

Flexible x4 PCI Express 4-Way Splitter

Hardware Manual

Feb 11, 2014
Revision 1.4

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
3	Requirements/Features	6
3.1	Power Source	6
3.2	Software.....	6
4	Hardware Description	7
4.1	Board Layout	7
4.2	LEDs	8
4.3	Connectors	9
5	Installation	10
5.1	Hardware Installation.....	10
6	Operation Modes.....	11
7	Ordering Information	12
7.1	Standard package.....	12
8	Appendix A: Limited warranty	13

Figures

Figure 1: Flexible x4 PCI Express 4-way Splitter	2
Figure 2: x4 PCI Express Host card (top view).....	3
Figure 3: x4 PCI Express Host card (bottom view).....	3
Figure 4: x1 PCI Express adapter board (powered from Host card 12V, 3.3V)	4
Figure 5: x1 PCI Express adapter board (powered from ATX power supply) (12V, 5V).....	4
Figure 6: x1 PCI Express adapter board (powered from external 12V power supply).....	5
Figure 7: x16 PCI Express adapter board (powered from external 12V power supply).....	5
Figure 8: x4 PCI Express Host card layout.....	7
Figure 9: x1 PCI Express Adapter board layout	8
Figure 10: x1 PCI Express adapter boards in combination	11

Tables

Table 1: x4 PCI Express Host card LEDs.....	8
Table 2: x4 PCI Express Host card connectors.....	9
Table 3: x1 PCI Express adapter board connectors.....	9

1 About this Document

1.1 Purpose

This document describes Hardware installation, features, specification and operation for AMFELTEC Flexible x4 PCI Express 4-Way Splitter (SKU-042).

1.2 Feedback

AMFELTEC Corp. makes every effort to ensure that the information contained in this document is accurate and complete at time of release. Please contact AMFELTEC Corp. 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.	December 10, 2009
1.2	Update hardware installation instructions	June 01, 2011
1.3	Minor changes	July 27, 2011
1.4	Addition of the x16 PCIe adapter option	Feb 11, 2014

2 General Description

2.1 Introduction

Flexible x4 PCI Express 4-Way Splitter (Splitter) (Figure 1) is designed to support expansion of modern motherboards with limited numbers of PCI Express Connectors. Splitter converts the standard x4, x8 or x16 PCI Express motherboard slot up-to 4 independent x1/x4/x16 PCI Express slots.

It includes single x4 PCI Express Host card (Figure 2/Figure 3) and multiple (up-to 4) x1/x4/x16 PCI Express adapter boards (Figure 4/Figure 5/Figure 6). The x4 PCI Express Host card has to be plugged into an upstream PCI Express motherboard connector. Each PCI Express adapter board connects to the main x4 PCI Express Host card via 12” Flex PCI Express cable. The expansion PCI Express add-in board has to be plugged into the standard x1/x4/x16 PCI Express female connector on the x1/x4/x16 PCI Express adapter board.

Because of the flexible nature of the connection (unlike traditional rigid raisers), expansion PCI Express add-in boards can be positioned away from the Splitter, including around any obstacles inside a computer chassis. Each x1/x4/x16 PCI Express adapter board has two mounting holes allowing them to be securely fixed inside a computer chassis. In addition, each x1 PCI Express adapter board has two support tabs for mechanical stabilization expansion add-in boards (US Patent 7,255,570).

x4 PCI Express Host card can be retained inside a computer chassis by using a full size bracket or by using the unique PCI Express add-in card Retainer (Patent Granted) to prevent wiggling. The add-in card Retainer can securely hold a PCI Express Host card without the use of a bracket.

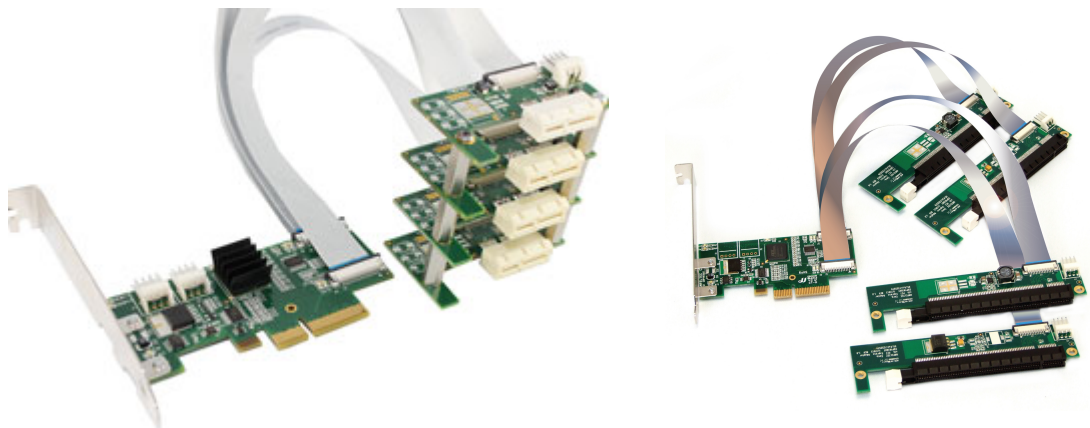


Figure 1: Flexible x4 PCI Express 4-way Splitter - [x1 PCIe \(left\)](#) & [x16 PCIe \(right\)](#) adapter board versions.



