Lenovo

ThinkSystem SD520 V4
Internal Cable Routing Guide

Machine Types: 7DFY, 7DFZ, 7DG0, and 7DG1

Note

Before using this information and the product it supports, be sure to read and understand the safety information and the safety instructions, which are available at:
https://pubs.lenovo.com/safety_documentation/

In addition, be sure that you are familiar with the terms and conditions of the Lenovo warranty for your server, which can be found at:
http://datacentersupport.lenovo.com/warrantylookup

First Edition (November 2024)

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information （安全信息）。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας
(safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

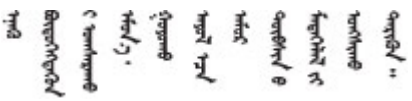
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.



Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་རྫས་འདི་བདེ་སྒྲིག་མ་བྱས་གོང་། ་སྲོར་ཀྱི་ཡིད་གཟབ་
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་སྡེར་བཀླ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.

Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your server. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

Note: The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.

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.

Note: The set-up of the server is made in the server room only.

CAUTION:
This equipment must be installed or serviced by trained personnel, as defined by the IEC 62368-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology. Lenovo assumes you are qualified in the servicing of equipment and trained in recognizing hazards energy levels in products. Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

Important: Electrical grounding of the server is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type.

To view the power cords that are available for the server:

a. Go to:

   http://dcsc.lenovo.com/#/

b. Click **Preconfigured Model** or **Configure to order**.

c. Enter the machine type and model for your server to display the configurator page.

d. Click **Power → Power Cables** to see all line cords.

- Make sure that the insulation is not frayed or worn.

3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Internal cable routing

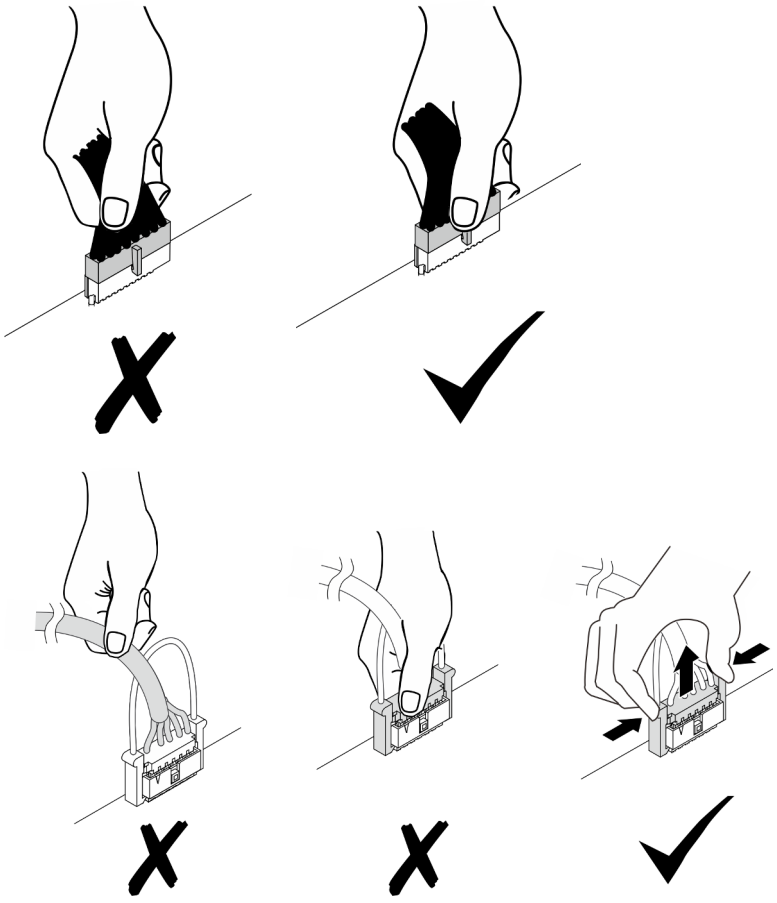
See this section to do cable routing for specific components.

Before connecting the cables, read the following guidelines carefully:

- Turn off the node before connecting or disconnecting any internal cables.
- Refer to the documentation that comes with any external devices for additional cabling instructions.
- Make use of the identifiers printed on the cables to locate the proper connectors.
- Make sure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.

