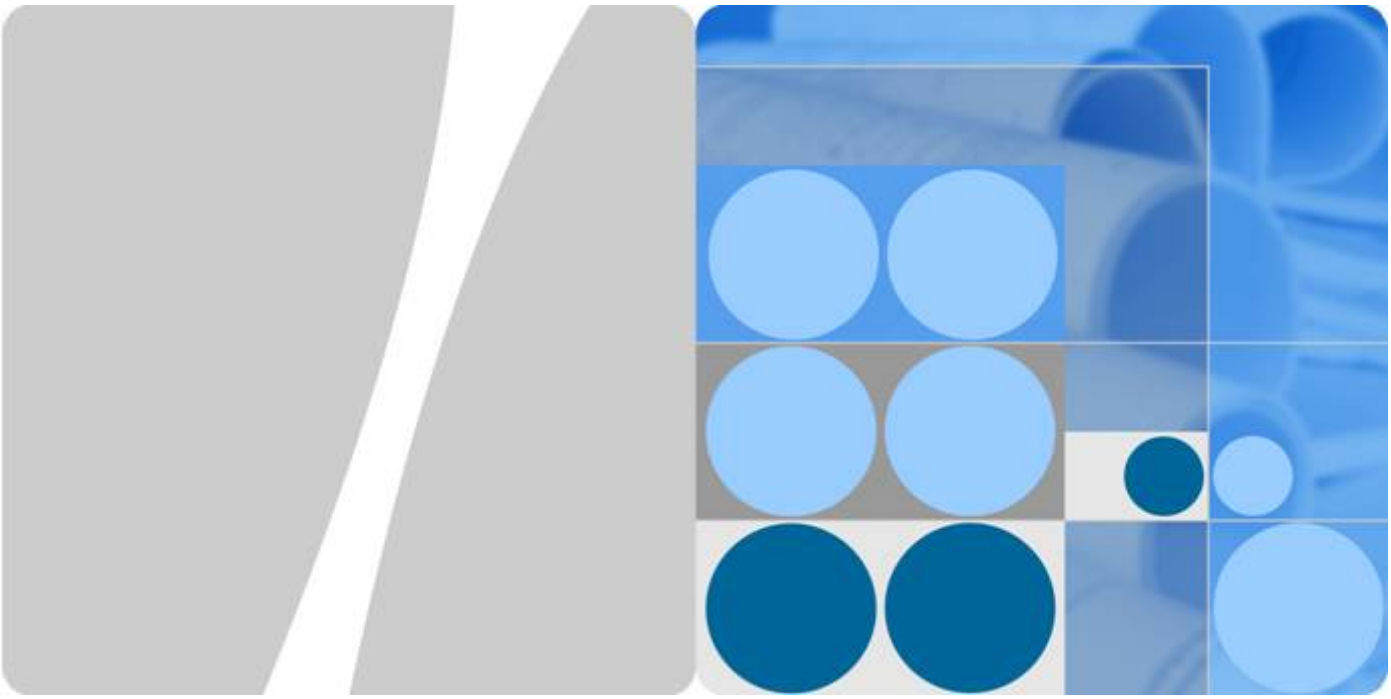

# Huawei CX210 Switch Module

# V100R001C10

# White Paper



**Issue** 04
**Date** 2015-07-17

**HUAWEI TECHNOLOGIES CO., LTD.**

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# Contents

# 1 About This Document

## About This Chapter

### Purpose

The white paper for E9000 CX210 FC switch module describes functions, advantages, appearance, specifications, networking, standards and certifications, and regulatory compliance of Huawei CX210. You can learn about the CX210 by reading this document.

### Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

### Symbol Conventions

The symbols that may be found in this document are defined as follows:

| Symbol | Description |
| --- | --- |
| DANGER | **DANGER** indicates a hazard with a high level or medium level of risk which, if not avoided, could result in death or serious injury. |
| WARNING | **WARNING** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury. |
| CAUTION | **CAUTION** indicates a potentially hazardous situation that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. |

| Symbol | Description |
| --- | --- |
| TIP | **TIP** indicates a tip that may help you solve a problem or save time. |
| NOTE | **NOTE** provides additional information to emphasize or supplement important points of the main text. |

# Change History

## Issue 04 (2015-07-17)

This issue is the fourth official release.

| Mode | Change Description |
| --- | --- |
| Modified | The reference to the throughput is added to **1.8 Technical Specifications**. |

## Issue 03 (2015-03-20)

This issue is the third official release.

