# Dolphin DXE410 Expansion Chassis

# User Guide

**Revision Information:**     **Revision 3.0**

**December 2008**

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# Preface

This manual describes how to configure and install the DXE410 Expansion Chassis. The primary use of this chassis is for the following:

- PCI Express Expansion

If additional information is required, send email to Dolphin at pci-*support@dolphinics.com.*

Refer to the DXE410 Expansion Chassis Release Notes for any release specific updates.The release notes can be downloaded from our customer support section of *www.dolphinics.com.*

Comments about (and corrections to) this manual can also be sent to pci-*support@dolphinics.com.*

## Overview

This manual contains the following chapters:

Chapter 1      Introduction

Chapter 2      Installation

Chapter 3      Operation

Chapter 4      System Configuration

Chapter 5      Troubleshooting

# Introduction

The Dolphin DXE410 PCI Express Expansion Chassis is a flexible and scalable platform for PCI Express I/O expansion. The DXE410 provides both distance and slot scaling for applications requiring additional PCI Express (PCIe) I/O. The eight standard PCIe slots can be configured to meet your slot or performance requirements. They provide a flexible configuration, ranging from 8-x4 PCIe slots to 4- x8 PCIe slots. The slot configuration is autosensing based on how PCIe card are installed.

The chassis includes two pre-installed cards. One card provides cable connections to external systems and the other card includes a fault indicator. Cable support includes both copper and fiber optic cables. Fiber optic cable provides x8 performance for up to 100 meters.

## 1.1 DXE410 Feature Summary

The DXE410 chassis has the following features:

- Dolphin SX4010 PCI Express Switch
- 8 available PCIe Slots
    - x16 connectors per slot
    - Configurable slot bandwidth
    - Supports up to x4 and x8 PCI Express bandwidths
- ATX power supply
- Standard 4U rackmount enclosure
- Supports external 4-channel parallel fiber-optic transceivers
    - Extended distance up to 100 meters
- Fault indicator

## 1.2 Printed Circuit Boards Descriptions

Printed circuit boards (PCB) included in the DXE410 chassis consist of three multi-layer boards.

### 1.2.1 Base Board

The base board or motherboard is a mini-ATX size as shown in Figure 1–1. Its main components include the SX4010 switch with heat sink assembly, 8 PCI Express x16 connectors, 1 PCI Express x8 connector, 1 PCI express x4 connector and supporting power and diagnostic circuitry. It uses DC power from a standard ATX power supply as well as onboard DC-DC converters. It is referred to as the mini-ATX expansion board.

**Figure 1–1  DXE410 Mini-ATX expansion board**
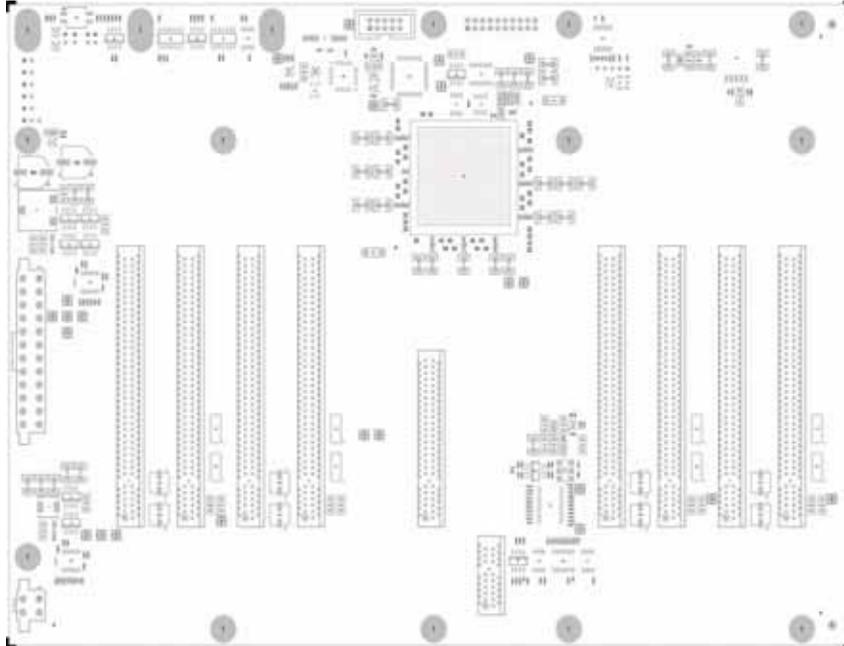
### 1.2.2 Uplink Card

The Uplink Card is installed in the uplink slot on the mini-ATX board. Its function is to transform a standard PCIe motherboard connection into two high speed data cable connections. Each connections is capable of carrying 4 lanes of 2.5 Gbps traffic. The Uplink card is shown in Figure 1–2. The Uplink card also supports the use of optical fiber transceivers.

**Figure 1–2  Uplink Card**
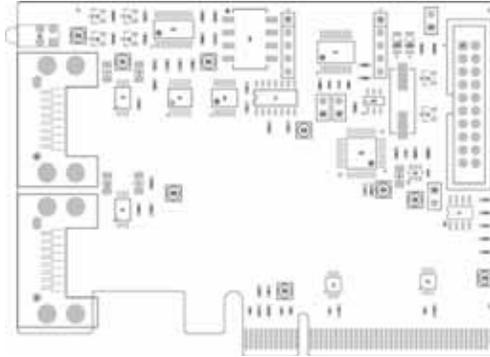


### 1.2.3 Serial Card

The system comes with a Serial card as shown in Figure 1–3. The main function of the serial card is to provide a warning indicator for faults such as over temperature and a RJ45 serial interface for manufacturing use only.

**Figure 1–3  Serial Card**

## 1.3 Specifications

### 1.3.1 Mechanical

The following specifications are for the expansion chassis.