Important: To avoid cable interference, the cables next to the DIMM slots must be separated from the DIMMs by the cable ducts.

Note: Disengage all latches, release tabs, or locks on cable connectors when you disconnect cables from the system board. Failing to release them before removing the cables will damage the cable sockets on the system board, which are fragile. Any damage to the cable sockets might require replacing the system board.

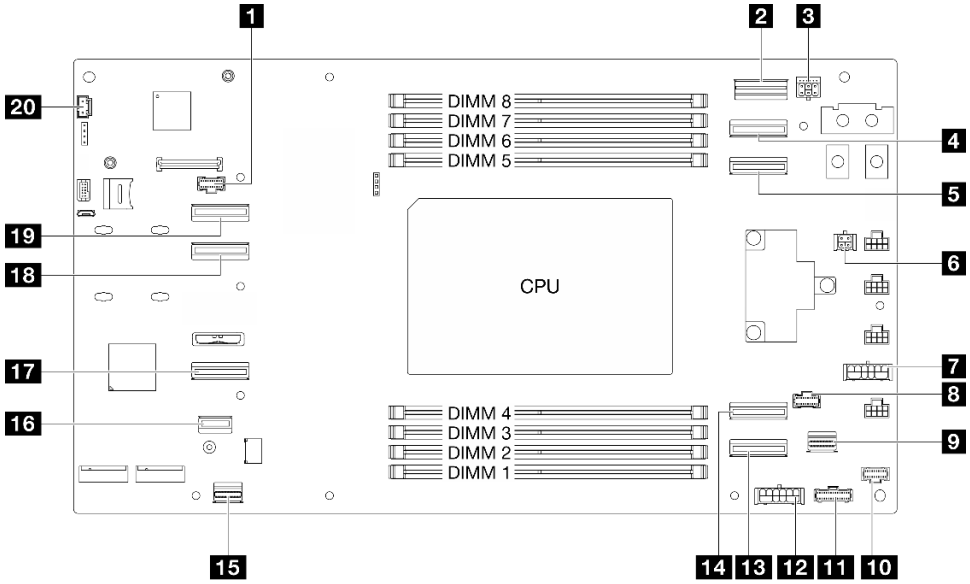


Identifying connectors

See this section to locate and identify the connectors on the electric boards.

System-board connectors for cable routing

See this section to locate and identify the connectors on the system board that are used for internal cable routing.



1 Drive backplane sideband connector	2 OCP sideband connector
3 Drive backplane power connector	4 OCP signal connector 1
5 OCP signal connector 2	6 Leakage sensor connector
7 PCIe riser power connector	8 PCIe riser sideband connector
9 Rear I/O Ethernet connector	10 M.2 boot adapter power and sideband connector
11 PDB management connector	12 PDB auxiliary power connector
13 PCIe riser connector 1	14 PCIe riser connector 2
15 Rear I/O USB DP connector	16 M.2 boot adapter signal connector
17 NVMe 4-5 connector	18 NVMe 2-3 connector
19 NVMe 0-1 connector	20 Thermal sensor connector

2.5-inch drive backplane connectors

See this section to locate and identify the connectors on the 2.5-inch drive backplane that are used for internal cable routing .

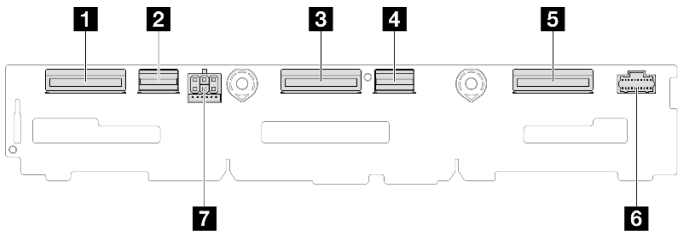


Figure 1. 2.5-inch drive backplane

Table 1. Drive backplane connectors

1 NVMe 4-5	2 SAS/SATA 4-5
3 NVMe 2-3	4 SAS/SATA 0-3
5 NVMe 0-1	6 Sideband connector
7 Power connector	

Front I/O board connectors

See this section to locate and identify the connectors on the front I/O board.

