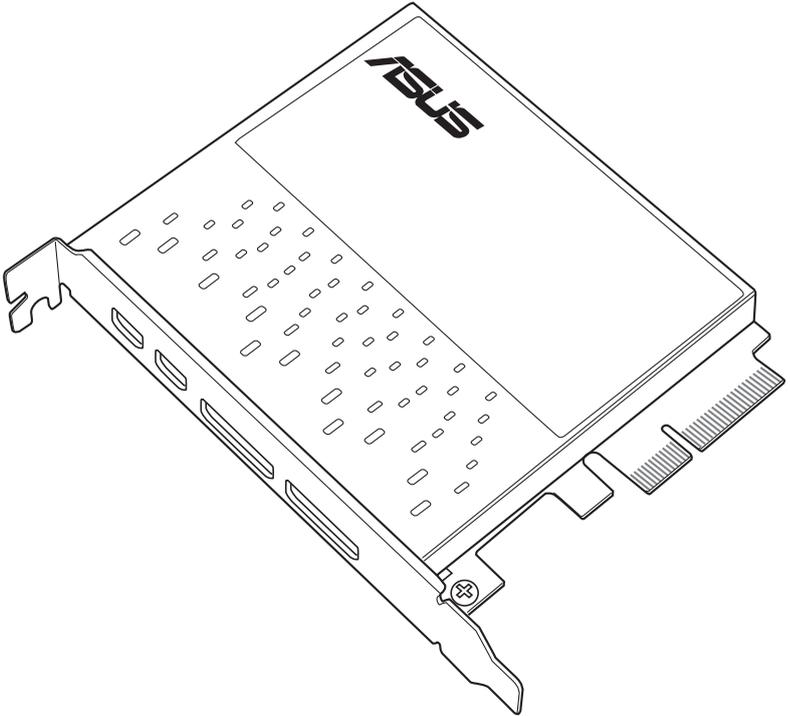


ThunderboltEX II/DUAL

User Guide



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Welcome!

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

The ASUS ThunderboltEX II/DUAL 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/DUAL card features two Thunderbolt™ 2 ports that supports Thunderbolt™ 2 technology and two 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. Each of the Thunderbolt™ 2 port 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/DUAL 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/DUAL card is compatible with the following ASUS motherboards:

- ASUS Z87-DELUXE
- ASUS Z97-DELUXE
- ASUS Z97-DELUXE (NFC & WLC)



Use the ThunderboltEX II/DUAL card only with motherboards that passed Intel® certification.

ThunderboltEX II/DUAL specifications summary

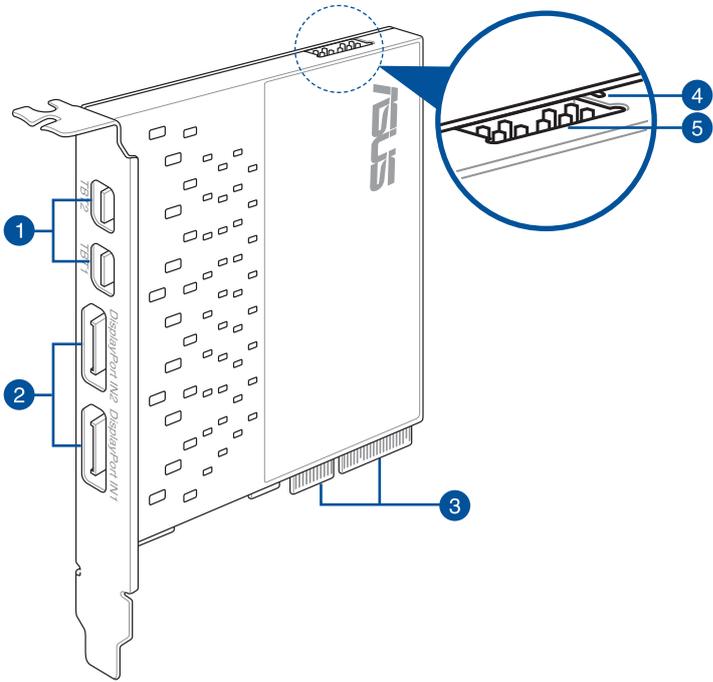
Chipset	Intel® DSL5520 Thunderbolt™ 2 Controller
External Connectors	2 x Thunderbolt™ 2 ports (20 Gb/s bandwidth on each port) 2 x DisplayPort 1.2 IN ports 1 x 9-pin TB header
Display	Supports Thunderbolt™ 2 interface* with maximum resolution of 4096 x 2160 @ 24 Hz / 3840 x 2160 @ 60 Hz DisplayPort 1.2 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	2 x Thunderbolt™ 2 ports for 4 channels, 20 Gb/s bi-directional 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/DUAL card to the 5-pin TB_Header connectors of 9 series motherboards. **** Contains the Thunderbolt™ 2 driver.
Operating Systems Supported	Windows® 7 (64-bit) / Windows® 8 (64-bit) / Windows® 8.1 (64-bit)
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 the Intel® validation to ensure optimum performance and compatibility with your ThunderboltEX II/DUAL 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/DUAL card layout



