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Note

Before using this information and the product it supports, read the general information in Appendix A “Getting help and technical assistance”, Appendix B “Notices”, the safety information, warranties, and licenses information on the Lenovo Web site at: <https://support.lenovo.com/documents/LNVO-DOCS>.

First Edition February 2018

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Chapter 1: Hardware Installation

1.1 Requirements

The following items are required for installation:

- A ThinkSystem 1610-4P Non-Volatile Memory Express (NVMe) switch adapter
- A host system with an available x16 PCI Express (PCIe) expansion slot
- The *ThinkSystem Storage Adapters Software User Guide*
- The necessary internal cables to connect between the NVMe Solid State Devices (SSDs) and the backplane
- NVMe SSDs

1.2 Hardware Installation Instructions

To install the ThinkSystem 1610-4P NVMe switch adapter, follow these steps:

1. **Unpack the adapter, and inspect it for damage.** Unpack the adapter in a static-free environment. Remove the adapter from the anti-static bag, and carefully inspect the device for damage. If you notice any damage, contact Lenovo or your reseller support representative.

ATTENTION To avoid the risk of data loss, back up your data before you change your system configuration.

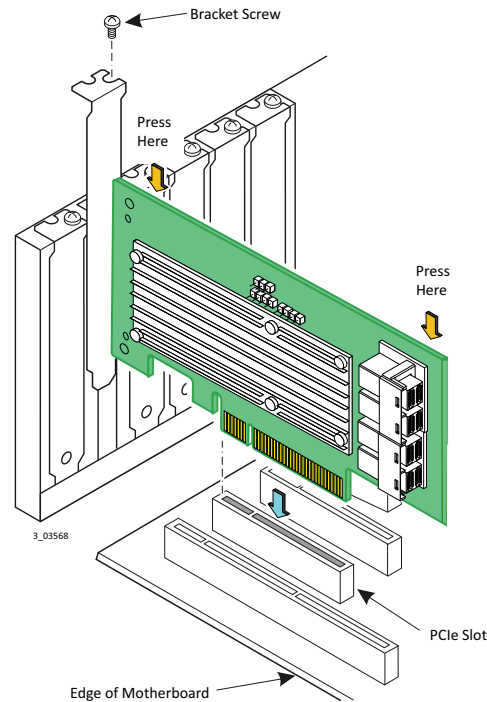
2. **Prepare the computer.** Turn off the computer, and disconnect the power cord from the rear of the power supply.

CAUTION Disconnect the computer from the power supply or you risk damaging the system or experiencing electrical shock.

3. **Remove the cover from the chassis.**
4. **Insert the adapter into an available PCIe slot.** Locate an empty x16 PCIe slot adequate for your board. Remove the blank bracket panel on the rear of the computer that aligns with the empty PCIe slot. Save this bracket screw, if applicable. Align the adapter to a PCIe slot. Press down gently, but firmly, to seat the adapter correctly in the slot. The following figure shows how to insert the adapter into a PCIe slot.

NOTE The shape, size, and locations of the components on your adapter and its bracket might vary from this illustration. Depending on the available slot you select, you might need to change the bracket installed on the adapter. The adapter requires an x16 PCIe slot.

Figure 1 Installing the ThinkSystem 1610-4P NVMe Switch Adapter in a PCIe Slot



5. **Connect PCIe cables between the adapter and the NVMe backplane.** The adapter has four SFF-8643, internal x4, mini-SAS HD connectors. Use cables with an internal mini-SAS HD connector on one end (to connect to the adapter) and the appropriate connector on the other end to attach to the backplane.
6. **Replace the cover and reconnect any cords and cables, and power up the system.**

The hardware installation of your ThinkSystem 1610-4P NVMe switch adapter is complete.