Figure 2: x4 PCI Express Host card (top view)

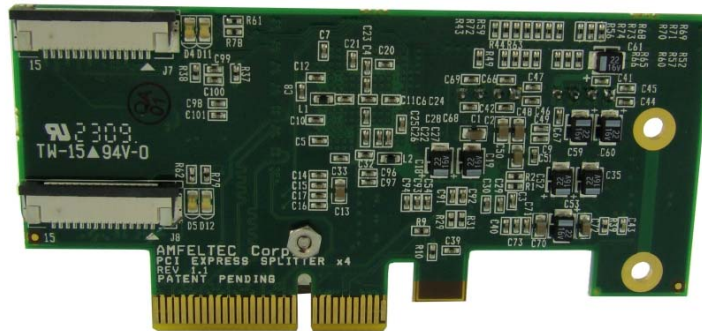


Figure 3: x4 PCI Express Host card (bottom view)

The Splitter functions right out of the box, no additional software needs to be installed. The x4 PCI Express Host card has LEDs for displaying upstream and downstream PCI Express Link status as well as expansion PCI Express add-in boards “PRESENT” status.

General Description

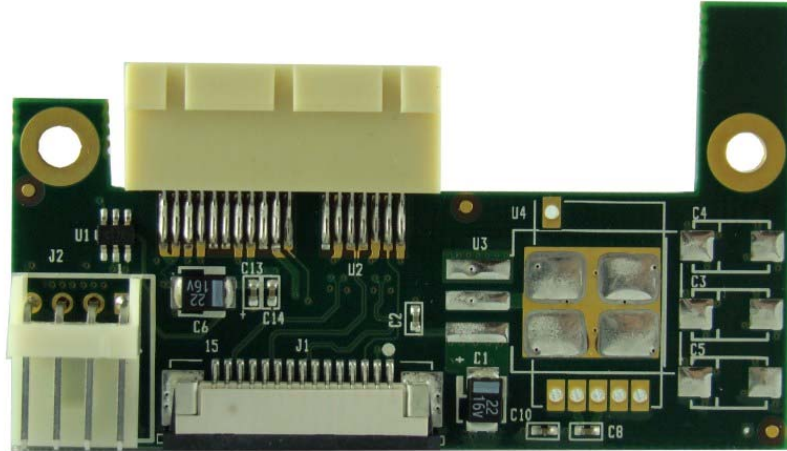


Figure 4: x1 PCI Express adapter board (powered from Host card 12V, 3.3V)



Figure 5: x1 PCI Express adapter board (powered from ATX power supply) (12V, 5V)

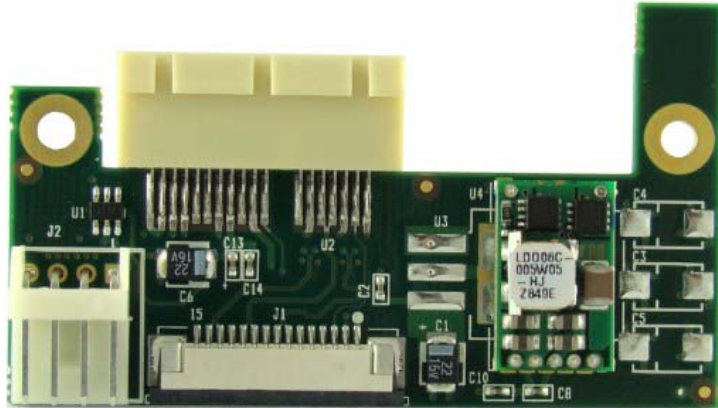


Figure 6: x1 PCI Express adapter board (powered from external 12V power supply)

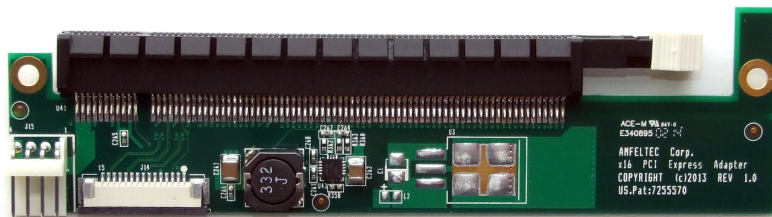


Figure 7: x16 PCI Express adapter board (powered from external 12V power supply)

3 Requirements/Features

3.1 Power Source

The power for the expansion PCI Express add-in board can be supplied from three different sources:

- From x4 PCI Express Host card (12 and 3.3 volt) via power cable and x1 PCI Express adapter board
- From standard ATX power supply (“floppy disk” connector) (12 and 5 volts) via x1/x4/x16 PCI Express adapter board
- From any 12 volt power supply via x1/x4/x16 PCI Express adapter board

Note: These adapters are limited to 40W power delivery.