- Standard 4U rackmount chassis
- Dimensions
  - Height: 6.96" (4U /176.8mm)
  - Depth: 18.9 (480mm)
  - Width: 19" (483mm)
- Weight approximately 32lbs (14.5kg)

**Figure 1–4  Chassis Diagram**
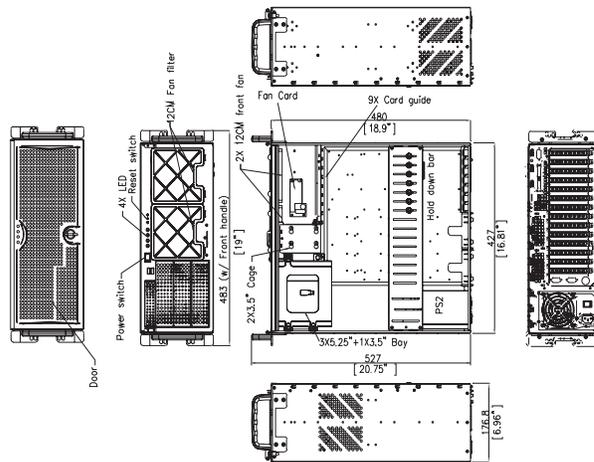


### 1.3.2 Environmental

- Operating Temperature: $0^0$C to $50^0$C ambient
- Storage Temperature: $-20^0$C to $70^0$C
- Relative Humidity: 15-85% non-condensing

### 1.3.3 Electrical

- Operating Voltage:100-240 VAC at 50-60Hz
- Power Supply: 430 watt PSU

### 1.3.4 Agency Approvals - EMI and EMC

- FCC Part 15, Class A
- EMC Directive CE Mark, EN55022, EN55024, 61000-3-2, 61000-3-3, EN6950-1
- VCCI, Class A

# Installation

This chapter describes how to initially setup the DXE410 Expansion Chassis.

## 2.1 Kit Contents

- DXE410 Expansion Chassis
    - 4U Chassis with power supply
    - One or more DXU405 Uplink boards that support optical transceivers
    - One Serial Board
    - Mini-ATX Expansion Board with 8 PCI Express Slots
- One US Standard 3-Prong AC Power Cord
- Handling Instruction Document

## 2.2 Minimum Hardware Requirements

- One DXH510 PCI Express Host Adapter
- High speed data cables
- PCI Express form factor boards

*Note:* *A DXH510 host adapter and a DXU405 Uplink card are required for each additional host attached to a DXE410*

### 2.2.1 Cable Requirements

A high speed data cable is required to connect the DXE410. Dolphin provides the following cables to support the DX products (See Table 2–1).

*Note:* *Cables should be strain relieved or strapped to a cabinet/rack to ensure additional reliability.*

**Table 2–1 Dolphin Cable Offering**

| Part Number | Description |
|---|---|
| DXC1M-A | 1 Meter copper cable |
| DXC3M-A | 3 Meter copper cable |
| FCDX10M-A | 10 Meter fiber optic cable |
| FCDX50M-A | 50 Meter fiber optic cable |
| FCDX100M-A | 100 Meter fiber optic cable |

## 2.3  System Configuration

The DXE410 supports two configuration modes; auto configuration and manual configuration. Auto configuration mode is used for configuring one DXH510 host bus adapter to one DXE410 chassis with all slots assigned to that single host. Manual configuration mode allows for configurations of multiple hosts connecting to a single DXE410 or the addition of switching to your topology (e.g., DXS410 switch).

### 2.3.1  Software Required

#### 2.3.1.1  Auto configuration mode

When configuring a DXE410 with a single DXH510, auto configuration mode can be used. No specific drivers are required for operation. Dolphin provides a driver for the Windows operating systems to identify the DXH510 to the operating system. These drivers are available on the dolphin website at www.dolphinics.com/support.

#### 2.3.1.2  Manual configuration mode

When using manual configuration mode, configuration files are required to configure your system. Several sample configurations are provided on Dolphin's website. For custom configurations contact Dolphin support at pci-support@dolphinics.com. Dolphin provides an update utility to configure the DXE410 in manual configuration mode. This utility currently only supports Linux.

Manual configuration mode requires the programming of both the DXH510 and the DXE410. This programming is accomplished by using the update tool and the configuration files for each board. This process is reviewed in the manual configuration section of this document.

## 2.4  Safety

*Caution:* *When installing or servicing the DXE410 chassis, power should be disconnected from the chassis prior to installing any cards. In order to disconnect power remove the power cord from its receptacle in the back of the chassis as shown in Figure 2–1.*

**Figure 2–1  AC Power Inlet**



*The front power switch is not a disconnect switch for system power.*

## 2.5  Configuration Procedure

### 2.5.1  Auto Configuration

In order start using the DXE410 Expansion Chassis in auto configuration mode follow these steps:

1. Remove the chassis from packaging

2. Open the top cover of the chassis and insert PCI Express (PCIe) I/O card(s) into one or more of the available PCIe slots. (See Chapter 3.3 for information on peripheral installation.)

*Note: Use ESD protection such as a wrist strap to minimize static discharge and potential damage to electronic components.*

3. Close the cover.

4. Connect main power (100-240VAC) using the provided AC power cord or a regionally appropriate AC power cord to the DXE410 power connector, which is located on the back of the chassis see Figure 2–1. The power supply will accept any voltage from 100V to 240VAC at frequency of 50-60Hz

5. Turn on the AC power switch on the back of the DXE410 located next to the power cable connectors see Figure 2–1. This will apply AC power to the chassis.