## Issue 02 (2015-02-16)

This issue is the second official release.

| Mode | Change Description |
| --- | --- |
| Modified | The reference to the Networking Assistant is added to **1.6 Internal Chassis Networking**. |

## Issue 01 (2014-09-15)

This issue is the first official release.

1.1 Function
This topic describes the main functions, supported protocols, and port types of the CX210 GE switch module.

1.2 Advantages
The CX210 delivers high performance and various data center features, and supports on-demand configuration and flexible deployment. In addition, the CX210 switch module can be easily deployed and maintained.

1.3 Appearance
This topic describes the CX210 in terms of its appearance, panel, and installation positions in the chassis.

### 1.4 Ports
This topic describes the features, numbering rules, names, types, and quantity of the CX210 ports.

### 1.5 Indicators
This topic describes the indicators on the CX210.

### 1.6 Internal Chassis Networking
This topic describes connection relationships between the CX210 and mezz modules on compute nodes.

### 1.7 Software and Hardware Compatibility
This topic describes mezz modules that can work with the CX210 and pluggable modules and cables supported by ports on the CX210 panel.

### 1.8 Technical Specifications
This topic describes the physical, environmental, power, and network switching specifications of the CX210.

# 1.1 Function

This topic describes the main functions, supported protocols, and port types of the CX210 GE switch module.

The CX210 FC switch module (CX210 for short) is a storage switching unit that provides storage data switching functionality for service slots in the system and centrally provides service, and management interfaces for external devices.

The CX210 is installed in the rear slot of the E9000 chassis and connected to compute nodes, and management modules through the E9000 midplane. The CX210 performs switching of storage data packets and the management system to provide high-speed data transmission.

**Table 1-1** describes the functions of the CX210.

**Table 1-1** FC switching planefunction description

| Function | | Description |
|---|---|---|
| FC switching | FC optical port | Supports 4G/8G FC autonegotiation, full duplex. |
| | Switching | ● Supports the FC switching mode (Native) and access gateway mode (that is, NPV mode). NPV is short for N-Port virtualization.<br>● Supports free mapping to the internal fibre channel (FC) ports and external FC ports in NPV mode.<br>● Supports network connection between E_Ports and Brocade FC switches in FC mode. A license is required for the function. |
| | NPIV | Supports N_Port ID virtualization (NPIV). A physical port supports access of multiple N_Port_IDs. |
| FC switching | Link aggregation | Supports FC port multi-link aggregation to expand the port bandwidth and provide redundancy.<br>● Supports connection only to Brocade FC switches.<br>● Requires a license. |
| Configuration and maintenance | Configuration and management modes | ● Supports configurations using command lines.<br>● Supports the HTTPS-based Webtool (GUI).<br>● Simple Network Management Protocol Version 1/3 (SNMPv1/v3).<br>● Supports the FC Fabric Element management information base (MIB). |

| Function | | Description |
| --- | --- | --- |
| | Connection mode | ● ETH connection (over SSH, SNMP, or the Web).<br>● SOL connection. |
| | Version upgrade | Supports online upgrades for software. Services are not interrupted during an upgrade. The upgrade takes effect after the restart.<br>**NOTE**<br>To ensure secure service application, periodically upgrade the switch module software version. |
| Network security | System security | ● Hierarchical rights management based on user levels, preventing unauthorized users from accessing switch modules.<br>● Supports Secure Shell (SSH) and Secure Sockets Layer (SSL).<br>● Supports Hypertext Transfer Protocol Secure (HTTPS).<br>● Supports SNMPv1/v3.<br>● Supports Remote Authentication Dial In User Service (RADIUS) for user logins.<br>● Supports SSH login using the username and password or public and secrete keys. |

# 1.2 Advantages

The CX210 delivers high performance and various data center features, and supports on-demand configuration and flexible deployment. In addition, the CX210 switch module can be easily deployed and maintained.

## High Performance

The CX210 FC switching plane provides eight 8G FC ports for connecting to the FC SAN and provide 192 Gbit/s switching capacity (384 Gbit/s throughput).

## Easy Deployment and Maintenance

The CX210 provides one FC switching plane, which is easy to deploy. The panel indicators show the link connection status and fault status. The software upgrade and configuration files are easy to import or export, which facilitates maintenance.

