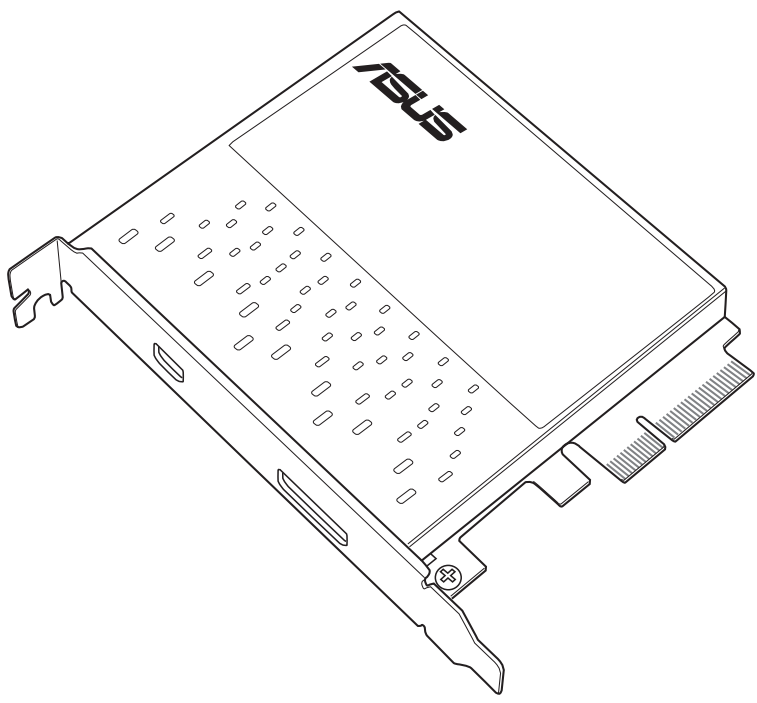


ThunderboltEX II

User Guide



E8613
First Edition
February 2014

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Welcome!

Congratulations and thank you for buying an ASUS ThunderboltEX II card!

The ASUS ThunderboltEX II card provides Thunderbolt™ connection to other Thunderbolt-enabled devices. Use this card to quickly transfer native PCIe and DisplayPort protocols between a PC and Thunderbolt™ devices.

Features

Your ASUS ThunderboltEX II card features a Thunderbolt™ 2 port that supports Thunderbolt™ 2 technology and a DisplayPort that supports DisplayPort 1.2 specifications. The Thunderbolt™ 2 port provides 20 Gb/s bi-directional bandwidth and incorporates DisplayPort 1.2 support enabling transfer and display of 4K video files simultaneously. The Thunderbolt™ 2 port also allows you to connect up to six Thunderbolt-enabled devices in a daisy-chain configuration using Thunderbolt™ cables.

Package contents

Check your package for the following items:

- 1 x ThunderboltEX II card
- 1 x DisplayPort cable
- 1 x mini DisplayPort cable
- 1 x ASUS TB_Header cable
- 1 x User guide
- 1 x Support CD



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

Compatible ASUS motherboard models

The ThunderboltEX II card is compatible with the following ASUS motherboards with TB Headers that passed Intel® validation:

- MAXIMUS VI EXTREME
- SABERTOOTH Z87
- Z87-PRO
- Z87-PRO (V EDITION)
- Z87-PLUS
- Z87-PLUS (VivoMouse EDITION)
- Z87-A
- Z87-A (NFC EXPRESS EDITION)