6. The DXE410 will go through a self test. You will observe that for 0.5 seconds the 2 Port LEDs on the Uplink board will turn green. Then for 0.5 seconds, the 2 Port LEDs turn yellow. Then the 2 Port LEDs will turn off.

*Note: The DXE410 provides automatic remote power-on capabilities, pushing the front power button is not necessary to provide DC power to the chassis. DC power will be provided when the host is powered on.*

7. Install the DXH510 PCI Express Host Adapter into a host PC using a x8 or x16 PCIe slot. Follow PC manufacturer's instructions for installing PCIe add-in cards.

8. Insert one or more cables into the connectors on the front of the Uplink card. There are two connectors on the uplink card as shown in Figure 2–2.

**Figure 2–2  Front Panel connectors**



9. Connect at least one cable from the DXE410 chassis to the DXH510 host adapter. The cable should be connected with the corresponding ports connected to each other. For examples, connect the cable from port P0 on the DXE410 to P0 on the DXH510.

10. Power-on the host PC that contains the DXH510. After the host power is turned on, the DC power on the chassis should come on automatically. This is indicated by the following:

• Chassis fans will turn on

• The uplink board LEDs will change from yellow to OFF and then Green for active ports.

11. Check the link LEDs for both the DXH510 and the DXE410, at least one LED should be lit Green for both cards.

12. Boot as you would without the expansion chassis. Follow normal procedures for bringing up the O/S, loading drivers, etc.

*Note:* *If you are running a Windows operating system, Dolphin provides drivers to support the DXH510. These drivers are available on the Dolphin website at www.dolphinics.com/support*

## 2.5.2  Manual Configuration

All DXE410 chassis come pre-configured for automatic configuration to manually configure the DXE410 Expansion Chassis, follow these steps:

*Note:* *Prior to installing any adapter card you should pre-determine which slots you intend to use. This will become important when you install the configuration files. DXU405 Uplink cards may be required to create connections to additional DXH510 host adapters. Uplink cards can be placed in any slot. A x8 PCI Express slot is required for x8 connection to a host.*

### 2.5.2.1 Hardware Installation

1. Remove the chassis from packaging

2. Open the top cover of the chassis and insert PCI Express (PCIe) I/O card(s) into one or more of your pre-determined PCIe slots.

3. Insert a DXU405 uplink board into the DXE410 chassis in an available slot as shown in Figure 2–3. (See Chapter 3.3 for peripheral card installation instructions)
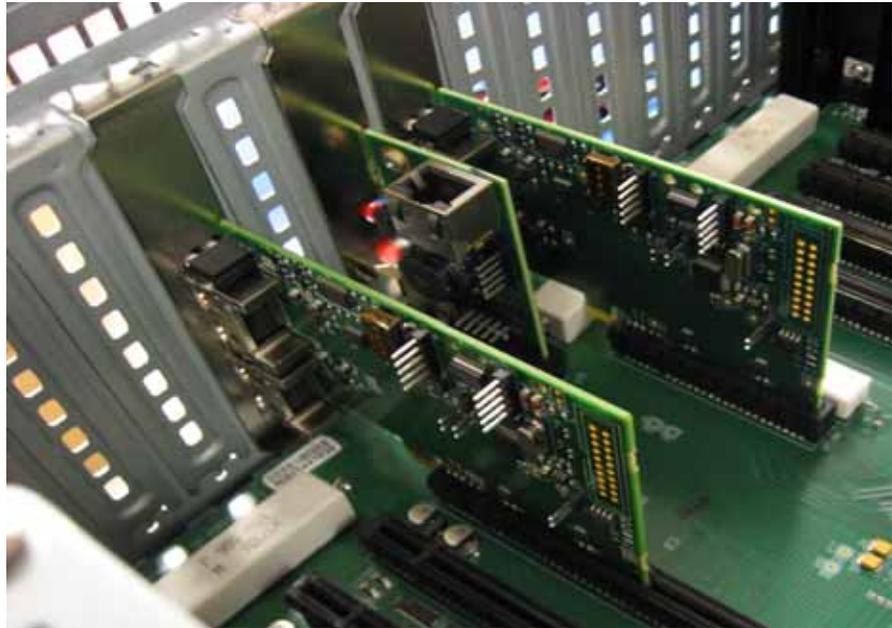


**Figure 2–3  DXU405 Uplink board installed in DXE410 Chassis**

*Note:* *Use ESD protection such as a wrist strap to minimize static discharge and potential damage to electronic components.*

4. Close the cover.

5. Connect main power (100-240VAC) using the provided AC power cord or a regionally appropriate AC power cord to the DXE410 power connector, which is located on the back of the chassis see Figure 2–1. The power supply will accept any voltage from 100V to 240VAC at frequency of 50-60Hz

6. Install one or more DXH510 PCI Express Host Adapter into one or more host PC(s) using a x8 or x16 PCIe slot. Follow PC manufacturer's instructions for installing PCIe add-in cards.

7. Insert one or two cables into the connectors on the front of each DXU405 Uplink card. There are two connectors on each uplink card as shown in Figure 2–4.

**Figure 2–4  Cable connectors**



8. Connect one cable for a x4 connection or two cables for a x8 connection from each DXU405 Uplink card to each DXH510 host adapter. The cable should be connected with the corresponding ports connected to each other. For examples, connect the cable from port P0 on the DXU405 uplink card to P0 on the DXH510 host adapter.

9. For uninitialized systems, first power-on each host PC that contains a DXH510 host adapter card. After each host is powered on, then power-on the DXE410 chassis. Proper power-on is indicated by the following:

- Chassis fans will turn on

- The uplink board LEDs will change from yellow to OFF and then Green for active ports.

*Note: If the system has previously been configured for manual operation, use power on sequence outlined in step 19 of Section 2.5.2.2.2*

10. Check the link LEDs for both the DXH510 and the DXE410, at least one LED should be lit Green for both cards.

## 2.5.2.2  Software Installation

Three steps are required to manually configure DX systems.