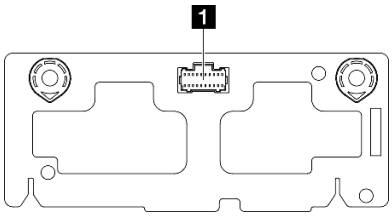


Figure 2. Front I/O board connector

Table 2. Front I/O board connector

1 Sideband connector

PCIe riser connectors

See this section to locate and identify the connectors on the PCIe riser card.

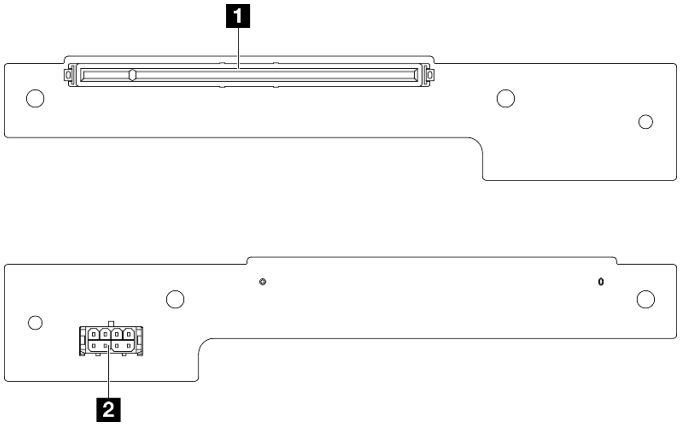


Figure 3. PCIe riser card connectors

Table 3. Gen 5 HH riser card connectors

1 PCIe x16 (Gen5) slot	2 PCIe riser power connector

Power distribution board connectors

See this section to locate and identify the connectors on the power distribution board.

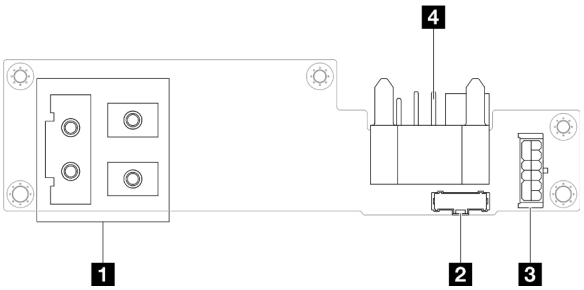


Figure 4. Power distribution board connectors

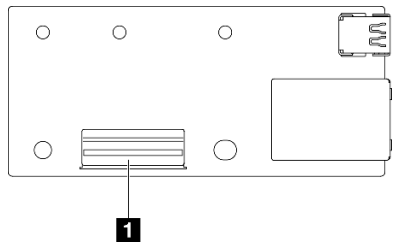
Table 4. Power distribution board connectors

1 Power bus bar connector	3 Power connector
2 Sideband connector	4 Chassis midplane connector

Rear I/O module connector

See this section to locate and identify the connectors on the rear I/O module.

Table 5. Rear I/O module connector

	1 Rear I/O signal connector

2.5-inch drive backplane cable routing

Follow instructions in this section to route the cables for the 2.5-inch drive backplane.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