- 1 Thunderbolt™ 2 ports 1 and 2
- 2 DisplayPort IN ports 1 and 2
- 3 PCIE 2.0 interface
- 4 LED indicator
- 5 TB_Header

Installing the ThunderboltEX II/DUAL driver



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



- Before installing the ThunderboltEX II/DUAL 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/DUAL 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.

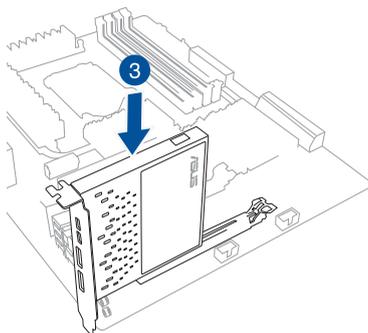
To install ThunderboltEX II/DUAL card:

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

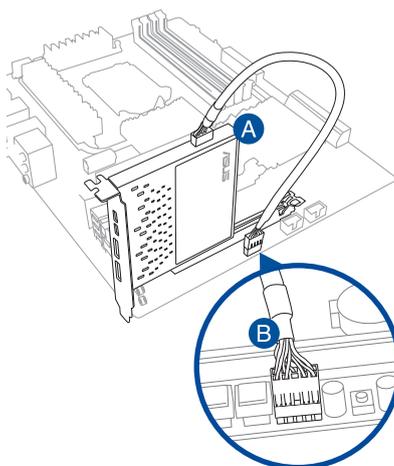


Ensure that no cables or peripherals are blocking the PCIE 2.0 slot.

3. Align and insert the ThunderboltEX II/DUAL 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/DUAL card (A) and to the TB_Header port on the motherboard (B).

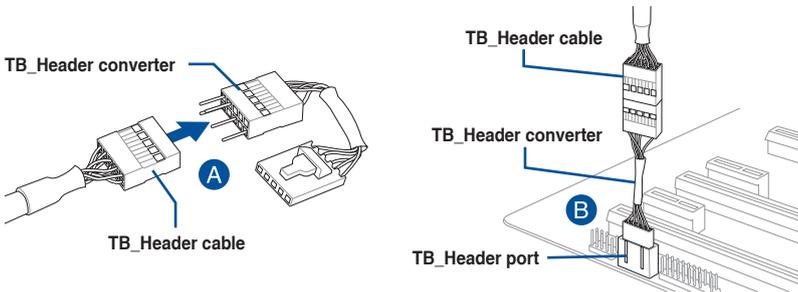


When the red LED on the ThunderboltEX II/DUAL card is on, it indicates that a cable is disconnected. Refer to the section **ThunderboltEX II/DUAL card layout** of this user guide for the location of the LED indicator.