1. Download and install DX software

2. Ensure the latest firmware is installed on your DX systems

3. Install configuration files for your DX system configuration

### 2.5.2.2.1  Software Download

Dolphin's DX product software is located on the Dolphin website at www.dolphinics.com/support. Dolphin's software includes two installation kits.

1. Dolphin DX software for Multi-host expansion only

   File name will start with DIS_IOEXP_install_RELEASE...

2. Dolphin DX software for Cluster and Multi-host IO expansion

   File name will start with DIS_DX_install_RELEASE

*Note:* *These packages are operating system specific. They will include the specific operating system they support. The current version of DX software supports Linux.*

Installing the Cluster/multi-host will install both Dolphin's Supersockets software and support for multi-host expansion software.

For the Linux operating system, use the following command to install the DX I/O expansion software.

$ sh$ **file name** --install

Follow the software installation instructions as displayed during installation.

*Note:* *DX software should be installed on each host with a DXH510 adapter card.*

*Note:* *Make certain that each system is running the most current firmware. See Chapter 3.6 for firmware installation instructions.*

### 2.5.2.2.2 I/O configuration

In order to configure the I/O of the overall system, configuration files must be installed on each host DXH510 board and each DXE410 chassis. Dolphin provides sample configuration files for a two node configuration. Dolphin can assist you in creating configuration files by contact Dolphin support at PCI-support@dolphinics.com.

Follow these steps to manually setup the I/O configuration on each system.

1. Download all the sample configuration files for a set configuration from Dolphin's support website. www.dolphinics.com/support. Each configuration is a combination of DXH510 and DXE410 products with specific slots on a DXE bound to a specific DXH510 card.

*Note:* *Configuration files have the following format.*

*XXX - Board Type (i.e. DXH)*

*X - ID number (i.e. 0)*

*_ConfigXXX.txt - Configuration number (i.e. _config100.txt)*

*Examples - DXH0_config100.txt*

2. Identify each host with a particular configuration file. (i.e. host 0 would be identified a one particular server and host 1 would be identified as a second server)

3. Save the host configuration file on the corresponding host and the DXE410 config-uration file on one of the hosts, say host 0.

4. Start the DCE utility from the directory where the configuration files are located. As shown in Figure 2–5.

5. `$dce`

**Figure 2–5  DCE command environment**

6. Install each configuration file for each host in the setup. For example, configuration 100 includes two hosts: host 0 and host 1.

7. To see the contents of the existing configuration file, enter the following command:

8. `>> flash -srom`

9. The system will show the current configuration file (as shown in Figure 2–6).

**Figure 2–6  Configuration file contents**

```
==============================================
     Dx Command Environment (DCE) - Ver 1.0
         Copyright (C) 2008 Dolphin, Inc.
==============================================
Build Time : Nov  6 2008, 14:24:45
--------------
Adapter 0
--------------
board type   : DXH 510 (Host Adapter)
serial number: 31ad015107
>> flash -srom

** local device info **
board type   : DXH 510 (Host Adapter)
date of test : 3072008
test revision: 1
test result  : 0
operator id  : 1234
serial number: 31ad015107
srom image id: 1a0
firmware rev : 183

------- current image -------
          80
4001f20        1a1a0001
4001f24            1a1a
4001e00              10
4000108             555
4003690               1
4001f0c               9
4003594        ff000004
4000f04        80000004
4000f08               2
4000f0c               6
4000f10               0
4000f14               0
4000f18               0
4000f1c               0
4000f20               0
4000f24               0
4000f28               0
4000f2c               0
4000f30               0
4000f34               0
4000f38               0
4000f3c               0
4000f40               0
4000f44               0
4000f48               0
4000f4c               0
4000f50               0
4000f54               0
4000f58               0
4000f5c               0
4000f60               0
4003630               0
4000004               0
          0
------- current image -------
>> []
```

10. A configuration file must be installed on host 0 and host 1 using the following DCE command.

11. `>> flash -srom dxh0_config100.txt (enter)`

**Figure 2–7  DXH Config file installation**

```
===============================================
     Dx Command Environment (DCE) - Ver 1.0
          Copyright (C) 2008 Dolphin, Inc.
===============================================
Build Time : Nov  6 2008, 14:24:45
-------------
Adapter 0
-------------
board type   : DXH 510 (Host Adapter)
serial number: 95ad011008
>> flash -srom dxh0_config100.txt

** local device info **
board type   : DXH 510 (Host Adapter)
date of test : 9302008
test revision: 2
test result  : 0
operator id  : 1234
serial number: 95ad011008
srom image id: 1a1
firmware rev : 188

--------   new image   --------
       80
   4001f20         1a1a0001
   4001f24             1a1a
   4001e00               10
   4000108              555
   4003690                1
   4001f0c                9
   4003594         ff000004
   4000f04         80000004
   4000f08                7
   4000f0c                1
   4000f10         80000004
   4000f14                2
   4000f18                6
   4000f1c                0
   4000f20         7fffffff
   4000f24         7fffffff
   4000f28                0
   4000f2c         7fffffff
   4000f30         7fffffff
   4000f34                0
   4000f38         7fffffff
   4000f3c         7fffffff
   4000f40                0
   4000f44         7fffffff
   4000f48         7fffffff
   4000f4c                0
   4000f50         7fffffff
   4000f54         7fffffff
   4000f58                0
   4000f5c         7fffffff
   4000f60         7fffffff
   4000004                0
        0
--------   new image   --------

Hit ENTER to continue with srom update (CTRL-C to quit)
```

12. Repeat installation instruction on each host. Install dxh1_config100.txt file on host 1.

*Note: To exit from DCE type "quit" and return*

13. Install the configuration file for the DXE410 chassis in a similar manner. Ensure that the DXH0 system is connect to the DXE410 via port 0.