Sideband and power cable routing

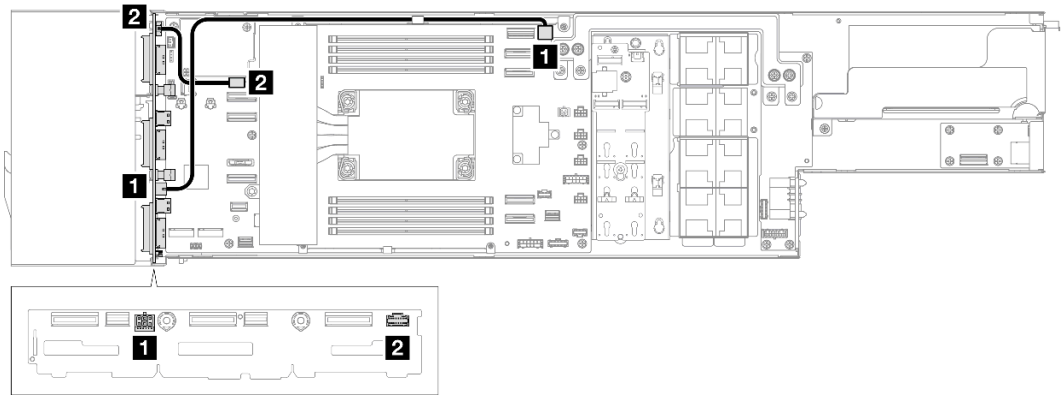


Figure 5. Sideband and power cable routing

From (Backplane)	To (System board)	Cable length
1 Power connector	1 Drive backplane power connector	460 mm
2 Sideband connector	2 Drive backplane sideband connector	120 mm

NVMe cable routing

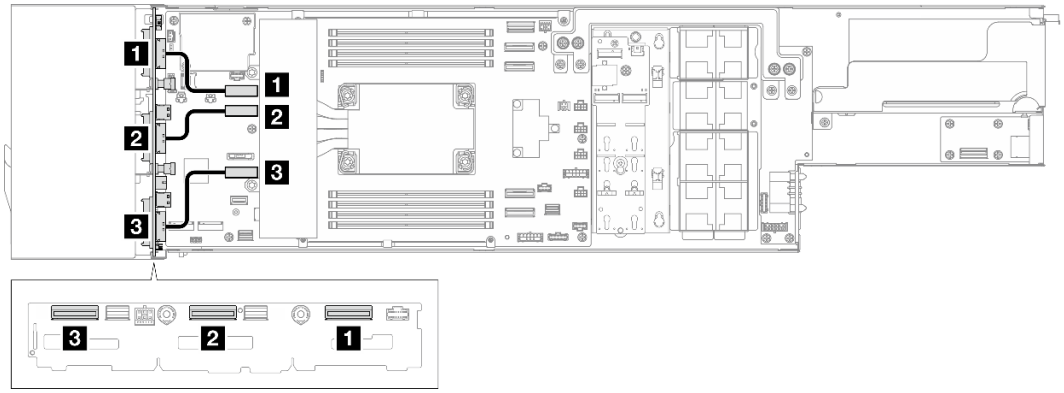


Figure 6. NVMe cable routing

From (Backplane)	To (System board)	Cable length
1 NVMe 0-1	1 NVMe 0-1 connector	100 mm
2 NVMe 2-3	2 NVMe 2-3 connector	100 mm
3 NVMe 4-5	3 NVMe 4-5 connector	100 mm

SAS/SATA cable routing

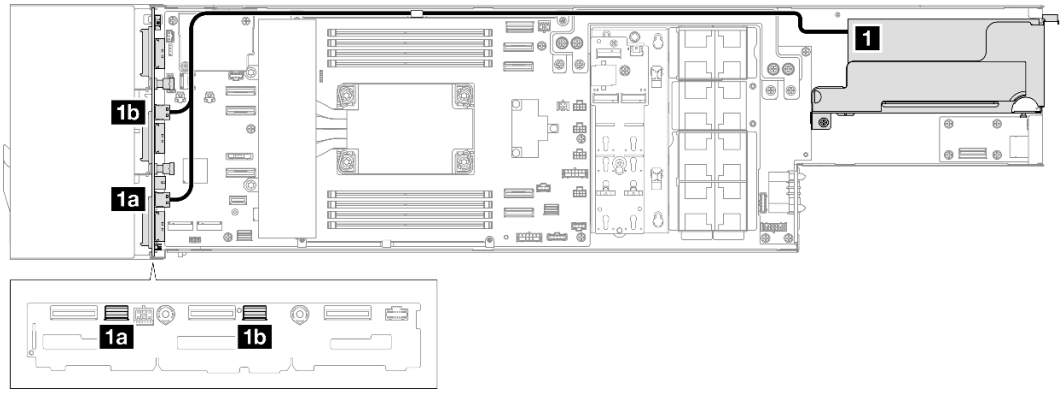


Figure 7. SAS/SATA cable routing

From (Backplane)	To (HBA/RAID adapter)	Cable length
1a SAS/SATA 4-5	1 C0 connector	645/715 mm
1b SAS/SATA 0-3		