ThunderboltEX II specifications summary

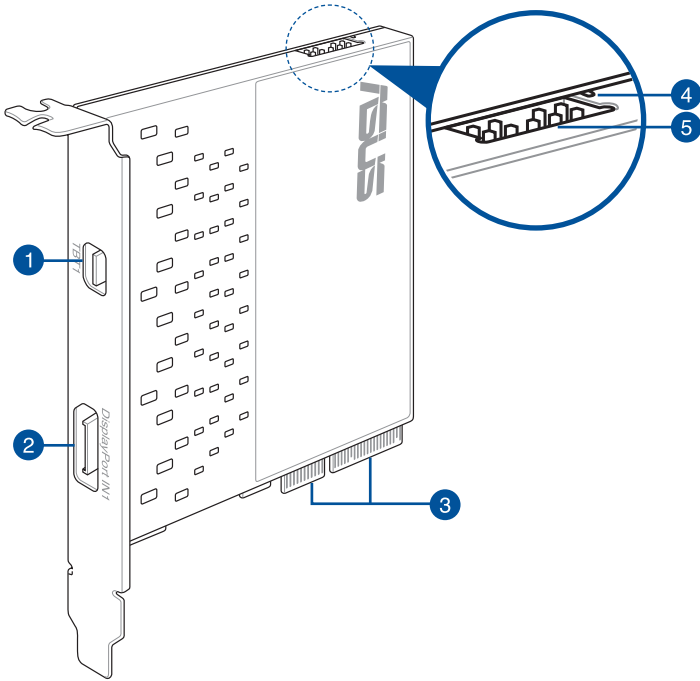
Chipset	Intel® DSL5320 Thunderbolt™ 2 controller
External Connectors	1 x Thunderbolt™ 2 port (up to 20 Gb/s bandwidth) 1 x DisplayPort 1.2 IN port 1 x 9-pin TB_Header
VGA	Supports Thunderbolt™ 2 interface* with maximum resolution of 4096 x 2160 @ 24 Hz / 3840 x 2160 @ 60 Hz DisplayPort 1.2 Multi-Stream Transport (MST) compliant; supports up to three displays of DisplayPort 1.2 monitors.** * Use the Thunderbolt™ cable to link Thunderbolt™ monitors and Thunderbolt-enabled devices in a daisy chain connection. ** Use the mini DisplayPort cable to link up to three DisplayPort 1.2 monitors in a daisy chain connection.
Data Rate	Thunderbolt™ 2 port for 2 channels, 20 Gb/s bidirectional per channel
Accessories	1 x DisplayPort cable* 1 x mini DisplayPort cable* 1 x ASUS TB_Header cable** 1 x Support CD*** * Provides link from the motherboard's DisplayPort or mini DisplayPort to the DisplayPort 1.2 IN port on the ThunderboltEX II card. Use the bundled DisplayPort or mini DisplayPort cable depending on the available DisplayPort connector on your motherboard. ** Provides link from TB_Header of the motherboard to the ThunderboltEX II card's TB header. *** Contains the Thunderbolt™ 2 driver.
Operating Systems Supported	Windows® 7 / Windows® 8 / Windows® 8.1
Form Factor	3.35 in. x 3.94 in. (8.5 cm x 10 cm)

* Specifications are subject to change without notice.



- Use only Thunderbolt™ technology-enabled devices that passed Intel® validation to ensure optimum performance and compatibility with your ThunderboltEX II card.
- Ensure your monitor complies with DisplayPort 1.2 specifications if you want to connect them in a daisy-chain configuration using the Thunderbolt™ 2 port.

ThunderboltEX II card layout



-
- 1 Thunderbolt™ 2 port
 - 2 DisplayPort IN port
 - 3 PCIe 2.0 interface
 - 4 LED indicator
 - 5 TB_Header
-

Installing the ThunderboltEX II driver



We highly recommend that you install the Thunderbolt™ 2 driver first before installing the ThunderboltEX II card.

To install the driver, place the Support DVD into the optical drive then follow on-screen instructions to finish the installation.

Installing the ThunderboltEX II card



- Before installing the ThunderboltEX II card in your motherboard, ensure that you have an available PCIE 2.0 x16 slot connected to the platform controller hub (PCH). For more information on the correct PCIE 2.0 slot to use, refer to the section **ThunderboltEX II card recommended configuration** of this user guide.
- The following illustrations are for reference only. The motherboard layout may vary with models, but the installation steps remain the same.

