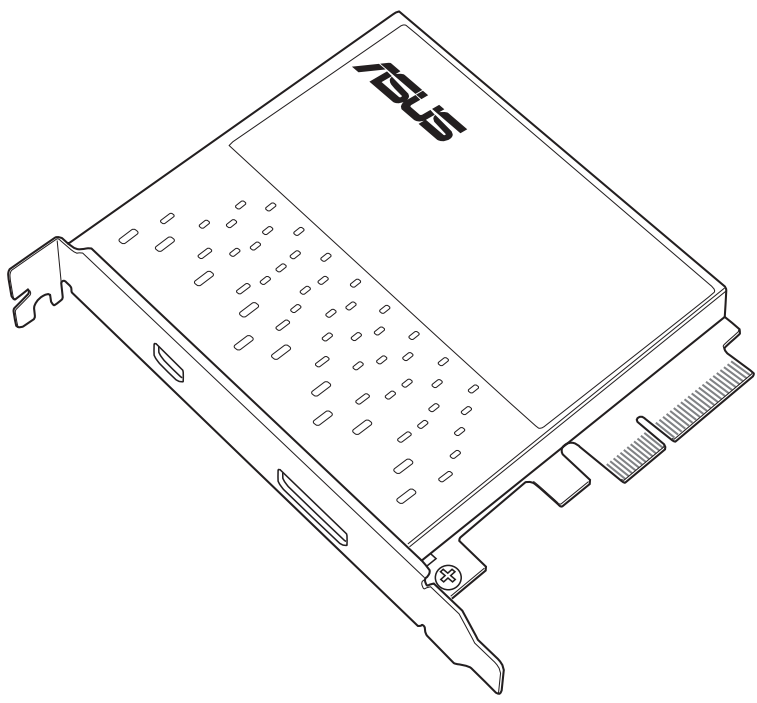


ThunderboltEX II

User Guide



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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 ASUS TB_Header converter
- 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 ASUS motherboards with TB-Headers that passed Intel® validation. The following motherboards are supported:

- MAXIMUS VI EXTREME
- SABERTOOTH Z87
- Z87-PRO / Z87-PRO (V EDITION)
- Z87-PLUS / Z87-PLUS (VivoMouse EDITION)
- Z87-A / Z87-A (NFC EXPRESS EDITION)
- Z97-PRO / Z97-PRO(Wi-Fi ac)
- Z97-A
- Z97-AR
- SABERTOOTH Z97 MARK 1
- SABERTOOTH Z97 MARK 2
- GRYPHON Z97 / GRYPHON Z97(ARMOR KIT)
- MAXIMUS VII FORMULA

ThunderboltEX II specifications summary

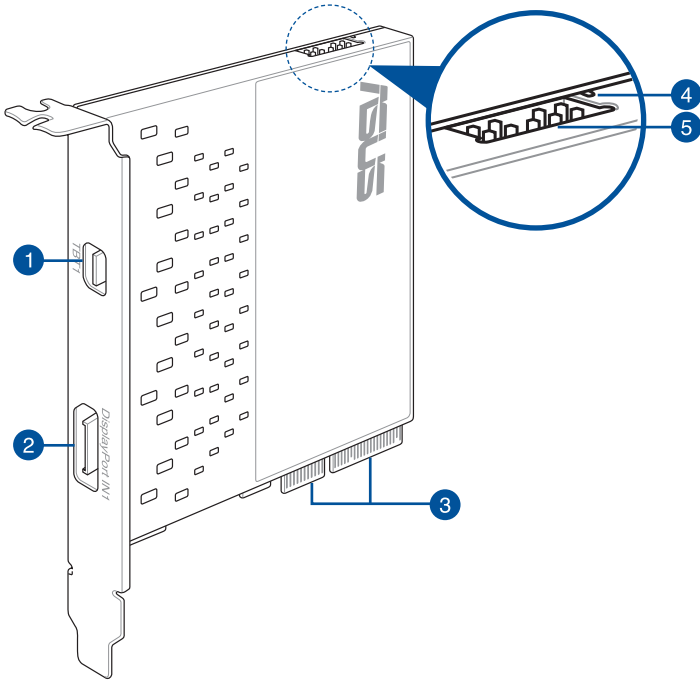
Chipset	Intel® DSL5320 Thunderbolt™ 2 controller
External Connectors	1 x Thunderbolt™ 2 port (up to 20 Gb/s bandwidth) 1 x DisplayPort 1.2 IN port 1 x 9-pin TB_Header
VGA	Supports Thunderbolt™ 2 interface* with maximum resolution of 4096 x 2160 @ 24 Hz / 3840 x 2160 @ 60 Hz DisplayPort 1.2 Multi-Stream 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 ASUS TB_Header converter*** 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. *** Use the bundled TB_Header converter with the TB_Header cable when connecting your ThunderboltEX II card to the 5-pin TB_Header port of 9 series motherboards. **** 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.