Flash power module cable routing

Follow instructions in this section to route the cables for the 2.5-inch drive backplane.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

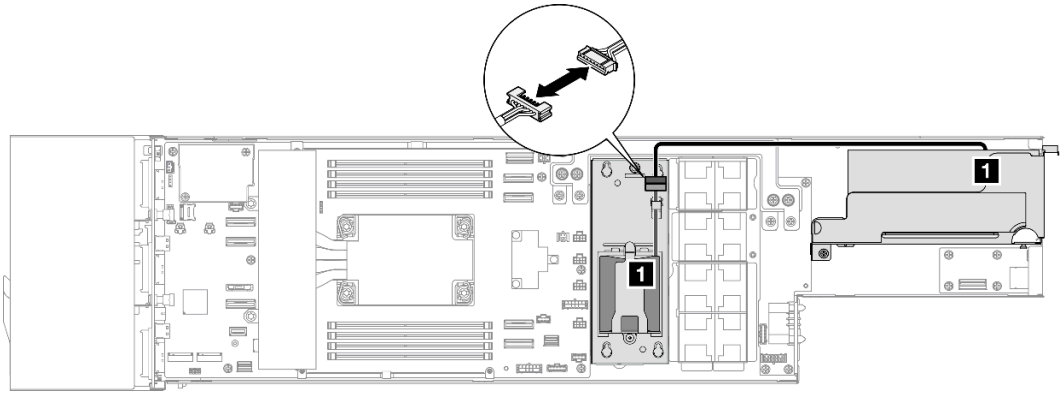


Figure 8. Flash power module cable routing

From (Flash power module)	To (RAID adapter)	Cable length
1 RAID flash power module connector	1 RAID flash power port on RAID adapter	380 mm

Front I/O board cable routing

Follow instructions in this section to install and route the cable for the I/O board.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

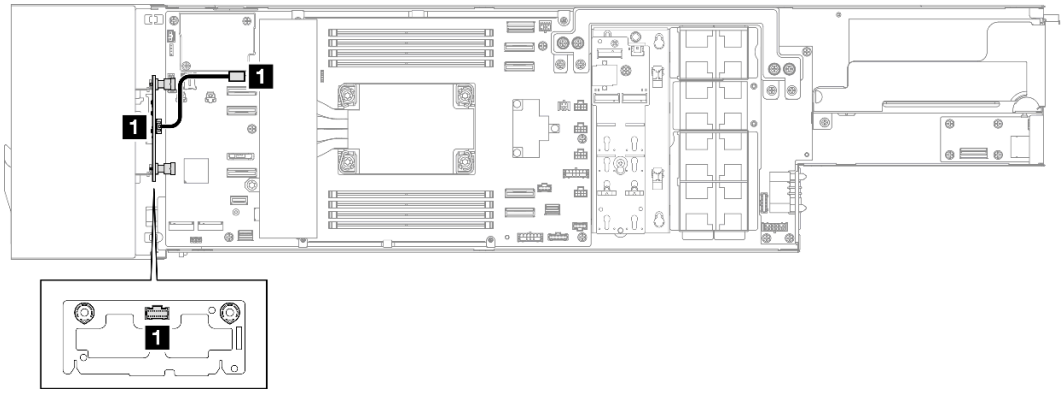


Figure 9. Front I/O board cable routing

From (Front I/O board)	To (System board)	Cable length
1 Front I/O connector	1 Drive backplane sideband connector	120 mm

M.2 boot adapter cable routing

Follow instructions in this section to route the cables for the M.2 boot adapter.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

