectX Virtual Channel Adapter Driver.
4. Click Next to start installing the driver.
5. **Tick I accept the terms in the license agreement** then click **Next** to continue.

6. **Click Change** to select your desired destination folder then click **Next** to continue.

7. **Tick the check box and click Next** to continue.
8. Click **Install** to begin the installation.

9. Tick the check box on your preferred options then click **Finish** to exit the wizard.

10. Click **Yes** to restart your system for the configuration changes to take effect.
3.1.2 Red Hat® Enterprise Linux OS

For users using SUSE Linux Enterprise Server OS, follow the general instructions in this section to mount the Mellanox driver on your system.

To mount the Mellanox driver:

1. Log in to the system as root.
2. Create a folder on the desktop and copy the latest Mellanox driver into the same folder. Rename the folder according to your preference, then key in the following commands:

   ```
   cd /
   mkdir [folder name]
   ```

3. Key in the command:

   ```
   mount -o ro,loop /tmp/[image file name] /[folder name] then mount the driver into the system.
   ```

   The driver version and the OS label may vary. Ensure that the command line matches your driver version and operating system.
4. Key in the following commands:

```bash
cd /[folder name]
./mlnxofedinstall
```

All other Mellanox, OEM, OFED, or distribution IB packages will be removed.

5. Press <Y> to continue.

6. Wait while the system installs the driver.
7. When done, reboot your system.

- If your system has the latest firmware, no firmware update will occur.
- To force the firmware update, key in the following command:

  -- force-fw-update
ASUS contact information

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Web site http://www.asus.com

Technical Support
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Fax +86-21-58668722 ext: 9101
Online Support http://support.asus.com/techserv/techserv.aspx

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Technical Support
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Online Support http://support.asus.com/techserv/techserv.aspx

ASUSTeK COMPUTER INC. (China)
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Telephone +86-21-5442-1616
Fax +86-21-5442-0099
Web site http://www.asus.com.cn

Technical Support
Telephone 400-620-6655
Online Support http://support.asus.com/techserv/techserv.aspx
We, the undersigned,
Manufacturer: ASUSTeK COMPUTER INC.
Address: 4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Authorized representative in Europe: ASUS COMPUTER GmbH
Address, City: HARKORT STR. 21-23, 40880 RATINGEN
Country: GERMANY
declare the following apparatus:
Product name: InfiniBand Card
Model name: PEM-FDR
conform with the essential requirements of the following directives:
- 2004/108/EC-EMC Directive
- EN 55022:2010+AC:2011
- EN 61000-3-2:2006+A2:2009
- EN 55024:2010
- EN 61000-3-3:2013
- EN 300 328 V1.7.1(2006-10)
- EN 300 440-1 V1.6.1(2010-08)
- EN 300 440-2 V1.4.1(2010-08)
- EN 301 511 V9.0.2(2003-03)
- EN 301 908-1 V5.2.1(2011-05)
- EN 301 908-2 V5.2.1(2011-07)
- EN 301 893 V1.6.1(2011-11)
- EN 302 544-2 V1.1.1(2009-01)
- EN 302 623 V1.1.1(2009-01)
- EN 50360:2001
- EN 62479:2010
- EN 50385:2002
- EN 62311:2008
- EN 301 489-1 V1.9.2(2011-09)
- EN 301 489-3 V1.4.1(2002-08)
- EN 301 489-4 V1.4.1(2009-05)
- EN 301 489-7 V1.3.1(2005-11)
- EN 301 489-9 V1.4.1(2007-11)
- EN 301 489-17 V2.2.1(2012-09)
- EN 301 489-24 V1.5.1(2010-09)
- EN 302 326-2 V1.2.2(2007-06)
- EN 302 326-3 V1.3.1(2007-09)
- EN 301 357-2 V1.4.1(2008-11)
- EN 302 291-1 V1.1.1(2005-07)
- EN 302 291-2 V1.1.1(2005-07)
- 2006/95/EC-LVD Directive
- EN 60950-1 / A12:2011
- 2009/125/EC-ErP Directive
- Regulation (EC) No. 1275/2008
- Regulation (EC) No. 642/2009
- Regulation (EC) No. 278/2009
- Regulation (EC) No. 617/2013
- 2011/65/EU-RoHS Directive

DECLARATION OF CONFORMITY
Per FCC Part 2 Section 2.1077(a)
Responsible Party Name: Asus Computer International
Address: 800 Corporate Way, Fremont, CA 94539.
Phone/Fax No: (510)793-5600 / (510)778-6000
hereby declares that the product
Product Name: InfiniBand Card
Model Number: PEM-FDR
complies with the following specifications:
FCC Part 15, Subpart B, Unintentional Radiators
Supplementary Information:
This device complies with part 15 of the FCC Rules. Operation is subject to the
following two conditions: (1) This device may not cause harmful interference,
and (2) this device must accept any interference received, including interference
that may cause undesired operation.
Representative Person’s Name: Steve Chang / President
Signature: ________________
Date: Jun. 20, 2014