

# eX10 Software Suite

## Software Manual

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**March 20, 2011**  
**Revision 1.3**

## Contents

1	About this Document.....	1
1.1	Purpose .....	1
1.2	Feedback .....	1
1.3	Revision History.....	1
2	General Description .....	2
2.1	Introduction .....	2
2.2	Software Versions.....	2
3	Installation/Un-installation .....	3
3.1	Linux OS .....	3
3.2	FreeBSD OS.....	3
3.3	Windows OS .....	3
4	Operation .....	4
4.1	Kernel module.....	4
4.2	Save/Restore PCI configuration .....	4
4.2.1	ex10_pcinfo Utility (Linux/FreeBSD OS) .....	4
4.2.2	PcinfoWin Application (Windows OS) .....	5
4.2.2.1	Get PCI/PCI Express Device Information .....	5
4.2.2.2	Save PCI/PCI Express Device Configuration .....	6
4.2.2.3	Restore PCI/PCI Express Device Configuration .....	8
4.3	PCI Express Bridge Tuning Application .....	8
4.3.1	ex10_plxctrl Utility (Linux/FreeBSD OS) .....	8
4.3.2	Ex10Tun Application (Windows OS) .....	9
5	Appendix A: EEPROM data file format .....	11

## Figures

Figure 1:	Pcinfo Application .....	5
Figure 2:	Sample output of all PCI/PCI express devices.....	6
Figure 3:	List of PCI Express Expansion Backplane Boards.....	7
Figure 4:	Expanded list of PCI Express Expansion Backplane Boards .....	7
Figure 5:	EX10Tun application .....	9
Figure 6:	EX10Tun main dialog .....	10





# 1 About this Document

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## 1.1 Purpose

This document describes the software installation and operation of AMFELTEC Corp. eX10 Suite Software.

## 1.2 Feedback

AMFELTEC makes every effort to ensure that the information contained in this document is accurate and complete at time of release. Please contact AMFELTEC if you find any errors, inconsistency or have trouble understanding any part of this document.

To provide your feedback, please send an email to support @amfeltec.com

Your comments or corrections are greatly valued in our effort for excellence and continued improvement.

## 1.3 Revision History

Rev. No.	Description	Rev. Date
1.0	Initial Release.	July 10, 2008
1.1	Update help message	February 20, 2010
1.2	Add detail instructions for Windows XP OS.	March 20, 2010
1.3	Add software revision paragraph	March 10, 2011

## 2 General Description

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### 2.1 Introduction

This document describes software that can be used for the following AMFELTEC products:

- 32-bit PCI Extender
- PCI to PCI Express Adapter
- PCI to PMC Adapter
- PCI Express Extender
- PCI Backplane
- PCI Express Backplane
- PCI Express Cable Extender

eX10 Suite includes a kernel support module and user applications. All user applications require a kernel module to first be loaded (this doesn't apply to the Windows package). The kernel module provides an interface between the user and Amfeltec's hardware products.

### 2.2 Software Versions

Operating System	Version	Date
Windows 2000/XP	2.3.4	March 15, 2011
Linux OS	4.1.2	March 20, 2011
FreeBSD OS	3.1.7	February 10, 2011

## 3 Installation/Un-installation

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### 3.1 Linux OS

To install software under Linux operating system:

- Copy `ex10-X.Y.Z.tgz` to `/usr/local` directory
- Untar the tar ball file by running `tar xvzf ex10-X.Y.Z.tgz`
- Change directory to `/usr/local/ex10-X.Y.Z`
- To install package, execute `./Setup install`. This script will copy all necessary file into you kernel, compile and install modules/binary files.

To un-install software under Linux operating system:

- Change current directory to `/usr/local/ex10`
- Execute `./Setup uninstall` to un-install software

### 3.2 FreeBSD OS

To install software under FreeBSD operating system:

1. Copy `ex10-X.Y.Z.tgz` to temporary directory
2. Execute `pkg_add ex10-X.Y.Z.tgz`

To un-install software under Linux operating system:

3. Execute `pkg_delete ex10-X.Y.Z`

### 3.3 Windows OS

Execute file `eX10SuiteInstall.msi` is located in the “eX10Suite\Windows” directory from CD and follow the installation instructions.