14. To see the contents of the DXE410 configuration file, enter the following command:

15.>>flash -srom -remote

**Figure 2–8  DXE410 Current Configuration File**

```
>> flash -srom -remote

** remote device info **
board type  : DXE 410 (Expansion Switch Chassis)
date of test : 0052008
test revision: 2
test result  : 15
operator id  : 1234
serial number: 1adX25007
srom image id: 2a0
firmware rev : 16b

------- current image -------
       80
  4140800            10
  41406e0        deadbee
  414106c            90
  414116c            90
  414126c            90
  414136c            90
  414146c            90
  414156c            90
  414166c            90
  414176c            90
  414186c            90
  414196c            90
  4000108           555
  4020108           555
  4040108           555
  4060108           555
  4080108           555
  40a0108           555
  40c0108           555
  40e0108           555
  4100108           555
  4120108           555
  4140108           555
  4141a00             2
  40006e4      80000004
  40006e8             1
  40006ec             7
  40206e4             0
  40206e8             0
  40206ec             0
  40406e4             0
  40406e8             0
  40406ec             0
  40606e4             0
  40606e8             0
  40606ec             0
  40806e4      80000004
  40806e8             8
  40806ec             0
  40a06e4      80000004
  40a06e8             6
  40a06ec             2
  40c06e4             0
  40c06e8             0
  40c06ec             0
  40e06e4             0
  40e06e8             0
  40e06ec             0
  41006e4             0
  41006e8             0
  41006ec             0
  41206e4      80000004
  41206e8             3
  41206ec             5
  4000004             0
        0
------- current image -------

>> 
```

16. Use the following installation command to install the configuration file.

17. `>>flash -srom dxeA_config100.txt -remote`

**Figure 2–9  DXE410 config file installation**

```
>> flash -srom dxeA_config100.txt -remote

**  remote device info **
board type   : DXE-410 (Expansion Switch Chassis)
date of test : 8052008
test revision: 2
test result  : 15
operator id  : 1234
serial number: 1ad025007
srom image id: 2a0
firmware rev : 16b

--------   new image   --------
         80
   4140800             10
   41406e0         deadbee
   414106c             90
    14116c             90
   414126c             90
   41413c6             90
    14146c             90
   414156c             90
   414166c             90
   414176c             90
   414186c             90
   414196c             90
   4000108            555
   4020108            555
   4040108            555
   4060108            555
   4080108            555
   40a0108            555
   40c0108            555
   40e0108            555
   4100108            555
   4120108            555
   4140108            555
   4141a00              2
   40006e4       80000004
   40006e8              1
   40006ec              7
   40206e4              0
   40206e8              0
   40206ec              0
   40606e4              0
   40606e8              0
   40606ec              0
   40806e4       80000004
   40806e8              8
   40806ec              0
   40a06e4       80000004
   40a06e8              6
   40a06ec              2
   40c06e4              0
   40c06e8              0
   40c06ec              0
   41006e4              0
   41006e8              0
   41006ec              0
   41206e4       80000004
   41206e8              3
   41206ec              5
   4000004              0
         0
--------   new image   --------

Hit ENTER to continue with srom update (CTRL-C to quit.)
```

18. Once all the configuration files are installed power down the chassis and all hosts.

19. Restart the systems in the following sequence: 1) power off all hosts and DXS410 switches and DXE410 chassis 2) power on the DXE410 chassis and DXS410 switches 3) power on each host.

*Note: This is different from the setup phase where the hosts are powered on first followed by the DXE chassis.*

20. Your system should now configure the downstream I/O cards as normal. To verify that the cards are properly configured by doing an [lspci] command at the command prompt.

**Figure 2–10  LSPCI command**
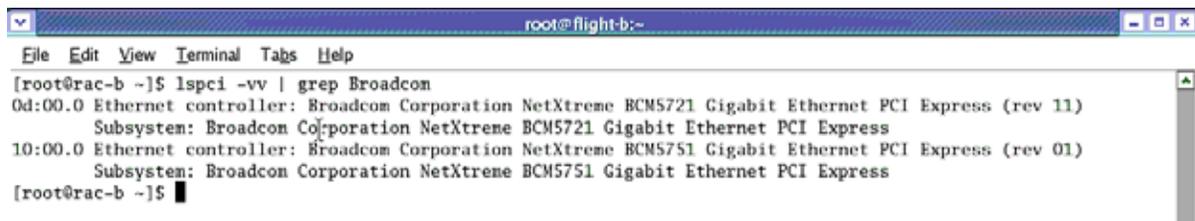


21. Your system is now ready to use.

# Operation

## 3.1 System Power-on

In order to provide power to the DXE410, you must connect the main power cord to a 100-240 VAC AC power source. To accomplish this, connect the AC power cord supplied with the DXE410 to the power connector, which is located at the back of the chassis. The AC power cord provided by Dolphin is a Northern American 3- prong plug. A different power cord, with the appropriate power prongs, is required for other geographies that don't support the North American standard. The chassis accepts any IEC 320 EN60320 C13 connector and the power supply provided with the DXE410 accepts any voltage from 100V to 240V at a frequency of 50-60Hz.

The AC power switch on the back of the chassis turns on main power to the chassis. This switch is a power disconnect switch and must be toggled to the on position to power-on the chassis, see Figure 2–1. A second power switch is provided in the front of the chassis. This momentary switch can be used to manually power up the chassis see Figure 3–1.