3.2 Software

No software required.

4 Hardware Description

4.1 Board Layout

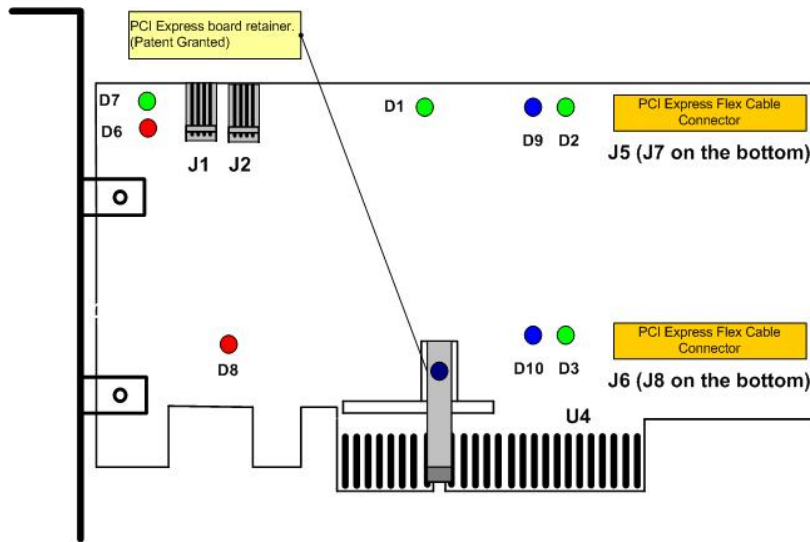


Figure 8: x4 PCI Express Host card layout

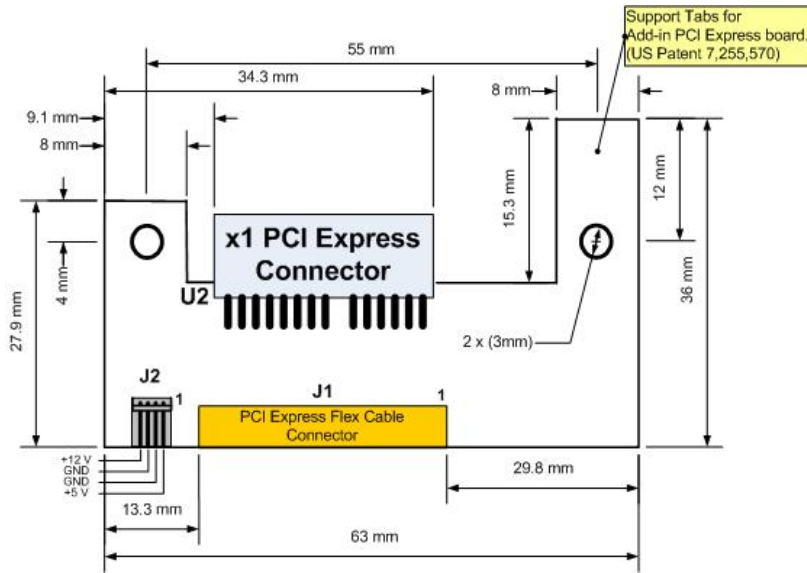


Figure 9: x1 PCI Express Adapter board layout

4.2 LEDs

Name	RefDes	Color	Usage
Link 1 UP	D1	Green	Upstream Link status
Link 2 UP	D2	Green	First downstream link status
Link 3 UP	D3	Green	Second downstream link status
Link 4 UP	D4	Green	Third downstream link status (bottom side)
Link 5 UP	D5	Green	Fours downstream link status (bottom side)
	D6	Red	Switch status
	D7	Green	Switch status
RESET	D8	Red	Upstream PCI Express reset signal
PRSNT 2	D9	Blue	First link "PRSNT" signal
PRSNT 3	D10	Blue	Second link "PRSNT" signal
PRSNT 4	D11	Blue	Third link "PRSNT" signal
PRSNT 5	D12	Blue	Fours link "PRSNT" signal

Table 1: x4 PCI Express Host card LEDs

4.3 Connectors

RefDes	Type	Usage
U4	Upstream x4 PCI Express male connector	Connection to the upstream PCI Express bus on motherboard
J1,J2	“Floppy disk” male power connectors	Supply power for the expansion add-in PCI Express boards
J5,J6,J7 J8	PCI Express Flex Cable connector	Connector via Flex PCI Express Cable to the x1 PCI Express Adapter boards.