## On-Demand Configuration and Flexible Deployment

The FC switching plane of the CX210 provides eight 8G FC ports. Four of the ports are activated by default, and the other four ports require licenses for activation, which addresses diverse user needs.

### Data Center Features

- Supports seamless intercommunication with the FC infrastructure, protecting investments on the FC SAN.
- Supports server virtualization and NPIV access to improve the data center interface bandwidth usage.

## 1.3 Appearance

This topic describes the CX210 in terms of its appearance, panel, and installation positions in the chassis.

**Appearance**

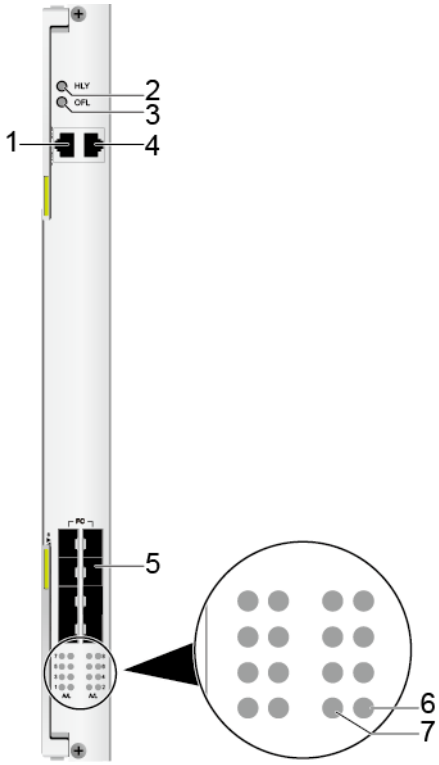
Figure 1-1 shows the CX210.

**Figure 1-1** Appearance

**Panel**

Figure 1-2 shows the CX210 panel.

**Figure 1-2** Panel




| | | | |
|---|---|---|---|
| 1 | BMC serial port | 2 | Health status indicator |
| 3 | Offline button/indicator | 4 | SYS serial port |
| 5 | 8G FC optical port | 6 | Connection status indicator of the 8G FC optical port |
| 7 | Diagnosis status indicator of the 8G FC optical port | - | - |

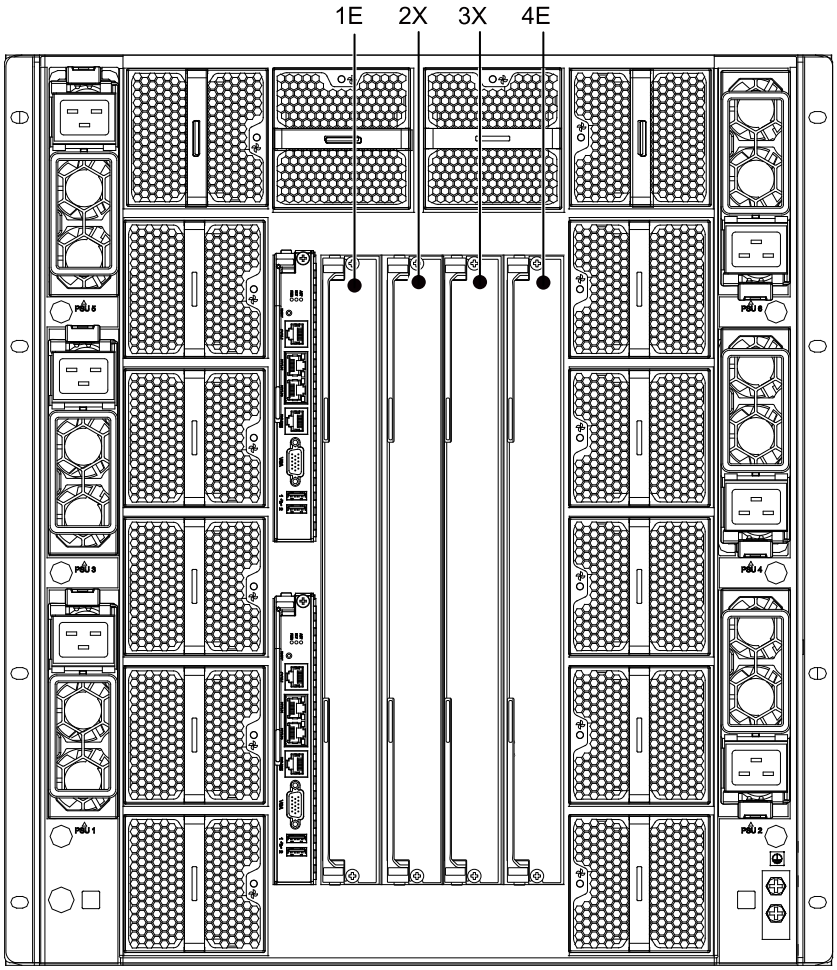
**NOTE**

The numbers on the left side are port serial numbers. The arrow direction of a triangle indicates the direction of a port.