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

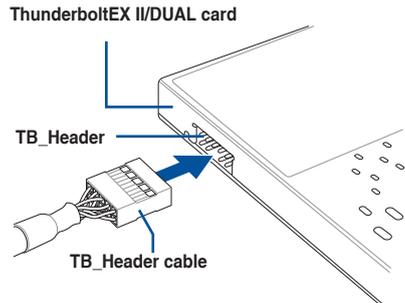
To use the TB_Header converter:

- 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.



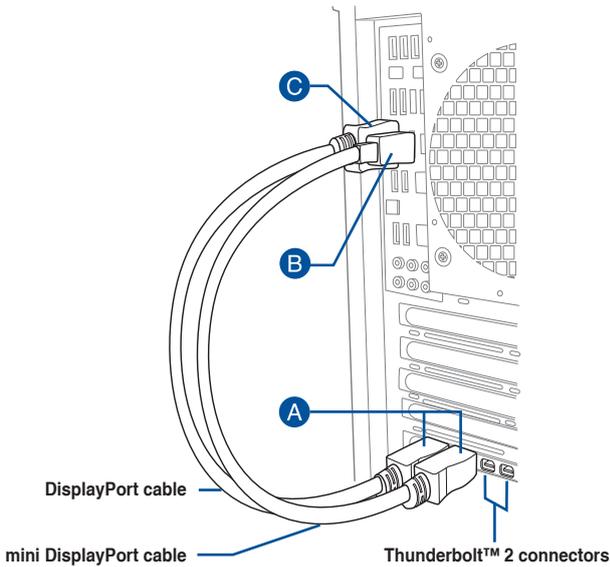
The TB_Header converter fits in one orientation only.

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



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

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



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/DUAL card.



- The Thunderbolt™ cable is not bundled with the ThunderboltEX II/DUAL package. Use the Thunderbolt™ cable that came with your Thunderbolt-enabled device when connecting to the Thunderbolt™ 2 port on your ThunderboltEX II/DUAL card.
- The two Thunderbolt™ 2 port of the ThunderboltEX II/DUAL 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/DUAL 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
Z87-DELUXE	PCIe 2.0 x16_3 (Dark Brown)	D/M: x4 mode	20 Gb/s	1702 or later**
Z97-DELUXE / Z97-DELUXE (NFC & WLC)	PCIe 2.0 x16_3 (Black)	D: Auto mode* D/M: x4 mode	20 Gb/s	0603 or later**



* Set the mode of your motherboard's PCIe 2.0 x16_3 to x4 mode to maximize the performance of your ThunderboltEX II/DUAL card. When you adjust the mode to x4, the USB3_E56 and SATAExpress_E1 connectors will be disabled. Refer to the chapter BIOS setup of your motherboard's user guide for more information.

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



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.

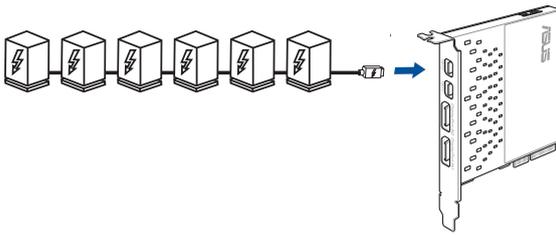
Single-port configuration

You can refer to the following recommended daisy-chain connections for a single-port configuration.

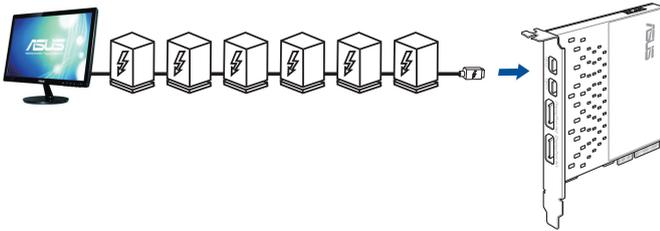


You can use either of the Thunderbolt™ 2 port on the ThunderboltEX II/DUAL card for the following connections.