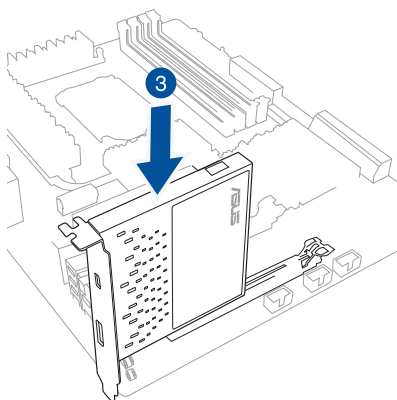
To install the ThunderboltEX II card:

1. Shut down your PC.
2. Open the chassis.



Ensure that no cables or peripherals are blocking the PCIE 2.0 slot.

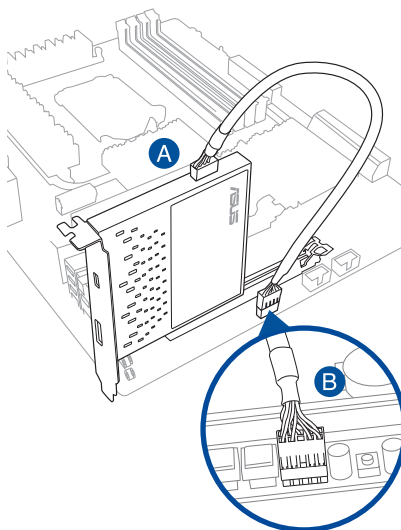
3. Align and insert the ThunderboltEX II card into a PCIE 2.0 slot until it is securely seated in place.



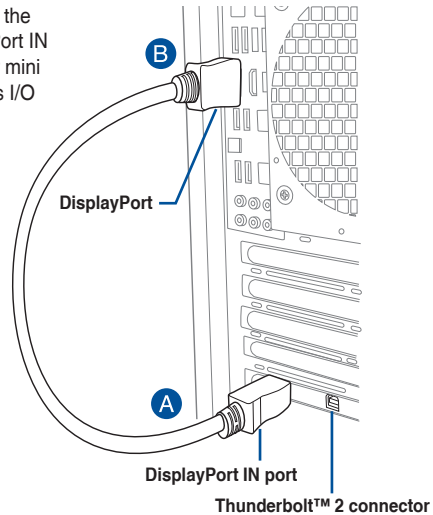
4. Connect the ASUS TB_Header cable to the ThunderboltEX II card (A) and to the TB_Header port on the motherboard (B).



When the red LED on the ThunderboltEX II card is on, it indicates that a cable is disconnected. Refer to the section **ThunderboltEX II card layout** of this user guide for the location of the LED indicator.



5. Connect the DisplayPort cable to the ThunderboltEX II card's DisplayPort IN port (A) and to the DisplayPort or mini DisplayPort on the motherboard's I/O port (B).



6. Close the chassis.
7. Turn on the PC.
8. Connect the Thunderbolt™ cable from your Thunderbolt-enabled device to the Thunderbolt™ 2 port on the ThunderboltEX II card.



- The Thunderbolt™ cable is not bundled with the ThunderboltEX II package. Use the Thunderbolt™ cable that came with your Thunderbolt-enabled device when connecting to the Thunderbolt™ 2 port on your ThunderboltEX II card.
- The Thunderbolt™ 2 port of the ThunderboltEX II card is backward compatible with the previous Thunderbolt™ technology.
- For the recommended daisy-chain configurations or connections, refer to the section **Connecting to external devices** of this user guide.

ThunderboltEX II card recommended configuration

Compatible ASUS motherboard models	PCIe 2.0 port on the motherboard (color)	PCIe 2.0 mode (D = Default; M = Maximum; D/M = Default & Maximum)	Maximum bandwidth	Supported BIOS version*
MAXIMUS VI EXTREME	PCIe 2.0/1.1 x4_1 (Black)	D/M: x4 mode	20 Gb/s	1702 or later
SABERTOOTH Z87	PCIe 2.0 x16_3 (Black)	D/M: x4 mode	20 Gb/s	1702 or later
Z87-PRO	PCIe 2.0 x16_3 (Dark Brown)	D: x1 mode** M: x4 mode	20 Gb/s	1702 or later
Z87-PRO (V EDITION)	PCIe 2.0 x16_3 (Dark Brown)	D: x1 mode** M: x4 mode	20 Gb/s	1702 or later
Z87-PLUS	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s	1702 or later
Z87-PLUS (VivoMouse EDITION)	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s	1702 or later
Z87-A	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s	1702 or later
Z87-A (NFC EXPRESS EDITION)	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s	1702 or later



* Update the BIOS of your motherboard and the VGA driver to the latest version. Go to www.asus.com for more information.