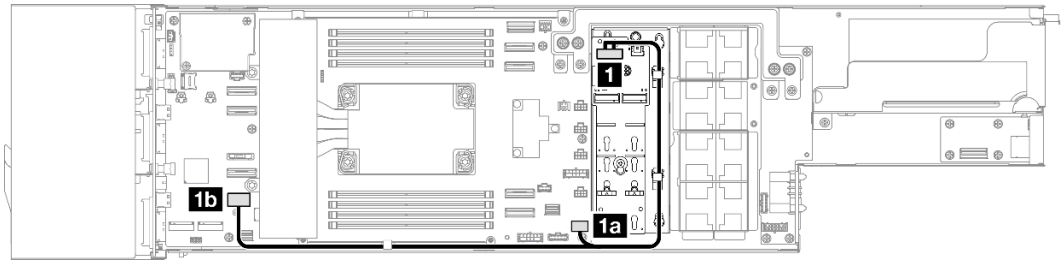


Figure 10. M.2 boot adapter cable routing

From (M.2 boot adapter)	To (System board)	Cable length
1 Signal and power connector	1a M.2 boot adapter power and sideband connector	640/305 mm
	1b M.2 boot adapter signal connector	

OCP module cable routing

Follow instructions in this section to install and route the cables for the OCP module.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

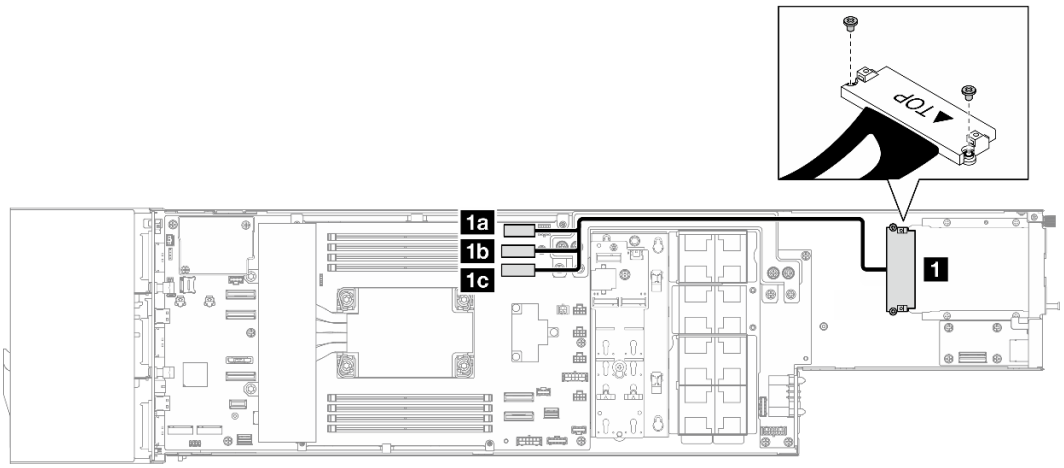


Figure 11. OCP module cable routing

From (Rear OCP)	To (System board)	Cable length
1 Rear OCP slot (secured with screws)	1a OCP sideband connector	350/355/370 mm
	1b OCP signal connector 1	
	1c OCP signal connector 2	

PCIe riser cable routing

Follow instructions in this section to route the cables for the PCIe riser.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