### Installation Positions

The CX210 can be installed in the four slots at the rear of the E9000 chassis. The four slots are 1E, 2X, 3X, and 4E, as shown in **Figure 1-3**.

**Figure 1-3** Installation positions and slot numbers




# 1.4 Ports

This topic describes the features, numbering rules, names, types, and quantity of the CX210 ports.

The CX210 provides ports for users to operate and configure. The ports are used to send and receive data.

The FC optical ports on the CX210 panel are numbered from 1 to 8. See **Figure 1-4** and **Table 1-2**. For details about internal port numbers, see **Table 1-4**.

**Figure 1-4** Port numbering rules

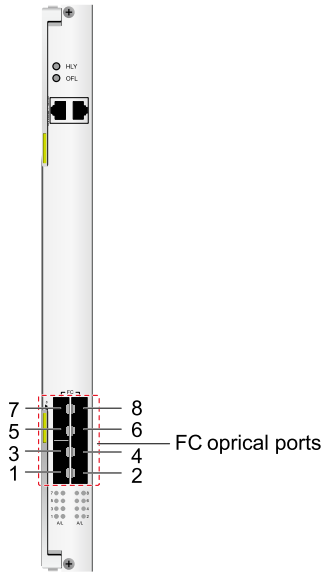



**Table 1-2** describes the external ports on the CX210.

**Table 1-2** External ports

| Name | Type | Quantity | Subcard Number | Port Number | Description |
|---|---|---|---|---|---|
| Serial port | RJ45 | 2 | - | - | The serial ports include the baseboard management controller (BMC) serial port and the SYS serial port. The ports comply with RS232. No indicator is available.<br>● BMC serial port: The port is used to log in to the BMC command-line interface (CLI).<br>● SYS serial port: This port is used for managing, maintaining, and commissioning the FC switching plane.<br>The BMC serial port support the baud rate of 115,200 bit/s.<br>The serial port of theFC switching plane supports the baud rate of 9,600 bit/s. |
| 8G FC port | SFP+ | 8 | - | - | The FC switching plane provides eight 8G FC ports for connecting to the FC storage network. Ports 1 to 4 are activated by default, and ports 5 to 8 require licenses for activation.<br>Each port has two indicators. The orange one is a diagnosis status indicator, and the green one is a connection status indicator. |

**Table 1-3** Internal ports

| Name | Type | Quantity | Subcard Number | Port Number | Description |
|---|---|---|---|---|---|
| GE port | - | 32 | 1 to 16 | The value is 1 to 2. | This port is connected to half-width front slots 01 to 16. Each half-width slot maps to two port numbers. |
| GE port | - | 2 | 19 | The value is 1 to 2. | The two GE ports connect to and communicate with two MM910s. |

Table 1-4 describes the internal ports on the CX210 FC switching plane.

**Table 1-4** FC switching plane internal ports

| Name | Type | Quantity | Description |
|---|---|---|---|
| FC port | 0 | 1 | The port is connected to half-width slot 16. |
| FC port | 9 to 23 | 15 | The ports are connected to half-width front slots 01 to 15. |

NOTE

The internal FC interface rate must be set to 8 Gbit/s.

# 1.5 Indicators

This topic describes the indicators on the CX210.

By observing the indicators, you can determine the current operating status of the CX210. Table 1-5 describes the indicators on the CX210 panel.