1.3 Replacing the Bracket

To replace the bracket for the ThinkSystem 1610-4P NVMe switch adapter, follow these steps:

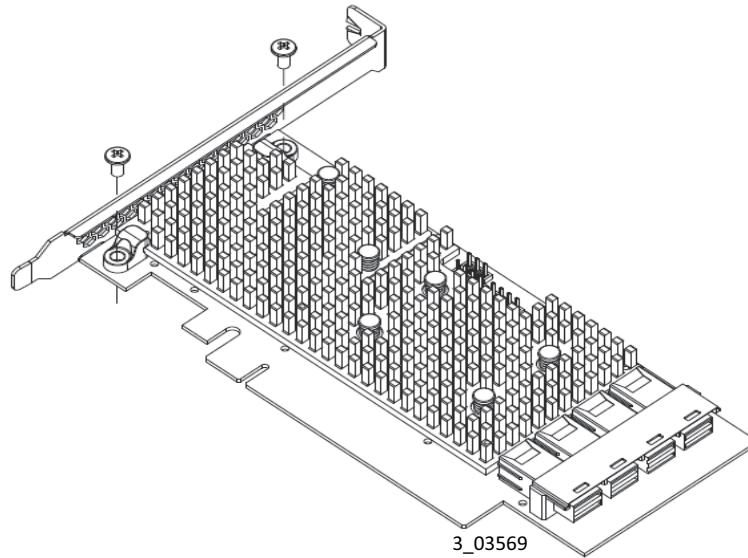
1. **At an ESD-safe workstation, remove the board from its ESD protective bag.**

ATTENTION Never apply pressure to the bracket or the heat sink when inserting the board. Do not handle the board by the bracket. Do not handle the heat sink at any time. Do not bend or twist the board at any time.

2. **Use an ESD-safe No.1 Phillips screwdriver to carefully remove the two Phillips screws that connect the bracket to the board.** The following figure shows how to unscrew the two screws located at the top edge and bottom edge of the board.

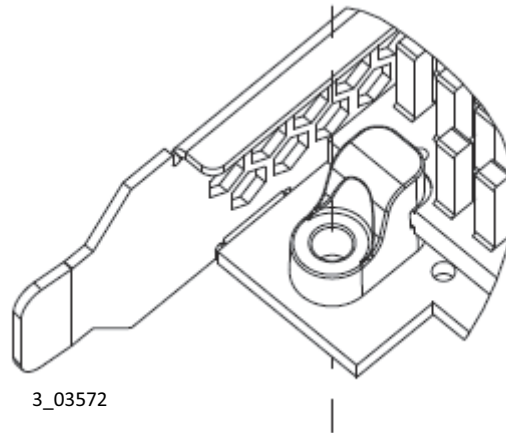
CAUTION Damaging the screw can void the warranty. To prevent damage to the screw, make sure that the screwdriver is centered in the top of the screw.

Figure 2 Removing the Screws



3. **Keep the board on a level surface to make sure you do not lose any retaining clips.** The heat sink is held in place by the same screws that attach the bracket. The black retaining clips shown in the following figure can come loose when the screws are removed.

Figure 3 Heat Sink Held in Place by Retaining Clips Attached by Bracket Screws

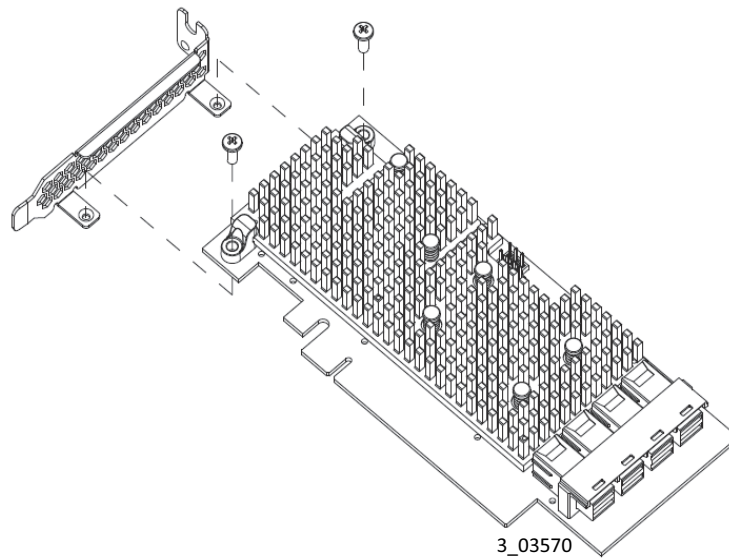


CAUTION

Do not move or rock the heat sink after you remove the bracket screws. Doing so might damage the thermal interface material, which causes the board to overheat during operation. Damage to the heat sink or the interface material while changing the bracket might void the board warranty.

4. **Place the adapter on top of the replacement bracket.** Make sure to position the bracket so that the screw holes in the tabs are aligned with the openings in the board as shown in the following figure.