To un-install the software under Windows operating system:

- Open Control Panel window
- Select the “Amfeltec eX10 Suite Software”
- Click “Remove” button

## 4 Operation

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### 4.1 Kernel module

Kernel support module must be loaded before using any of eX10 Suite utilities.

Under Windows OS, the kernel support module is loaded automatically on start of any utility.

Under Linux/FreeBSD OS, the kernel support module needs to be loaded manually. To load kernel support module, execute the following command: *ex10.sh load*. To unload kernel support module, execute the following command: *ex10.sh unload*.

### 4.2 Save/Restore PCI configuration

This application allows saving/restoring PCI/PCI express configuration into/from a file.

This feature is very useful while debugging a new UUT device. During this step, UUT device can be removed from and installed into a computer without shutting down the computer. AMFELTEC application will save and restore configuration for selected device and also all devices are located behind it in order to support full hot-swap functionality.

Please note that PCI to PCI Express Adapter and PCI to PMC Adapter doesn't support hot-swap functionality!

#### 4.2.1 ex10\_pcinfo Utility (Linux/FreeBSD OS)

Under Linux/FreeBSD OS, the utility that provide this feature is called *ex10\_pcinfo*. The following table represents help message for *ex10\_pcinfo* utility:

```
ex10_pcinfo [-h | help] [device id] [operation mode]
```

where:

<i>[-h   help]</i>	Print help message
<i>[device id]:</i>	Search for specified board. The option can be one of the following: <i>[-v &lt;num&gt; -d &lt;num&gt; -bus &lt;num&gt; -slot &lt;num&gt;]</i> <i>[-pcieadp]</i> Specify PCI-to-PCI Express Adapter <i>[-pcitst]</i> Specify PCI Expansion Backplane <i>[-pcietst]</i> Specify PCI Express Expansion Backplane

*[operation mode]:*

<i>[-save   -js]</i>	Save PCI/PCI express configuration
<i>[-restore   -r]</i>	Restore PCI/PCI express configuration
<i>[-more]</i>	Display all PCI/PCI express devices behind selected device.
<i>[-print  -p] &lt;filename&gt;</i>	Print list of PCI/PCI express devices are saved in specified file.

## 4.2.2 PcinfoWin Application (Windows OS)

PcinfoWin utility provides functionality to save and restore PCI/PCI Express configuration registers under Windows OS. The utility will save configuration registers for all devices that are located behind selected PCI/PCI Express device. This will allow implementation of hot-swap functionality (Note: PCI to PCI Express Adapter and PCI to PMC Adapter doesn't support hot-swap functionality).

The *pcinfoWin.exe* utility is located under "c:\Program Files\Amfeltec\EX10 Suite Software" directory. You can execute this file from Windows Explorer or from the Start Menu | Programs | Amfeltec | EX10 Suite Software.

### 4.2.2.1 Get PCI/PCI Express Device Information

The application supports the following option for the search (Figure 1):

- All PCI/PCI express boards – the application will search for all PCI/PCI express boards in your computer.
- PCI to PCI Express Adapter – the application will search for all AMFELTEC PCI to PCI Express Adapter installed in your computer.
- PCI Expansion Backplane – the application will search for all AMFELTEC PCI Expansion Backplanes connected to you computer.
- PCI Express Expansion Backplane – the application will search for all AMFELTEC PCI Express Expansion Backplanes connected to your computer.