** Set the mode of your motherboard's PCIe 2.0 x16_3 from x1 to x4 to maximize the performance of your ThunderboltEX II card. When you adjust the mode from x1 to x4, the PCIEX1_2, PCIEX1_3, PCIEX1_4, and SATA6G_E12 are disabled. Refer to the chapter **BIOS setup** of your motherboard's user guide for more information.

*** The maximum bandwidth of the PCIe 2.0 x16_3 slot on these supported motherboards is up to x2 mode only. The maximum bandwidth in x2 mode is 10 Gb/s.



If you install an add-on VGA card, ensure to set the BIOS item **iGPU Multi Monitor** to **Enable**. Refer to the chapter **BIOS setup** of your motherboard's user guide for more information.

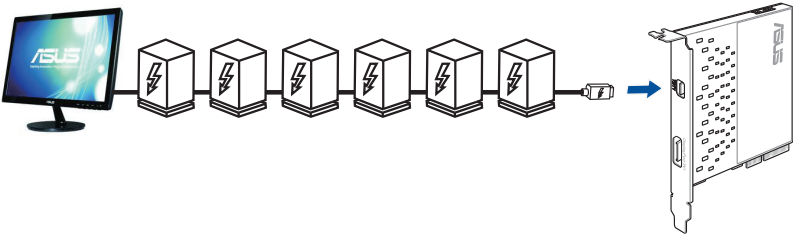
Connecting to external devices



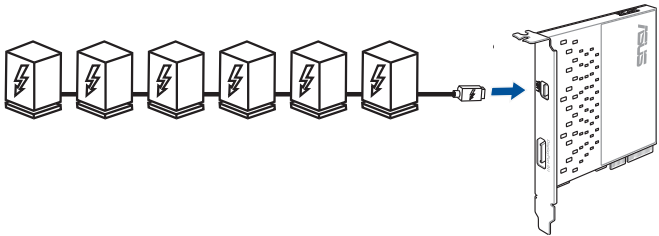
Before connecting any Thunderbolt-enabled devices in a daisy-chain configuration, ensure that it is equipped with one Thunderbolt™ IN port and one Thunderbolt™ OUT port.

You can refer to the following illustrations for the recommended daisy-chain connections:

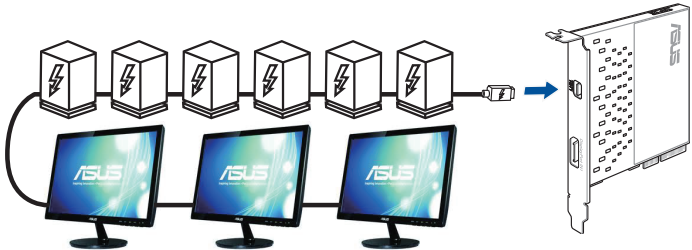
Five Thunderbolt™ devices + one native Thunderbolt™ monitor



Six Thunderbolt™ devices



Six Thunderbolt™ devices + three DisplayPort 1.2 displays



Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IC: Canadian Compliance Statement

Complies with the Canadian ICES-003 Class B specifications. This device complies with RSS 210 of Industry Canada. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada. Cet appareil numérique de la Classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Cet appareil est conforme aux normes CNR exemptes de licence d'Industrie Canada. Le fonctionnement est soumis aux deux conditions suivantes :

- (1) cet appareil ne doit pas provoquer d'interférences et
- (2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité de l'appareil.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

VCCI: Japan Compliance Statement

VCCI Class B Statement

情報処理装置等電波障害自主規制について

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は家庭環境で使用されることを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

KC: Korea Warning Statement

B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

*당해 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다.