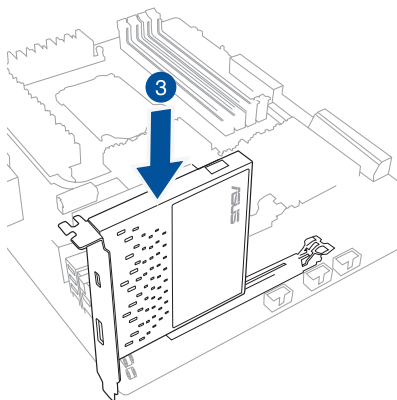
To install the ThunderboltEX II card:

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



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

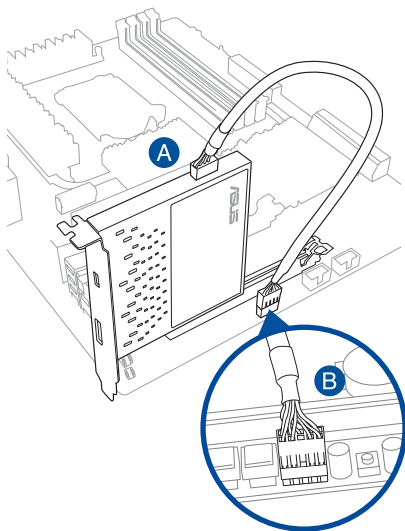
3. Align and insert the ThunderboltEX II card into a PCIe 2.0 slot until it is securely seated in place.



4. For supported 8 Series motherboards, connect the ASUS TB_Header cable to the ThunderboltEX II card (A) and to the TB_Header port on the motherboard (B).



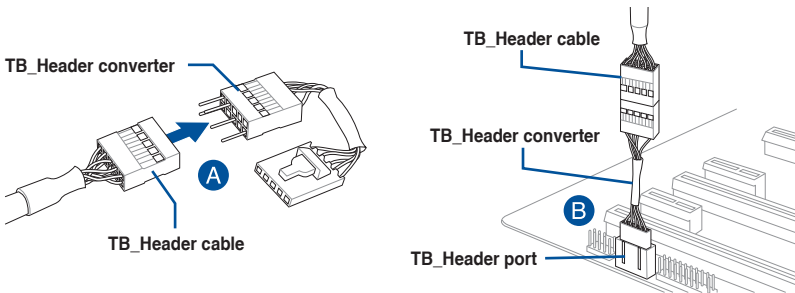
When the red LED on the ThunderboltEX II card is on, it indicates that a cable is disconnected. Refer to the section **ThunderboltEX II card layout** of this user guide for the location of the LED indicator.



For supported 9 Series motherboards, use the bundled TB_Header converter to connect your ThunderboltEX II card to the TB_Header port on the motherboard.

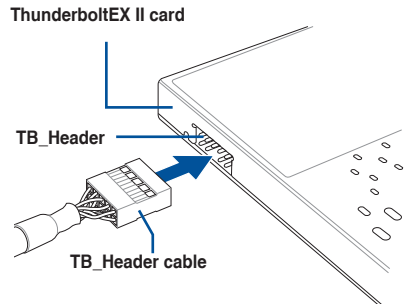
To use the TB_Header converter:

- a. Prepare the ASUS TB_Header converter and the TB_Header cable.
- b. Connect one end of the TB_Header converter to the TB_Header cable (A) then connect the other end of the TB_Header converter to the TB_Header port on the motherboard (B) as shown.