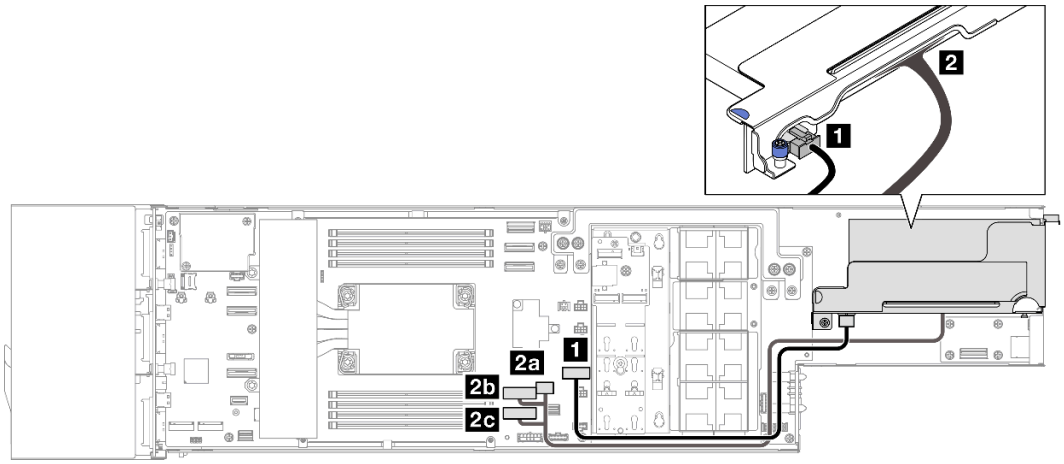


Figure 12. PCIe riser cable routing

From (Riser)	To (System board)	Cable length
1 Riser power connector	1 PCIe riser power connector	385 mm
2 Riser slot 1 connector	2a PCIe riser sideband connector	422/432/432 mm
	2b PCIe riser connector 2	
	2c PCIe riser connector 1	

Power distribution board cable routing

Follow instructions in this section to route the cables for the power distribution board.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

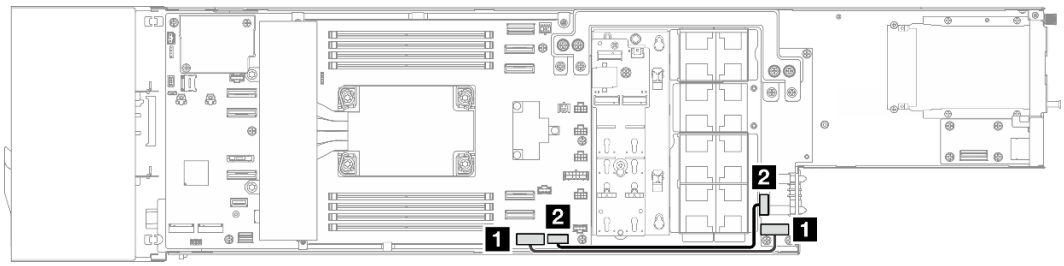


Figure 13. Power distribution board cable routing

From (Power distribution board)	To (System board)	Cable length
1 PDB P12V AUX power connector	1 PDB auxiliary power connector	245 mm
2 PDB sideband connector	2 PDB management connector	230 mm

Rear I/O module cable routing

Follow instructions in this section to install and route the cables for the rear I/O module.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

Attention: When routing cables, ensure that the rear I/O cable is not lying on top of the PDB power cable at its connector area.

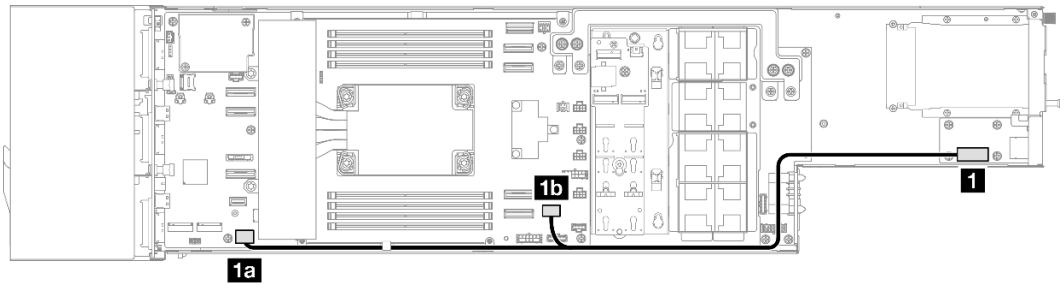


Figure 14. Rear I/O module cable routing

From (Rear I/O module)	To (System board)	Cable length
1 Rear I/O signal connector (on rear I/O module)	1a Rear I/O USB DP connector	750/495 mm
	1b Rear I/O Ethernet connector	

Thermal sensor cable routing

Follow instructions in this section to install and route the cable for the front thermal sensor cable.

Notes:

- Connections between connectors; 1↔1, 2↔2, 3↔3, ... n↔n
- When routing the cables, make sure that all cables are routed appropriately through the corresponding cable guides and cable clips.