REACH

Complying with the REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS REACH website at <http://csr.asus.com/english/REACH.htm>.



DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.



DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to <http://csr.asus.com/english/Takeback.htm> for detailed recycling information in different regions.

ASUS contact information

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Fax +886-2-2890-7798
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Web site <http://www.asus.com>

Technical Support

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Fax +86-21-5866-8722, ext. 9101#
Online support <http://support.asus.com/techserv/techserv.aspx>

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Address 800 Corporate Way, Fremont, CA 94539, USA
Telephone +1-510-739-3777
Fax +1-510-608-4555
Web site <http://usa.asus.com>

Technical Support

Telephone +1-812-284-0883
Support fax +1-812-282-2787
Online support <http://support.asus.com/techserv/techserv.aspx>

ASUS COMPUTER GmbH (Germany and Austria)

Address Harkort Str. 21-23, 40880 Ratingen, Germany
Fax +49-2102-959931
Web site <http://www.asus.com/de>
Online contact <http://eu-rma.asus.com/sales>

Technical Support

Telephone +49-2102-5789555
Support Fax +49-2102-959911
Online support <http://support.asus.com/techserv/techserv.aspx>

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) 739-3777/(510) 608-4555**

hereby declares that the product

Product Name : ThunderboltEX II PCI EXPRESS Card

Model Number : THUNDERBOLT EX II DUAL, THUNDERBOLT EX II

Conforms to 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 : Dec. 13, 2013

Ver. 120601

EC Declaration of Conformity



We, the undersigned,

Manufacturer:	ASUSTEK COMPUTER INC.
Address, City:	#F, NO. 150, LITE RD., PEITOU, TAIPEI 112, TAIWAN
Country:	TAIWAN
Authorized representative in Europe:	ASUS COMPUTER GmbH
Address, City:	HARKORT STR. 21-23, 40880 DATTENEN
Country:	GERMANY

declare the following apparatus:

Product name :	ThunderboltEX II PCI EXPRESS Card
Model name :	THUNDERBOLT EX II DUAL, THUNDERBOLT EX II

conform with the essential requirements of the following directives:

- 2004/108/EC EMC Directive**
 - EN 55022:2010/A2:2011
 - EN 61000-3-2:2006+A2:2009
 - EN 55013:2001+A1:2009+A2:2006
- 1989/5/EEC R & L TTE Directive**
 - EN 300 328 V1.7.1 (2006-10)
 - EN 300 440-2 V1.4.1 (2010-08)
 - EN 301 511 V0.0.2 (2005-03)
 - EN 301 888 V5.2.1 (2011-07)
 - EN 301 883 V1.6.1 (2011-1)
 - EN 301 888 V1.1 (2009-01)
 - EN 302 223 V1.1 (2010-04)
 - EN 50360:2001
 - EN 62479:2010
 - EN 62311:2008
- 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
- 2011/65/EU RoHS Directive**
 - EN 55024:2010
 - EN 61000-3-3:2008
 - EN 55020:2007+A1:2011
 - EN 301 489-1 V1.9.2 (2011-08)
 - EN 301 489-4 V1.4.1 (2009-05)
 - EN 301 489-7 V1.3.1 (2009-11)
 - EN 301 489-8 V1.2.1 (2009-05)
 - EN 301 489-17 V2.2.1 (2012-09)
 - EN 301 489-24 V1.5.1 (2010-09)
 - EN 302 223 V1.2.2 (2010-08)
 - EN 302 223 V1.2.1 (2009-08)
 - EN 301 357-2 V1.4.1 (2008-11)
 - EN 302 291-1 V1.1.1 (2006-07)
 - EN 302 291-2 V1.1.1 (2009-07)



(EC conformity marking)

Position : CEO
Name : Jerry Shen

Signature : _____

Declaration Date: 13/12/2013
Year to begin affixing CE marking: 2013

Ver. 130116