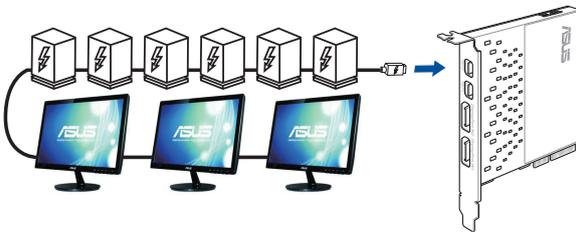
Six (6) Thunderbolt™ devices



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



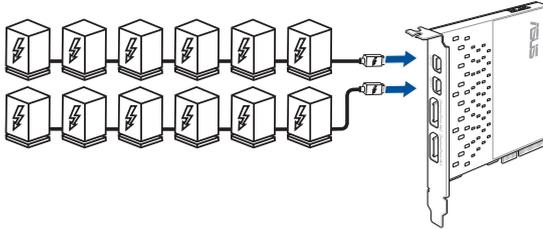
Six (6) Thunderbolt™ devices + three (3) DisplayPort 1.2 displays



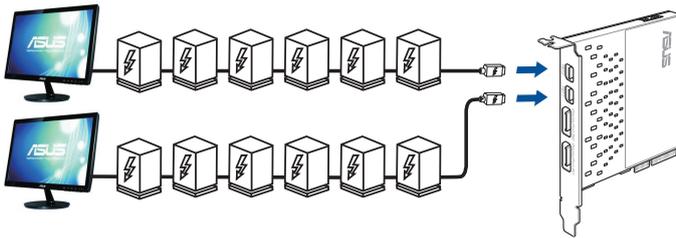
DUAL-port configuration

You can refer to the following recommended daisy-chain connections for a DUAL-port configuration.

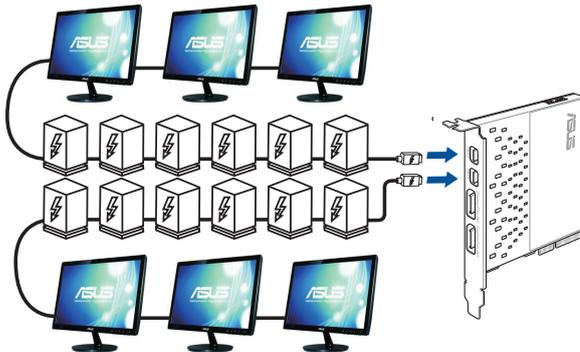
Twelve (12) Thunderbolt™ devices



Twelve (12) Thunderbolt™ devices + two (2) native DisplayPort monitors



Twelve (12) Thunderbolt™ devices + six (6) 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。

V C C I - 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 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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Technical Support

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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 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: **4F, No. 150, LI-TE 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 EX II/DUAL, THUNDERBOLT EX II**

conform with the essential requirements of the following directives:

2004/108/EC-EMC Directive

EN 55024:2010-AC:2011
 EN 55024:2010-AC:2011
 EN 55035:2001/A1:2003/A2:2006
 EN 55020:2007/A1:2011

1989/5/EC-RoHS ATTE Directive

EN 300 528 V1.7 (12005-10)
 EN 300 440-1 V1.6 (12010-08)
 EN 300 440-2 V1.6 (12010-08)
 EN 301 511 V0.4.2 (2003-03)
 EN 301 489-1 V1.3 (2005-11)
 EN 301 489-2 V1.3 (2005-11)
 EN 301 489-3 V1.4 (2007-11)
 EN 301 988-1 V5.2 (12011-05)
 EN 301 988-2 V5.2 (12011-07)
 EN 302 844-1 V1.1 (2009-01)
 EN 302 844-2 V1.1 (2009-01)
 EN 302 823 V1.1 (12009-01)
 EN 302 326-3 V1.3 (12007-09)
 EN 302 326-2 V1.2 (12007-09)
 EN 302 291-1 V1.1 (12005-07)
 EN 62479:2010
 EN 50365:2002
 EN 62311:2005

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

Regulation (EC) No. 617/2013

CE marking



(EC conformity marking)

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

Signature : _____

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

Ver. 130616