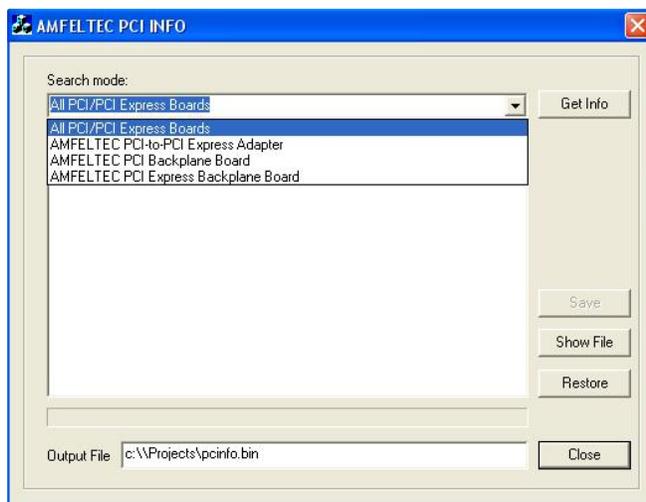
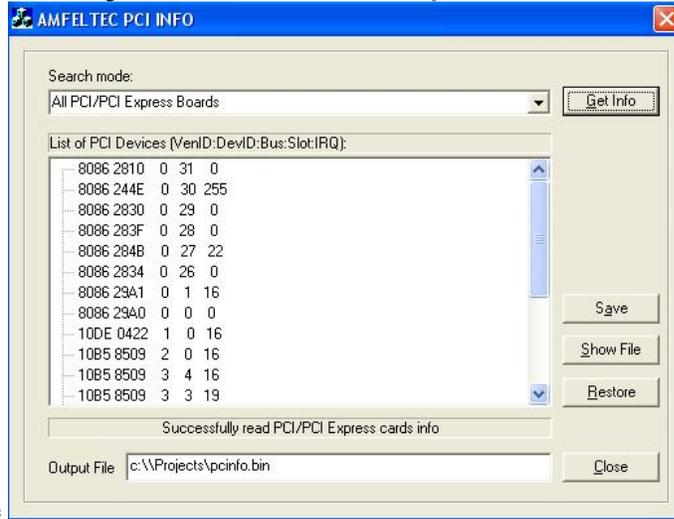


Figure 1: Pcinfo Application

After selecting the search mode, click *Get Info* button. The result will be display in a window.



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Figure 2 shows list of all PCI/PCI express devices are installed in your computer.

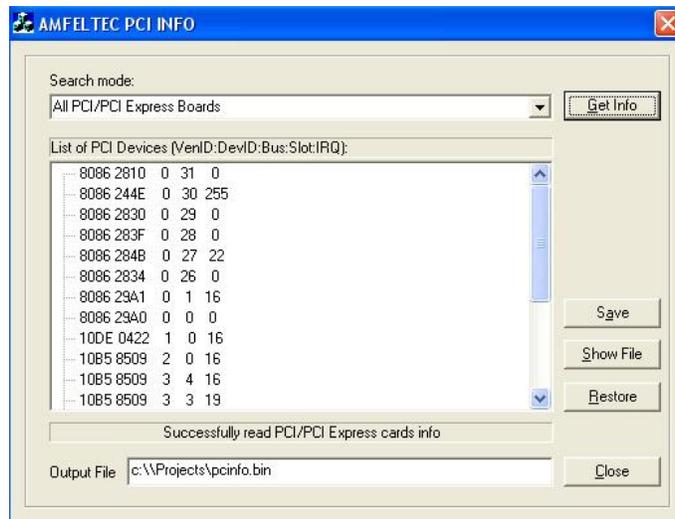


Figure 2: Sample output of all PCI/PCI express devices

#### 4.2.2.2 Save PCI/PCI Express Device Configuration

If you selected one of AMFELTEC devices, you will have option to expand the list of devices with the list of devices located behind selected AMFELTEC device. Figure 3 shows output from search for AMFELTEC PCI Express Expansion Backplane. Figure 4 show expanded output of previous example.