Figure 4 Replacing the Bracket



5. **Use an ESD-safe No. 1 Phillip screwdriver to set the screws to a maximum torque of 4.8 ± 0.5 inch pounds to replace the two Phillips screws that you removed in step 2.**
6. **Replace the board in its ESD-protective bag and seal the bag appropriately.**

ATTENTION Exceeding this torque specification can damage the board, connectors, or screws, and can void the warranty on the board.

1.4 Driver Installation

You do not have to download a device driver for the ThinkSystem 1610-4P NVMe switch adapter. This product uses inbox drivers for Microsoft, Linux, and VMWare. For Windows operating systems, use inf (a dummy driver) to make the yellow bang symbol disappear.

Chapter 2: Overview

2.1 Overview

The ThinkSystem 1610-4P NVMe switch adapter provides high-performance storage connectivity for servers and workstations. The adapter supports a x16 PCIe Gen3 host interface to four x4 PCIe Gen3 ports for NVMe connectivity. The low-profile design of the adapter includes a full-height mounting bracket and a low-profile mounting bracket that create a universal fit for any server.

NVMe technology is a logical device interface specification used to access non-volatile storage media that is attached by a PCIe bus. Non-volatile memory is usually flash memory in solid-state drives (SSDs).

The 1610-4P NVMe adapter uses the Broadcom ExpressFabric® PEX9733, a fully nonblocking and low-latency, 33-lane, 9-port PCIe Gen 3 switch. This ExpressFabric switch, which conforms to the PCIe Base r3.0 specification, allows you to build a high-performance, low-latency, scalable, and cost-effective PCIe-based fabric. Switched fabric is a network topology that allow network nodes to interconnect by using one or more network switches (particularly crossbar switches). A switched fabric network spreads data transfers across multiple physical links, which produces high total throughput.

2.2 Features

This section lists the ThinkSystem 1610-4P NVMe switch adapter features.

- Supports 4 internal 8Gb/s PCIe Gen3 ports
- Offered with a full-height and a low-profile vented bracket
- Provides a universal asynchronous receiver/transmitter (UART) debug/diagnostic port

2.3 Functional Descriptions

2.3.1 PCI Express Interface

PCIe is a high-speed standard local bus for point-to-point interfacing of I/O components to the processor and the memory subsystems in high-end computers and servers. The PCIe functionality for the ThinkSystem 1610-4P NVMe switch adapter is contained within the PEX9733 PCIe switch. The PEX9733 switch connects directly to the PCIe bus and generates timing and protocol in compliance with the PCIe specifications.

The ThinkSystem 1610-4P NVMe switch adapter supports 16-lane 8Gb/s PCIe performance up to 128Gb/s single direction and 256Gb/s dual direction.

2.3.2 NVMe Interface

The PEX9733 switch contains the PCIe functionality for the ThinkSystem 1610-4P NVMe switch adapter with PCIe performance of 32GB/s per port in each direction.

2.3.3 LED Management

The internal-connector ThinkSystem 1610-4P NVMe switch adapter offers LED management support for your backplane implementation. This configuration option lets you use the adapter with backplanes configured for the I²C interface. The adapter complies with the *I²C-bus specification and user manual Rev. 6 — 4*.

The adapter offers enclosure LED management support for your enclosure implementation through I²C management.

2.4 Operating System Support

The ThinkSystem 1610-4P NVMe switch adapter supports all major operating systems. Refer to <http://support.lenovo.com> for details on the software versions and device driver support.

2.5 ThinkSystem 1610-4P NVMe Switch Adapter Characteristics

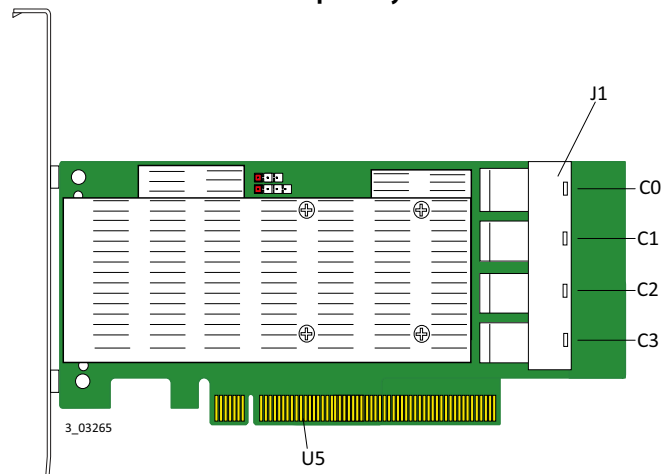
2.5.1 Flash Memory

The ThinkSystem 1610-4P NVMe switch adapter provides a 128-MB Flash memory device for storing the BCM58512 CPU BIOS and firmware.