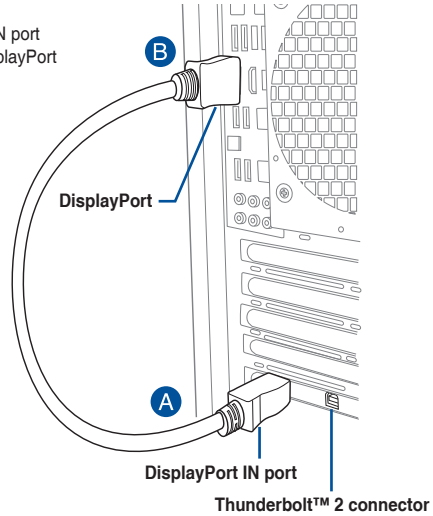
The TB_Header converter fits in one orientation only.

- c. Connect the other end of the TB_Header cable to the TB_Header on the ThunderboltEX II card.



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
MAXIMUS VI EXTREME	PCIe 2.0/1.1 x4_1 (Black)	D/M: x4 mode	20 Gb/s
SABERTOOTH Z87	PCIe 2.0 x16_3 (Black)	D: x1 mode** M: x4 mode	20 Gb/s
Z87-PRO	PCIe 2.0 x16_3 (Dark Brown)	D: x1 mode** M: x4 mode	20 Gb/s
Z87-PRO (V EDITION)	PCIe 2.0 x16_3 (Dark Brown)	D: x1 mode** M: x4 mode	20 Gb/s
Z87-PLUS	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s
Z87-PLUS (VivoMouse EDITION)	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s
Z87-A	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s
Z87-A (NFC EXPRESS EDITION)	PCIe 2.0 x16_3 (Dark Brown)	D/M: x2 mode***	10 Gb/s
Z97-PRO	PCIEX16_3 (Black)	D: x1 mode** M: x4 mode	20 Gb/s
Z97-PRO(Wi-Fi ac)	PCIEX16_3 (Black)	D: x1 mode** M: x4 mode	20 Gb/s
Z97-A	PCIEX16_3 (Black)	D/M: x2 mode***	10 Gb/s
Z97-AR	PCIEX16_3 (Black)	D/M: x2 mode***	10 Gb/s
SABERTOOTH Z97 MARK 1	PCIEX16_3 (Black)	D: x1 mode** M: x4 mode	20 Gb/s
SABERTOOTH Z97 MARK 2	PCIEX16_3 (Black)	D: x2 mode** M: x4 mode	20 Gb/s
GRYPHON Z97	PCIEX16_3 (Black)	D/M: x4 mode	20 Gb/s
GRYPHON Z97 (ARMOR EDITION)	PCIEX16_3 (Black)	D/M: x4 mode	20 Gb/s
MAXIMUS VII FORMULA	PCIEX16_3 (Red)	D: x2 mode** M: x4 mode	20 Gb/s



* 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. Refer to the **BIOS setup** chapter 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 x2 mode with a maximum bandwidth of 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.

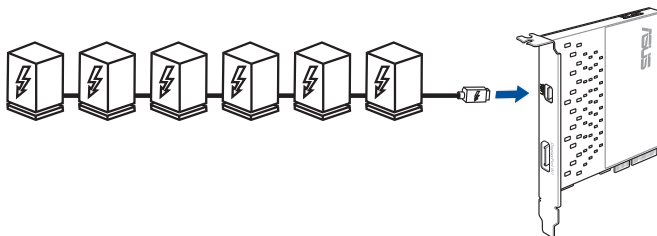
Connecting to external devices



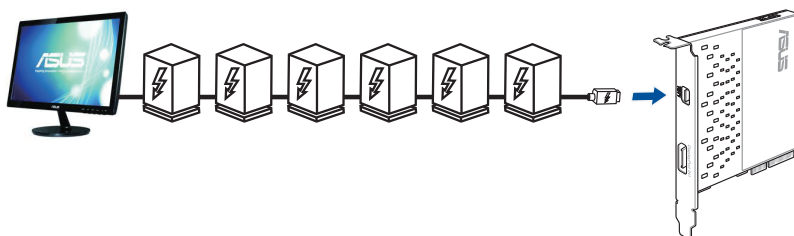
Before connecting any Thunderbolt-enabled devices in a daisy-chain configuration, ensure that it is equipped with one Thunderbolt™ IN port and one Thunderbolt™ OUT port.