**Figure 3–1  Front Power Switch**

**Note:** *The front power switch is not a power disconnect switch. If installing new peripheral cards or servicing the chassis, be sure to remove the power cord.*

The DXE410 also comes equipped with a remote power-on feature. This enables the chassis to be powered on by the host PC. The front power switch would not be required.

## 3.2 Connecting Cables

When connecting cables to the DXE410, it is necessary to ensure that the uplink board is pre-installed in the chassis. Make sure that you are using a Dolphin cable or contact Dolphin support (PCI-support@dolphinics.com) for supported cables.

Begin by inserting one or two cables into the connector(s) of the Uplink card of the DXE410 as shown in Figure 3–2

**Figure 3–2  Cable Connections to Uplink board**
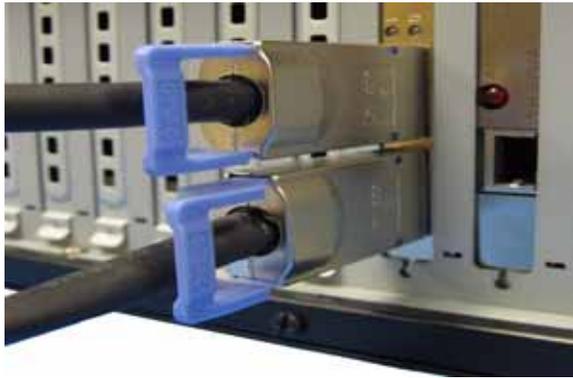


The Uplink card is installed in a dedicated slot labeled Uplink in the chassis. Figure 3–3 shows the location of the uplink board within the chassis.

**Figure 3–3  DXE410 Chassis interior view**
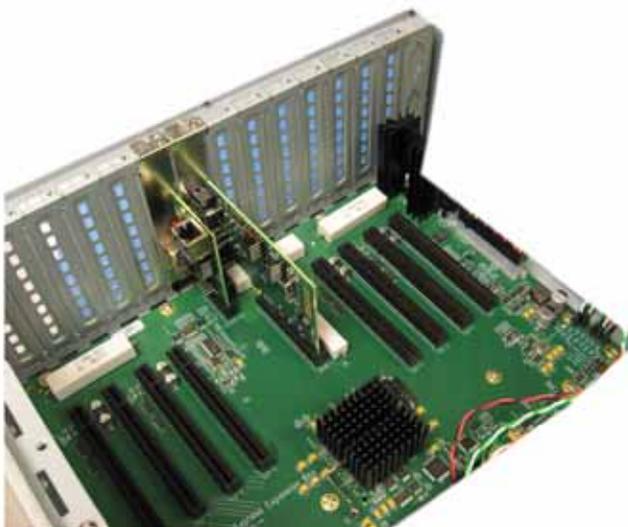


Then connect the other end of the cable to a DXH510 host adapter located in the server. The cable connection can be a x4 connection or a x8 connection. For a x4 connection a single cable is required, while for a x8 connection two cables are required.

### 3.2.1  x4 Connection

For x4 operation connect a cable to one of the DXE410's ports. Connect the other end of the cable to each targeted device, such as a DXH510 host adapter board, depending on your application. A single cable is required to connect to each device you intend to connect at x4 speeds. For examples, you can connect port 0 on the expansion chassis to port 0 on a DXH510 HBA board.

### 3.2.2  x8 Connection

For x8 operation two cables are necessary to form a x8 connection. When connecting ports make sure you are connecting lower ports to lower ports and upper ports to upper ports. The lower port of the DXE410 is port 0. The upper port is port 1. For example to create a x8 connection to a host, connect ports 0 and 1on the expansion chassis to the corresponding ports 0 and 1 on a DXH510 HBA, with port 0 on the expansion chassis connected to port 0 on the HBA and port 1on the expansion chassis connected to port 1 on the HBA. P0 on the DXH510 is the top port and P0 on the Uplink board is the bottom port. When both ports are connected properly and the system is powered on, the LED on PO will light green and there will only be one LED lit.

## 3.3  Installing peripheral cards

**Note:** *Use ESD protection such as a wrist strap to minimize static discharge and potential damage to electronic components when installing peripheral cards.*

Eight slots are available within the DXE410 for installing peripheral cards or additional DXU405 uplink cards. These slots are numbered from slot 1 thru slot 8. PCIe peripheral cards can be plugged into any available slot. The connectors accept all standard PCIe CEM form factor cards with up to a x16 card edge finger. All slots use a x16 connector. Although slots can physically support a x16 peripheral, this card will operate at whatever speed is supported by the slot. Peripherals in x8 slots will operate at x8 speeds and peripherals in x4 slots will operate at x4 speeds. By default, the PCIe slot will automatically train to either x1, x2, x4 or x8 PCI Express at power up. PCIe boards are configured automatically for subsequent use by standard PCIe configuration software such as a BIOS. No additional software is needed to configure or operate PCIe I/O peripherals than is typically used when inserting the card directly into a system.

The chassis is designed to auto configure the width a slot based on how the chassis is populated. The minimum configuration is four x8 slots with every other slot populated. The maximum configuration is eight x4 slots. Table 3–1 shows some of the different population options for the DXE410 chassis.