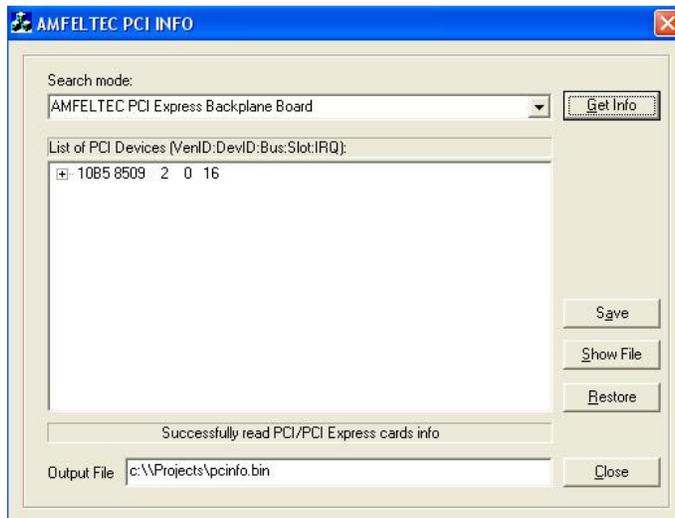


Figure 3: List of PCI Express Expansion Backplane Boards

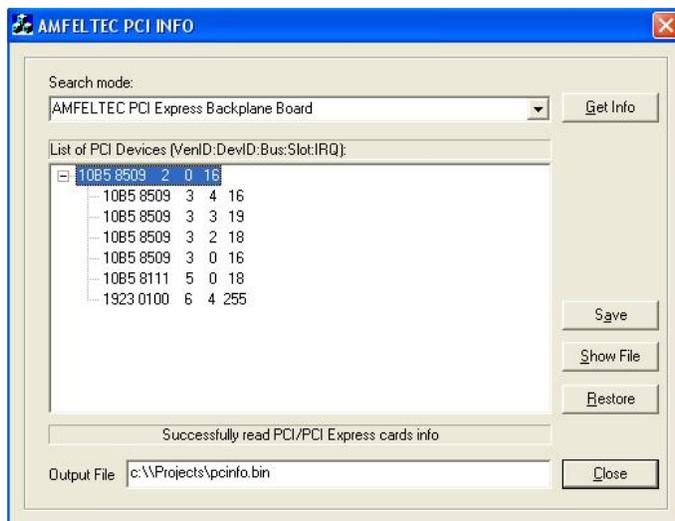


Figure 4: Expanded list of PCI Express Expansion Backplane Boards

In order to save PCI/PCI express configuration, select the main PCI/PCI express board and click on SAVE button. All configuration including selected device and all devices behind the selected device will be saved in specified output file.

### **4.2.2.3 Restore PCI/PCI Express Device Configuration**

First, specify file name in *Output File* box that includes previously stored PCI/PCI Express device configurations.

You can use *Show File* button to display contents of the file in order to confirm that the list of device is correct.

For Windows NT/2000, you can click on RESTORE button and the application will update PCI/PCI Express configuration automatically.

For Windows XP, you need to update ex10winfd.inf located under C:\Program Files\Amfeltec\eX10Suite-X.Y.Z\Drivers directory:

1. Open ex10winfd.inf file and find [Amfeltec] section. This section includes Device Instance Id. For example: PCI\VEN\_12E2&DEV\_4013&SUBSYS\_401312E2&REV\_20
2. You need to include separate line for each device that you are going to restore the configuration. Each line must have different DisplayName (%DeviceDesc.ex10winfd\*%, where '\*' is any number). For each name, add new line in [Strings] section. For example: %DeviceDesc.ex10winfd5% = "Fifth device"
3. Leave the second column unchanged.
4. Update the DeviceID column (third column) for each device. You can take this information from DeviceManage by opening Properties for the device and selecting Details tab.
5. Close the ex10winfd.inf file and click on Restore button.

## **4.3 PCI Express Bridge Tuning Application**

This application provides functionality to update EEPROM on the following AMFELTEC devices:

- PCI to PCI Express Adapter
- PCI Expansion Backplane
- PCI Express Expansion Backplane

The EEPROM is used to adjust default values on PCI express bridge/switch that is used in AMFELTEC devices. Usually, you will never need to do it, but sometimes you need to tune the device in order to reach better performance for your application. Use this feature very carefully and confirm your changes with AMFELTEC technical support group.

### **4.3.1 ex10\_plxctrl Utility (Linux/FreeBSD OS)**

The following table represents help message for ex10\_plxctrl utility:

*ex10\_plxctl [help] [device id] [operation modes]*

where:

<i>[help]</i>	Print help message
<i>[device id]:</i>	Search for specified board. The option can be one of the following: <i>[-v &lt;num&gt; -d &lt;num&gt; -bus &lt;num&gt; -slot &lt;num&gt;]</i> <i>[-pcieadp]</i> Specify PCI-to-PCI Express Adapter <i>[-pcitst]</i> Specify PCI Expansion Backplane <i>[-pcietst]</i> Specify PCI Express Expansion Backplane
<i>[operation modes]:</i>	These parameters provide command to EEPROM. The option can be one of the following: <i>-rr &lt;reg&gt;</i> Read register value <i>-wr &lt;reg&gt; &lt;value&gt;</i> Write value into specified register <i>-wef &lt;filename&gt;</i> Write file contents into EEPROM <i>-we &lt;off&gt; &lt;value&gt;</i> Write value into specified EEPROM offset <i>-ref &lt;filename&gt;</i> Read EEPROM contents into file <i>-re &lt;num&gt; &lt;off&gt;</i> Read values started at <off> (<num> specified number of values to read) <i>-reload</i> Reload content of EEPROM into PCI-to-PCI Bridge or PCI Express Switch (depending of the product) <i>-erase</i> Erase EEPROM contents

ex10\_plxctrl utility uses special EEPROM format to save and load data (refer to Appendix A for mode details).