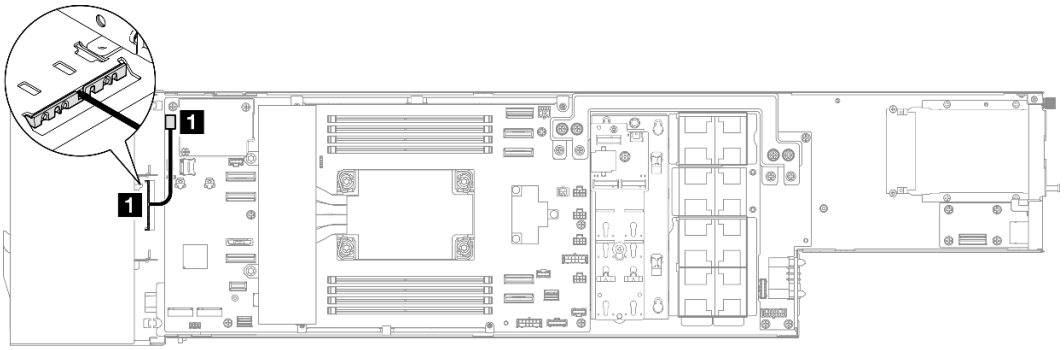


Figure 15. Front thermal sensor cable routing

From (Front thermal sensor)	To (System board)	Cable length
1 Front thermal sensor	1 Thermal sensor connector	220 mm

Appendix A. Documents and supports

This section provides handy documents, driver and firmware downloads, and support resources.

Documents download

This section provides introduction and download link for handy documents.

Documents

Download the following product documentations at:

https://pubs.lenovo.com/sd520-v4/pdf_files

- ***Rail Installation Guides***
  - Rail installation in a rack

    https://pubs.lenovo.com/st650-v2/thinksystem_l_shaped_rail_kit.pdf
- ***User Guide***
  - Complete overview, system configuration, hardware components replacing, and troubleshooting.

    Selected chapters from the *User Guide*:
    - ***System Configuration Guide*** **:** Server overview, components identification, system LEDs and diagnostics display, product unboxing, setting up and configuring the server.
    - ***Hardware Maintenance Guide*** **:** Installing hardware components, cable routing, and troubleshooting.
- ***Cable Routing Guide***
  - Cable routing information.
- ***UEFI Manual***
  - UEFI setting introduction

Support websites

This section provides driver and firmware downloads and support resources.

Support and downloads

- Lenovo Data Center Forum
  - https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg
- Lenovo License Information Documents
  - https://datacentersupport.lenovo.com/documents/lnvo-eula
- Lenovo Press website (Product Guides/Datasheets/White papers)
  - https://lenovopress.lenovo.com/
- Lenovo Privacy Statement
  - https://www.lenovo.com/privacy
- Lenovo Product Security Advisories
  - https://datacentersupport.lenovo.com/product_security/home

- Lenovo Product Warranty Plans
  - http://datacentersupport.lenovo.com/warrantylookup
- Lenovo Server Operating Systems Support Center website
  - https://datacentersupport.lenovo.com/solutions/server-os
- Lenovo ServerProven website (Options compatibility lookup)
  - https://serverproven.lenovo.com
- Operating System Installation Instructions
  - https://pubs.lenovo.com/thinksystem#os-installation
- Submit an eTicket (service request)
  - https://support.lenovo.com/servicerequest
- Subscribe to Lenovo Data Center Group product notifications (Stay up to date on firmware updates)
  - https://datacentersupport.lenovo.com/solutions/ht509500

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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.

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Internet Explorer, Microsoft, and Windows are trademarks of the Microsoft group of companies.

Linux is a registered trademark of Linus Torvalds.

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Important notes

Processor speed indicates the internal clock speed of the processor; 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 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 drive capacities assume the replacement of any standard drives and population of all 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.

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.

Taiwan Region 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	○	○	○	○	○	○
機械組合件	–	○	○	○	○	○
空氣傳動設備	–	○	○	○	○	○
冷卻組合件	–	○	○	○	○	○
內存模組	–	○	○	○	○	○
處理器模組	–	○	○	○	○	○
電纜組合件	–	○	○	○	○	○
儲備設備	–	○	○	○	○	○
印刷電路板	–	○	○	○	○	○

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.

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.

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.

Taiwan import and export contact information

Contacts are available for Taiwan import and export information.

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進口商地址: 台北市南港區三重路 66 號 8 樓
進口商電話: 0800-000-702