Table 2: x4 PCI Express Host card connectors

RefDes	Type	Usage
J1	PCI Express Flex Cable connector	Connector via Flex PCI Express Cable to the x4 PCI Express Host card.
J2	“Floppy disk” male power connectors	Incoming power for the expansion add-in PCI Express boards
U2	Downstream 1x PCI Express female connector	Connection to the expansion add-in PCI Express board.

Table 3: x1 PCI Express adapter board connectors

5 Installation

5.1 Hardware Installation

Following steps provide the exact sequence need to be followed in order to properly install the x4 PCI Express 4-Way Splitter product from AMFELTEC Corp.:

Warning: Before touching anything inside the computer or any components, be sure to discharge your body's static electricity by touching a grounded surface.

- Turn off host computer and unplug it from the wall outlet.
- Remove the chassis cover or side panel from host computer. Refer to the computer manual for instructions if you need them.
- If the unit is a tower unit, turn it over on its side to make access easier.
- Ground yourself to the PC case. Attach a grounding wrist strap (if available) to the computer's metal chassis and your wrist. **CAUTION: If you choose not to use the grounding wrist strap, be sure to take adequate precautions to discharge static electricity from your body before touching any components.**
- Insert PCI Express Flex Cables into the connectors on the PCI Express Host card and on the PCI Express Adapters.
- Install the host card into the motherboard PCI Express slot.
- Place and retain PCI Express Adapters inside the chassis.
- Connect power to the PCI Express Adapters.
- Holding your add-in card by its edges and the mounting bracket, position the card with the contacts downward over the PCI Express slot and insert the card into the slot. Do not let it touch any of the components on the motherboard or PCI Express Adapter.
- Now, you can close computer cover and power-up the host computer.



BE SURE THAT TWO LEDS: D1 (GREEN) IS ON and D8 (RED) IS OFF!
(Upstream Link status and PCI Express RESET signal).



BE SURE THAT GREEN LEDS ARE ON where BLUE LEDS ARE ON!
(Downstream Link connected where add-in PCI Express board is presented)

6 Operation Modes

Multiple x1/x4/x16 PCI Express adapter boards can be attached together with spacers as shown in a photo below.

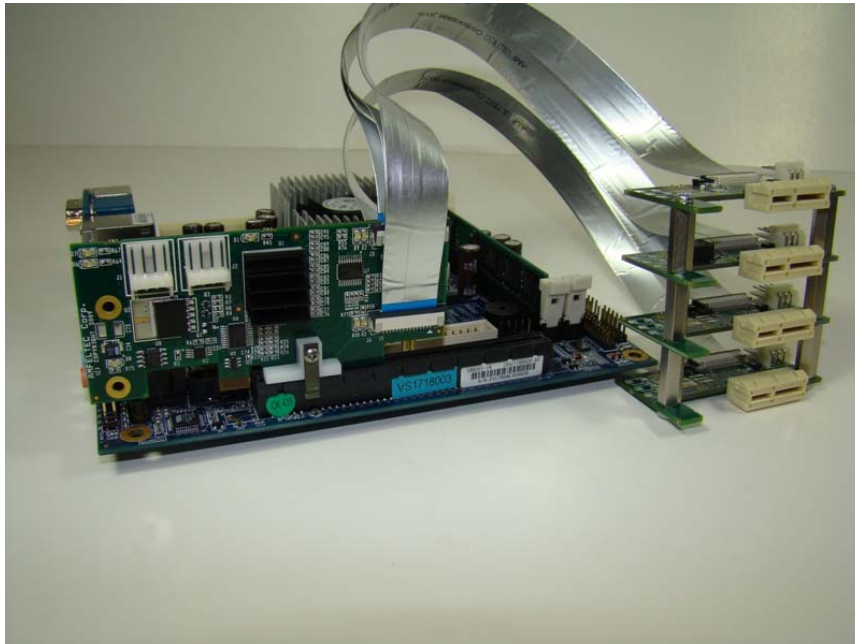


Figure 10: x1 PCI Express adapter boards in combination

7 Ordering Information

7.1 Standard package

Standard package include the following components:

- x4 PCI Express Host card with full size bracket and PCI Express board Retainer
- x1/x4/x16 PCI Express adapter boards with Flex PCI Express cables (up to 4 pieces each)

8 Appendix A: Limited warranty

AMFELTEC Corporation does not warrant that the operation of the hardware, software or firmware products will be uninterrupted or error free. AMFELTEC products are not intended to be used as critical components in life support systems, aircraft, military systems or other systems whose failure to perform can reasonably be expected to cause significant injury to humans. AMFELTEC expressly disclaims liability for loss of profits and other consequential damages caused by the failure of any product which would cause interruption of work or loss of profits, such as shipboard or military attachment.

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