**Table 1-5** Indicator description

| Label | Meaning | Color | Description |
| --- | --- | --- | --- |
| HLY | Healthy indicator | Red and green | ● Off: The CX210 is not powered on.<br>● Steady green: The CX210 is working properly.<br>● Blinking red (1 Hz): A major alarm is generated.<br>● Blinking red (at 5 Hz): A critical alarm is generated for the CX210, or the CX210 is not securely installed. |
| OFL | Offline button/ indicator (reserved) | N/A | None. |
| A | Diagnosis status indicator of the 8G FC optical port | Orange | ● Off: No optical module is installed, or an exception occurs when the port is receiving optical signals. (The L indicator is also off.)<br>● Steady orange: The port is not synchronized, and a connection exception occurs.<br>● Blinking orange (once/2 seconds): The port is disabled.<br>● Blinking orange (twice/ second): The port is faulty. |

| Label | Meaning | Color | Description |
| --- | --- | --- | --- |
| L | Connection status indicator of the 8G FC optical port | Green | ● Off: No optical module is installed, or an exception occurs when the port is receiving optical signals. (The A indicator is also off.)<br>● Steady green: The port is normal, and the link is connected.<br>● Blinking green (blinking every two seconds): The port is normal but isolated. No link is set up.<br>● Blinking green (blinking twice per second): The port is in the diagnosis state.<br>● Blinking green (blinking four times per second): The link is properly set up and the port is transmitting data. |

# 1.6 Internal Chassis Networking

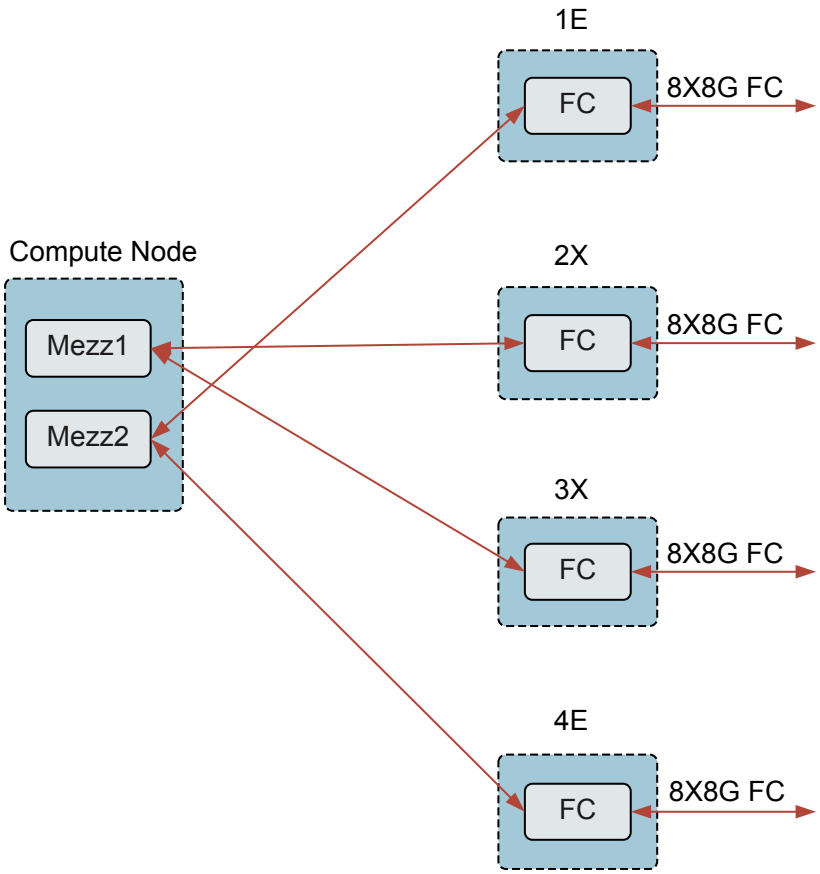
This topic describes connection relationships between the CX210 and mezz modules on compute nodes.

For details about the networking of the CX210 and Mezz cards on compute nodes, see ***E9000 Server Mezz Card-Switch Module Networking Assistant***.

**Figure 1-5** shows the internal chassis networking for the CX210 and compute nodes. Ports on compute nodes for connecting to the CX210 are provided by two mezz modules as follows:

- Mezz 1 connects to the FC switching planes of the CX210s in slots **2X** and **3X**.
- Mezz 2 connects to the FC switching planes of the CX210s in slots **1E** and **4E**.

**Figure 1-5** Mapping between the CX210 and mezz modules on compute nodes




**NOTE**

If a compute uses the ports provided by four mezz modules to connect to the CX210, slots Mezz1 and Mezz3 connect to switch module slots 2X and 3X respectively, and slots Mezz2 and Mezz4 connect to switch module slots 1E and 4E respectively.