2.5.2 Physical Characteristics

The ThinkSystem 1610-4P NVMe switch adapter is a 6.6 in. × 2.7 in. (167.65 mm × 68.90 mm) board. The component height on the top and bottom of the adapter complies with the PCIe specification. The following figure shows the ThinkSystem 1610-4P NVMe switch adapter layout.

Figure 5 ThinkSystem 1610-4P NVMe Switch Adapter Layout



- **J1**– SFF-8643 mini-SAS HD internal connectors
- **U5**– PCIe x16 board edge connector

2.5.3 Connectors

NVMe Connector (J1). The ThinkSystem 1610-4P NVMe switch adapter supports connection to four NVMe devices through four SFF-8643 mini-SAS HD connections

PCIe Connector (U5). The ThinkSystem 1610-4P NVMe switch adapter supports a x16 interface. The PCIe host interface connection is through the U5 edge connector. The signal definitions and pin numbers conform to the PCIe specification.

2.5.4 Electrical Characteristics

The power requirements for the ThinkSystem 1610-P4 NVMe switch adapter under normal operation are as follows:

- Power values:
 - Typical = 16.2 W

Typical configuration assumes nominal silicon and voltage with all links running maximum I/Os at 25°C ambient temperature. Actual power consumption might vary depending on system and environmental configurations.

2.5.5 Thermal and Atmospheric Limits

The atmospheric limits for the ThinkSystem 1610-4P NVMe switch adapter are as follows:

- Relative humidity range: 5% to 90% noncondensing
- Maximum dew point temperature: 32°C (89.6°F)
- Minimum airflow: 300 linear feet per minute at 55°C inlet temperature

The following limits define the storage and transit environment for the ThinkSystem 1610-4P NVMe switch adapter:

- Temperature range: -45°C to +105°C (-49°F to +221°F) (dry bulb)
- Relative humidity range: 5% to 90% noncondensing

2.6 ThinkSystem 1610-4P NVMe Switch Adapter Certifications and Safety Characteristics

All ThinkSystem 1610-P4 NVMe switch adapters meet or exceed the requirements of UL flammability rating 94V-0. Each bare board is marked with the supplier's name or trademark, type, and UL flammability rating. Because these boards are installed in a PCIe bus slot, all voltages are less than the SELV 42.4V limit.

The design and implementation of the adapter minimizes electromagnetic emissions, susceptibility to radio frequency energy, and the effects of electrostatic discharge.

The adapter meets the following integrated electromagnetic interference (EMI) compliance labels:

- CE mark
- RCM mark
- Canadian Compliance Statement
- FCC Class B, marked with the FCC Self-Certification logo
- UL Listed Mark for Canada/U.S.
- Japan VCCI
- Korean KCC
- Taiwan BSMI

The adapter meets the following environmental directives:

- Restriction of Hazardous Substances (RoHS)
- Waste of electrical and electronic equipment (WEEE)

Appendix A: Getting Help and Technical Assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you can find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at <http://datacentersupport.lenovo.com>.

A.1 Contacting Support

You can contact support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to <https://datacentersupport.lenovo.com/us/en/serviceprovider> and use filter to search for different countries.

For Lenovo support telephone numbers, go to <https://datacentersupport.lenovo.com/us/en/supportphonenumber>. In the U.S. and Canada, call 1-800-426-7378. In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

China Product Support

To contact product support in China, go to <http://support.lenovo.com.cn/lenovo/wsi/es/ThinkSystem.html>, You can also call 400-106-8888 for product support. The call support is available Monday through Friday, from 9 a.m. to 6 p.m.

Taiwan Product Support

To contact product support for Taiwan, call 0800-016-888. The call support is available 24 hours a day, 7 days a week.