**Note:** *Odd slots 1,3,5, and 7 are capable of x8 performance if even slots 2,4,6 and 8 are not populated. Even slots 2,4,6, and 8 are only capable of x4 performance. When both an odd slot and an adjacent even slot is populated both slots will operate at x4 speeds.*

**Table 3–1 Slot configuration chart**

| Slot Population | Slot Operation | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| UPUPUPUP | - | x8 | - | x8 | - | x8 | - | x8 |
| PUPUPUPU | x4 | - | x4 | - | x4 | - | x4 | - |
| PPPPPPPP | x4 | x4 | x4 | x4 | x4 | x4 | x4 | x4 |
| UUUUPPPP | - | - | - | - | x4 | x4 | x4 | x4 |
| PPPPUUUU | x4 | x4 | x4 | x4 | - | - | - | - |
| PUPUUPUP | x4 | - | x4 | - | - | x8 | - | x8 |
| UPUPPUPU | - | x8 | - | x8 | x4 | - | x4 | |

P= Populated
U = Unpopulated

## 3.4 LED Behavior

### 3.4.1 DXH510 Host Adapter LEDs

When powered on the LEDs on the DXH510 will cycle from Yellow to Green to Off. If a cable connection is made between two systems (i.e. host system and expansion chassis) then the associated LED for the active ports will turn Green once a connection is established. At that point, it is possible to pass traffic on that port.

### 3.4.2 LED States

The different states of the LEDs on the Uplink board and the DXH510 are outlined in Table 3–2. Each LED is assigned to a particular port on the Uplink card and the DXH510. There are two ports on each board Port 0 and Port 1.

**Table 3–2 LED States**

| Status | Comment |
|---|---|
| Off | Connection not detected |
| On- Green | Connection active |
| Blinking Green | Connection detected but not active |

### 3.4.3 x8 LED Operation

If connecting 2 cables from to create a x8 port between an Uplink card and a DXH510, the port labeled P0 on each board will be connected together and the port labeled P1 will be connected together. When this occurs and a proper x8 connection is established only a single LED will light on each board. This LED will be on the P0 port as part of normal operation.

## 3.5 Serial Board Alarm LED

The serial board within the DXE410 provides temperature monitoring. The Red alarm LED on the serial board will flash when the SX4010 internal temperature exceeds $100^0$C. The LED will turn a solid RED if the temperature exceeds $125^0$C. If this happens, the AC power to the system will automatically turn off.

## 3.6 Firmware update

A linux system is required for firmware update. Dolphin provides a DX Command Environment tool (DCE) for Linux to provide both firmware and I/O configuration update. The latest DX firmware files can be found on the Dolphin Website at www.dolphinics.com/support in the software download section. The latest firmware files are identified by DXFupdate files with the following format DXFupdate. year and work week. Example (DXFupdate.0844).

### 3.6.1 DXH510 Adapter Firmware upgrade

To upgrade the DXH510 firmware follow the following steps:

1. Start the DCE application from the folder that you downloaded the DXFupdate file with the DCE command.

2. Enter the flash command for the local DXH510 and press enter.

3. `>> Flash –firmware –DXfupdate.XXXX`

4. Check if the latest version of DXH510 firmware is installed on the DXH510 card as shown in Figure 3–4. If the firmware revision is different from the revision shown on the DCE tool continue with update. If it is the same, you can cancel the update by pressing Ctrl-C.

5. DCE will complete the installation procedure of the new firmware or cancel out based on your choice.

*Note:* *Once you have completed the firmware upgrade you must power down and restart the system with the DXH510 for proper operation.*

**Figure 3–4  DXH510 firmware update procedure**

```
===============================================
    Dx Command Environment (DCE) - Ver 1.0
       Copyright (C) 2008 Dolphin, Inc.
===============================================
Build Time : Nov  4 2008, 11:42:06
-----------
Adapter 0
----------
board type   : DXH 510 (Host Adapter)
serial number: 95ad011008
>> flash -firmware DXfupdate.0844

** local device info **
board type   : DXH 510 (Host Adapter)
date of test : 9302008
test revision: 2
test result  : 0
operator id  : 1234
serial number: 95ad011008
srom image id: 1a1
firmware rev : 188

Hit ENTER to continue updating current firmware version 188 to version 188 (CTRL-C to quit)


** You must power cycle local host to avoid hardware malfunction **
>>
```

## 3.6.2  DXE410 or DXS410 firmware upgrade

To update firmware for the DXE410 expansion chassis or a DXS410 switchbox, a DXH510 must be connected directly to the expansion chassis or switch box. For a proper connection, port 0 on the DXH510 host adapter must be connect to port 0 on the DXE410 expansion chassis or port 1 on the DXS410. This is required for proper configuration. The update software will run on the DXH510 host connected to the DXE410 or DXS410.

To upgrade the DXE410 or DXS410 firmware follow the following steps:

1. Make sure a DXH510 is connected to the target DXE410 or DXS410 via port 0 on the DXH510.

2. Start the DCE application from the folder that you downloaded the DXFupdate file with the DCE command.

3. Enter the flash command for the remote DXE410 or DXS410 and press enter.

4. `$Flash –firmware –DXfupdate.XXXX –remote`

5. Check if the latest version of DXE410 or DXS410 firmware is installed as shown in Figure 3–5. If the firmware revision is different from the revision shown on the DCE tool continue with update. If it is the same, you can cancel the update by pressing Ctrl-C.

6. DCE will complete the installation procedure of the new firmware or cancel out based on your choice.

*Note:* *Once you have completed the firmware upgrade you must power down and restart the system with the DXS410 or DXE410 for proper operation.*

**Figure 3–5  DXE410 firmware update procedure**

```
================================================
Build Time : Nov  4 2008, 11:42:06
-----------
Adapter 0
-----------
board type   : DXH 510 (Host Adapter)
serial number: 95ad011008
>> flash -firmware DXfupdate.0844 -remote

** remote device info **
board type   : DXE 410 (Expansion Switch Chassis)
date of test : 8052008
test revision: 2
test result  : 15
operator id  : 1234                    I
serial number: 1ad025007
srom image id: 2a0
firmware rev : 16b

Hit ENTER to continue updating current firmware version 16b to version 16b (CTRL-C to quit)


** You must power cycle DXE to avoid hardware malfunction **
>> █
```

## 3.7  Example Manual Configuration

The chart below outlines example configurations that can be used in a two node configuration.