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

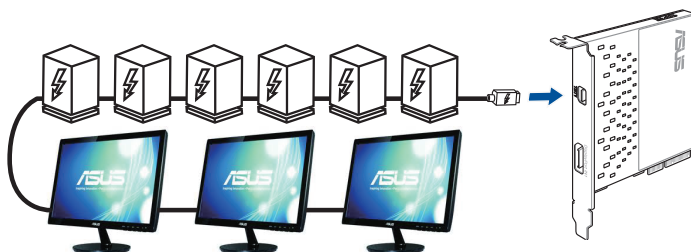
Six (6) Thunderbolt™ devices



Six (6) Thunderbolt™ devices + one (1) native DisplayPort monitor



Six (6) Thunderbolt™ devices + three (3) 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

Class B ITE

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用す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。

VCCI-B

This is a Class B product based on the standard of the VCCI Council. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

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 contact information

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Telephone +886-2-2894-3447
Fax +886-2-2890-7798
E-mail info@asus.com.tw
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>

ASUS COMPUTER INTERNATIONAL (America)

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 : Thunderbolt II PCI EXPRESS Card

Model Number : THUNDERBOLT II DUAL, THUNDERBOLT 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: **4F, No. 150, LITE Rd., PEITOU, TAIPEI 112, TAIWAN**
Country: **TAIWAN**
Authorized representative in Europe: **ASUS COMPUTER GmbH**
Address, City: **HARKORT STR. 21-23, 40880 RATINGEN**
Country: **GERMANY**

declare the following apparatus:

Product name : **Thunderbolt II PCI EXPRESS Card**
Model name : **THUNDERBOLT II DUAL, THUNDERBOLT II**

conform with the essential requirements of the following directives:

- 2004/108/EC-EMC Directive**
 - EN 55022:2010-AC:2011
 - EN 55024:2010-AC:2011
 - EN 50133:2011-01-01
 - EN 55020:2007-04-12:2010
- 1989/5/EEC-RoHS Directive**

- EN 55033:2011-01-01
- EN 300 440-1 V1.6.1 (2010-08)
- EN 300 440-2 V1.4.1 (2010-08)
- EN 300 440-3 V1.4.1 (2009-05)
- EN 301 489-4 V1.4.1 (2009-05)
- EN 301 908-1 V5.2.1 (2011-05)
- EN 301 908-2 V5.2.1 (2011-07)
- EN 302 544-2 V1.1.1 (2009-01)
- EN 302 623 V1.1.1 (2009-01)
- EN 302 326-3 V1.3.1 (2007-09)
- EN 302 326-2 V1.2.2 (2007-09)
- EN 302 326-1 V1.1.1 (2007-09)
- EN 62479:2010
- EN 50385-2:2002
- EN 62311:2008
- EN 301 489-1 V1.9.2 (2011-09)
- EN 301 489-3 V1.4.1 (2002-09)
- EN 301 489-4 V1.4.1 (2009-05)
- EN 301 489-5 V1.4.1 (2007-11)
- EN 301 489-7 V2.2.1 (2012-09)
- EN 302 326-2 V1.2.2 (2007-09)
- EN 302 326-3 V1.3.1 (2007-09)
- 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
 - EN 60965:2002 /A12:2011

- 2009/128/EC-ERP Directive**
 - Regulation (EC) No. 1275/2008
 - Regulation (EC) No. 642/2009

- 2011/65/EU-RoHS Directive**
 - Regulation (EC) No. 617/2013

Ver. 130616



(EC conformity marking)

Position : **CEO**
Name : **Jerry Shen**

Signature : _____

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