Appendix B: Notices

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Morrisville, NC 27560

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Attention: Lenovo VP of Intellectual Property

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Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

B.1 Trademarks

Lenovo and ThinkSystem are trademarks of Lenovo in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

B.2 Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

B.3 Recycling information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to: <http://www.lenovo.com/recycling>



US & Canada Only



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B.4 Particulate Contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 1 Limits for Particulates and Gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none"> ■ The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV9) according to ASHRAE Standard 52.2^a. ■ Air that enters a data center must be filtered to 99.97% efficiency or greater, using high- efficiency particulate air (HEPA) filters that meet MIL-STD-282. ■ The deliquescent relative humidity of the particulate contamination must be more than 60%^b. ■ The room must be free of conductive contamination such as zinc whiskers.
Gaseous	<ul style="list-style-type: none"> ■ Copper: Class G1 as per ANSI/ISA 71.04-1985^c ■ Silver: Corrosion rate of less than 300 Å in 30 days

- a. ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
- b. The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.
- c. ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

B.5 Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

B.6 Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

B.7 Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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 might cause undesired operation.

B.8 Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

B.9 Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

B.10 Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

B.11 European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A equipment according to European Standards harmonized in the Directives in compliance. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

B.12 CE

Figure 6



Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

B.13 Germany Class A statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit Dieses Produkt entspricht den Schutzanforderungen der EU Richtlinie 2014/30/EU zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der Klasse A der Norm gemäß Richtlinie.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln

Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EMV EU Richtlinie 2014/30/EU in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EU Richtlinie 2014/30/EU, für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Meitnerstr. 9, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55032 Klasse A.

Nach der EN 55032: „Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.“

Nach dem EMVG: „Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.“ (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

B.14 Japanese electromagnetic compatibility statements

Figure 7 Japan VCCI Class A Statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波障害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 V C C I - A

Figure 8 Japanese Electrical Appliance and Material Safety Law statement (for detachable AC power cord)

本製品およびオプションに電源コード・セットが付属する場合は、それぞれ専用のものでありますので他の電気機器には使用しないでください。

Figure 9 JEITA harmonics guideline - Japanese Statement for AC power consumption (W)

定格入力電力表示
(社) 電子情報技術参照委員会 家電・汎用品高調波抑制対策ガイドライン
実行計画書に基づく定格入力電力値： W
お手持ちのユニットの定格入力電力値(W)はユニットの電源装置に貼付されている電源仕様ラベルをご参照下さい

Figure 10 JEITA harmonics guideline - Japanese Statement of Compliance for Products Less than or Equal to 20A per phase

JEITA 高調波電流抑制対策適合品表示 (JEITA harmonics statements– Japan)
定格電流が 20A/相以下の機器 (For products where input current is less than or equal to 20A per phase)

日本の定格電流が 20A/相以下の機器に対する高調波電流規制高調波電流規格
JIS C 61000-3-2 適合品

B.15 Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

B.16 Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ!

Настоящее изделие относится к оборудованию класса А. При использовании в бытовой обстановке это оборудование может нарушать функционирование других технических средств в результате создаваемых промышленных радиопомех. В этом случае от пользователя может потребоваться принятие адекватных мер.

B.17 People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声明

此为A类产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

B.18 Taiwan Class A compliance statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

B.19 Taiwan BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁶⁺)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組合作件	-	○	○	○	○	○
空氣傳動設備	-	○	○	○	○	○
冷卻組合作件	-	○	○	○	○	○
內存模塊	-	○	○	○	○	○
處理器模塊	-	○	○	○	○	○
鍵盤	-	○	○	○	○	○
調製解調器	-	○	○	○	○	○
監視器	-	○	○	○	○	○
滑鼠	-	○	○	○	○	○
電纜組合作件	-	○	○	○	○	○
電源	-	○	○	○	○	○
儲備設備	-	○	○	○	○	○
電池匣組合作件	-	○	○	○	○	○
有mech的電路卡	-	○	○	○	○	○
無mech的電路卡	-	○	○	○	○	○
雷射器	-	○	○	○	○	○
<p>備考1. “超出0.1 wt %” 及 “超出0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。 Note1 : “exceeding 0.1wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.</p> <p>備考2. “○” 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note2 : “○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.</p> <p>備考3. “-” 係指該項限用物質為排除項目。 Note3 : The “-” indicates that the restricted substance corresponds to the exemption.</p>						

B.20 Taiwan import and export contact information

Contacts are available for Taiwan import and export information.

委製商/進口商名稱: 台灣聯想環球科技股份有限公司
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