### 4.3.2 Ex10Tun Application (Windows OS)

By default, the application is located at C:\Program Files\Amfeltec\EX10Suite directory. When you start EX10Tun application, the following dialog will show up (Figure 5).

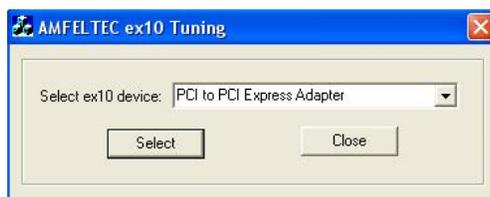


Figure 5: EX10Tun application

EX10Tun provides support for the following AMFELTEC products:

- PCI to PCI Express Adapter
- PCI Expansion Backplane

- PCI Express Expansion Backplane

Select the device type and click on SELECT. The application will search for selected cards and if the device is found the main dialog will be displayed (**Error! Reference source not found.**).

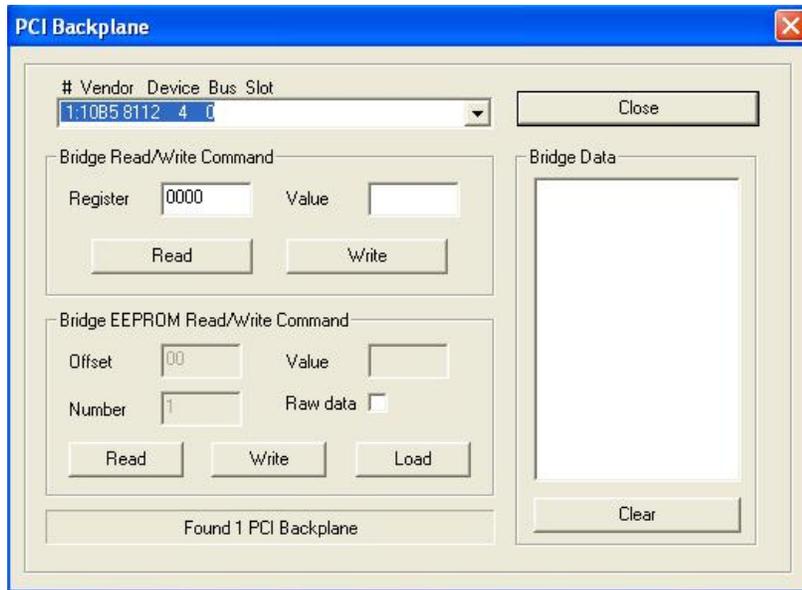


Figure 6: EX10Tun main dialog

Now, select your device from the top drop-down list box. After this, the application will enable operation buttons.

If you would like to read Bridge register, type the register number you want to read in Bridge READ/WRITE Command and click on Read button. The result will show in Bridge DATA LIST window. If you would like to write into a Bridge register, type the register number and register value in Bridge READ/WRITE Command and click on Write button.

You can read and write data into file. In order to read the content of the Bridge EEPROM, check that the RAW DATA checkbox is unchecked and click on Read button. If the EEPROM includes valid information than the EEPROM contents will be displayed in Bridge Data List window. If the EEPROM is empty, “No data available in Bridge EEPROM” message will display in a status bar. Otherwise, the error message will be displayed.

You can also update PLX EEPROM from the file. The format of the file explained in 5. Click on Write button, the Open dialog will ask you to provide location to file that has EEPROM content. Select the file and click on Open button. If any error happened during this period, an error message will be displayed

If you would like to update specific register in Bridge EEPROM, you can do it by selecting Raw Data checkbox. NOTE: The use of this feature is not recommended unless suggested by AMFELTEC technical support!

## 5 Appendix A: EEPROM data file format

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The following file format is used for PCI Express EEPROM data:

FORMAT:[8-bit value]	Define EEPROM width (1, 2 or 4). Currently only 01 is used.
[reg]:[32-bit value]:[port]	Define Register number and its value that will be written into PCI-to-PCI Express Bridge/Switch during power on ( <i>port</i> parameter is used only for PCI Express Expansion Backplane).