The following describes the mapping between the CX210s and mezz modules. For example, the CX210s are installed in slots **2X** and **3X** and connect to Mezz 1.

## Port Mapping Between a Switch Module and a Mezz Module

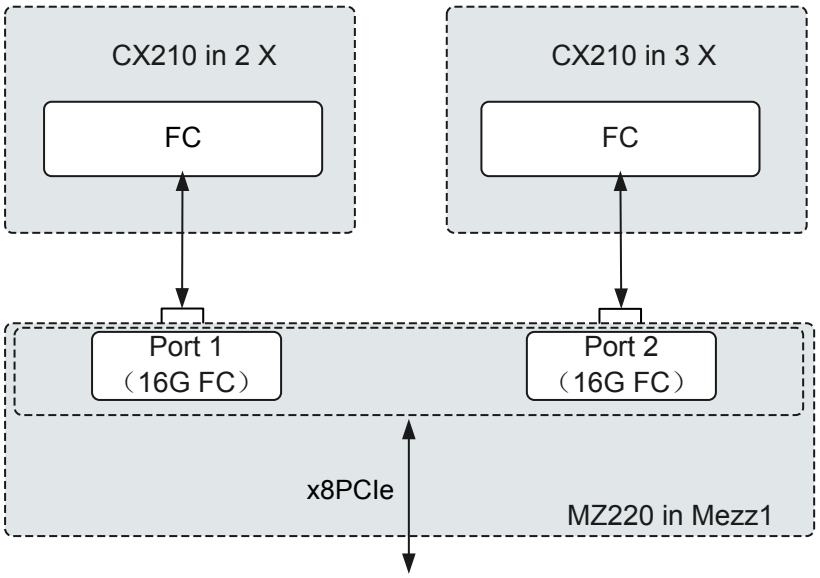
### Mapping between the CX210 and ports on the MZ220

The two 16G FC ports (ports 1 and 2) on the MZ220 map to the FC switching planes of the CX210s in slots **2X** and **3X** respectively, as shown in **Figure 1-6**.

**NOTE**

The two 16G FC ports on the MZ220 are switched to 8G FC ports to connect to the CX210 FC switching plane.

**Figure 1-6** Mapping between the CX210 and ports on the MZ220




# 1.7 Software and Hardware Compatibility

This topic describes mezz modules that can work with the CX210 and pluggable modules and cables supported by ports on the CX210 panel.

For details about the software and hardware that are compatible with the CX210, see ***Compatibility***.

## Supported Mezz Modules

The CX210 connects to mezz modules of compute nodes. **Table 1-6** describes models and specifications of the supported mezz modules.

**Table 1-6** Supported mezz modules

| Model | Specifications |
| --- | --- |
| MZ220 | Two-port FC mezz module, which provides two 16G FC ports |

### Supported Pluggable Modules and Cables

**Table 1-7** Supported pluggable modules and cables

| Module/Cable | Description |
| --- | --- |
| SFP+ multi-mode optical module (4G/8G)<br>(Only Brocade SFP+ optical modules are supported.) | Supports FC-PI-4. |
| SFP+ single-mode optical module (4G/8G)<br>(Only Brocade SFP+ optical modules are supported.) | Supports FC-PI-4. |
| Multi-mode fiber (MMF) | Supports the MMF of 850 nm OM1/OM2/OM3 with the maximum transmission distance of 300 m. |
| Single-mode fiber (SMF) | Supports the 1310 SMF with a maximum transmission distance of 10,000 m. |
| Console cable | Supports the RJ45 port and serves as the connection cable for RS232 serial ports. |

The CX210 supports:

- SFP+ optical ports
- Single-mode and multi-mode SFP+ optical modules
- 8 Gbit/s and 16Gbit/s
- various optical cables

You can choose the components based on site requirements.

**NOTE**

The CX210 supports only pluggable Brocade multi-mode and single-mode optical modules.

# 1.8 Technical Specifications

This topic describes the physical, environmental, power, and network switching specifications of the CX210.

**Table 1-8** describes the technical specifications of the CX210, and **Table 1-9** describes the network switching specifications of the CX210.

For details about the FC switching plane switching performance, see the ***MX210&MX220_Fabric_OS_Administrator_Guide***.