**Table 3–3  Example two node configuration**

| Slot Configuration | Host 1 | Host 1 | Host 2 | Host 2 |
|---|---|---|---|---|
| 6-x4 Slots | 3-x4 slots | | 3 -x4 slots | |
| | 4 -x4 slots | | 2 -x4 slots | |
| 3 - x8 Slots | 2 -x8 slots | | 1-x8 slot | |
| 4-x4 Slots/1 -x8 slot | 1-x8 slot | | 4-x4 slots | |
| | 1-x8 slot | 1-x4 slot | 3-x4 slots | |
| | 1-x8 slot | 2-x4 slot | 2-x4 slots | |
| 2-x4 slots / 2-x8 slots | 2-x4 slots | | 2- x8 slots | |
| | 1-x4 slot | 1-x8 slot | 1-x4 slot | 1-x8 slot |
| | 1 -x4 slot | | 2- x8 slots | 1-x4 slot |

### 3.7.1 Sample Configurations

Dolphin provides several sample configuration files for configuration two node systems.

*Note: Bound indicates that a slot is connect to a particular host. Devices in a bound slot are virtually connected to a particular host and act as if they are directly connected to a host. I/O devices should be installed in each slot for each configuration. Slot should not be left unpopulated in a bound configuration.*

*Each additional host will need an DXU405 Uplink card to connect to the added host. This card will occupy one slot in a DXE410 chassis. This card location is indicated by the connect location in the chart below.*

**Table 3–4  Configuraton 100**

| Host ID | Slot 1 | Slot 2 | Slot 3 | Slot 4 | Slot 5 | Slot 6 | Slot 7 | Slot 8 |
|---|---|---|---|---|---|---|---|---|
| Host 1 | Bound | Bound | | | | | | |
| Host 2 | | | | | | | Bound | Bound |
| Host 2 uplink | | | | | Connect | | | |

**Table 3–5  Configuraton 130**

| Host ID | Slot 1 | Slot 2 | Slot 3 | Slot 4 | Slot 5 | Slot 6 | Slot 7 | Slot 8 |
|---|---|---|---|---|---|---|---|---|
| Host 1 | Bound | Bound | Bound | | | | | |
| Host 2 | | | | Bound | | | Bound | Bound |
| Host 2 uplink | | | | | Connect | | | |

# System Configuration

This section outlines the power requirements as well as connector and jumper settings for the DXE410. Power requirements should be used as a guide for developing custom solutions based on the DXE410. The actual power requirement will be based on each customer's system requirements. DXE410 jumpers and connectors are also outlined below.

## 4.1 Power Supply Requirements

The power requirements in Table 4–1 show the minimum current requirements for each power supply rail in AMPs.

**Table 4–1  Expansion Board Slot Power Requirements (amps)**

|            |          |          |          | 8 slots @ 25W | 4 slots@75W |
| ---------- | -------- | -------- | -------- | ------------- | ----------- |
| **Power Rail** | **10W Slot** | **25W Slot** | **75W Slot** | **25W Slot** | **75W Slot** |
| 3.3V       | 3        | 3        | 3        | 24            | 12          |
| 12V        | 0.5      | 2.1      | 5.5      | 16.8          | 22          |
| 5V Vaux    |          |          |          | 2             | 2           |

Developers should select a supply that meets the maximum anticipated current requirements for each rail for their application.

## 4.2 Jumper configurations

Table 4–2 outline the various DXE410 jumper options and connectors.

**Table 4–2 Jumper and connector configurations**

| Location | Usage |
| --- | --- |
| JP3 | Connect to Chassis Power Switch |
| JP4 | Install to disable the automatic WAKE (DC-power on) feature |
| JP6 | Aux Power LED |
| JP7 | Chassis Reset Switch |
| JP8 | Chassis Power LED |
| JP11 | Disable 12V drain. Install jumper if a custom supply is installed that does not require a minimum current drawn from 12V. Contact Dolphin support for guidance |
| ATX_12v Connector | 4 Pin 12V connector |
| ATX_Power Connector | 24 Pin ATX power connector |
| JP1 | Dolphin Internal Use Only |
| JP2 | Dolphin Internal Use Only |
| JP5 | Dolphin Internal Use Only |
| JP9 | Dolphin Internal Use Only |
| JP10 | Dolphin Internal Use Only |
| PLD-JTAG connector | Dolphin Internal Use Only |
| LPC-JTAG | Dolphin Internal Use Only |
| SW1 | Dolphin Internal Use Only |
| J1 | Dolphin Internal Use Only |

**Dolphin**

5

# Troubleshooting

This chapter provides some troubleshooting hints to help determine if the supplied hardware or other items are the cause of unexpected behavior.

## 5.1 Troubleshooting DXE410 Expansion Chassis

### 5.1.1 Quick troubleshooting tips

**Table 5–1  Troubleshooting Tips**

| Symptom | Tip |
|---|---|
| No Power to board | 1) Check AC power cord for power. <br> 2) Ensure rear power switch is turned on |
| No LED when connected to host | 1) Check cable connections |
| Slot n Power LEDs off | 1) Check associated slot for DC power draw. |
| Card does not appear in device manager or device list | 1) Insure that the card in the slot is a functional PCI Express card and is seated properly |
| Host does not boot properly | Multiple DXH510s are connected to the DXE410 but manual configuration was not performed or performed improperly |
| System hangs on boot | If there is a missing PCIe card in a expansion chassis slot and the binding has been configured for that slot, Linux will hang on the boot up kernel. Reconfigure your bindings so that bindings are not set for that slot through the configuration process. |

### 5.1.2 Customer Support

If you continue to have issues with your system or need service, please contact Dolphin customer supports at pci-support@dolphinics.com.