**Table 1-8** Technical Specifications

| Category | Item | Specifications |
| --- | --- | --- |
| Physical specifications | Dimensions (H x W x D) | 388.55 mm x 35.06 mm x 272.15 mm (15.30 in. x 1.38 in. x 10.71 in.) |
| | Color | Silver white |
| | Weight | 2.3kg |
| Environmental specifications | Temperature | ● Operating temperature: 5°C to 40°C (41°F to 104°F)<br>● Storage temperature: -40°C to +65°C (-40°F to +149°F) |
| | Temperature change rate | 15°C/h (27°F/h) |
| | Humidity | ● Operating humidity: 5% RH to 85% RH (non-condensing)<br>● Storage humidity: 5% RH to 95% RH (non-condensing) |
| | Altitude | 900 m (2952.72 ft) at 40°C (104°F)<br>When the device is used in an altitude of 900 m to 3000 m, the operating temperature decreases by 1°C (1.8°F) as the altitude increases by 300 m (984.24 ft). |
| Input power supply | Rated input voltage | 12 V DC |
| Power consumption | Maximum power consumption | 50 W |

**Table 1-9** Network switching specifications

| Item | Description | Specifications |
| --- | --- | --- |
| Quantity of ports on the panel | 10 | ● One BMC serial port and one SYS serial port<br>● Eight 8 Gbit/s FC optical ports |
| Port rate | FC switching plane: 4G FC and 8G FC optical ports | Full duplex mode |
| Switching capability (throughput) | FC switching plane: 384 Gbit/s | - |

# 2 Standards and Certifications

## About This Chapter

# 2.1 Standards Compliance

This topic describes the international and industrial standards and communication protocols that the CX210 complies with.

## International Standards

Table 2-1 lists the international standards.

**Table 2-1** Standards and protocol compliance

| Standard | Protocol |
|---|---|
| FC-DA | FC Device Attach |
| FC-FS-2 | FC Framing and Signaling |
| FC-GS-5 | FC Generic Service |
| FC-LS | FC Link ServiceFC Link Service |
| FC-MI-2 | FC Methodologies for Interconnects |
| FC-PI-4 | FIBRE CHANNEL. Physical Interface-4 8G FC Interface |
| FC-SW-4 | FC Switch Fabric |
| FC-VI | FC Virtual Interface Architecture Mapping |
| FCP-3 | Fibre Channel Protocol for SCSI |
| RFC2837 | Fabric Element MIB Specification |
| IEEE 1149.1-2001 | IEEE Standard Test Acces Port and Boundary-Scan Architcture |
| SFF-8431 | Enhanced Small Form Factor Pluggable Module SFP+ |
| SFF-8472 | Diagnostic Monitoring Interface for Optical Transceivers |

## Industrial Standards

Table 2-2 lists the industrial standards.

**Table 2-2** Industrial standards

| Organization | Standard |
|---|---|
| ECMA TR/70 | Environment protection |
| EN60950 | Safety (Europe) |
| GR-929 | Reliability |

| Organization | Standard |
| --- | --- |
| IEC 863 | Reliability, maintainability, and availability compliance standard |
| IEC60297 | Chassis compliance |
| IEC60950 | Safety |
| IEC60825-1/2/6 | Safety |
| IEC60215 | Safety |
| IEC61000 | EMC standard |
| Telcordia SR-332 | Reliability |
| UL60950 | Safety (North America) |

## Communication Protocols

Table 2-3 lists the communication protocols.

**Table 2-3** Communication protocols

| Protocol | Description |
| --- | --- |
| ARP | Address Resolution Protocol |
| DHCP | Dynamic Host Configuration Protocol |
| FTP | File Transfer Protocol (By default, it is disabled. You can run a command to enable it.) |
| SFTP | Secure File Transfer Protocol |
| HTTPS | Hypertext Transfer Protocol Security |
| ICMP | Internet Control Message Protocol |
| IP | Internet Protocol |
| IPMI | Intelligent Platform Management Interface |
| IPv4/IPv6 | IPv4/IPv6 Internet Protocol |
| NTP | Network Time Protocol |
| RADIUS | Remote Authentication Dial In User Service |
| SNMP | Simple Network Management Protocol (V1/V3) |
| SSH | Secure Shell |
| SSL | Secure Socket Layer |
| TCP | Transmission Control Protocol |

| Protocol | Description |
| --- | --- |
| TELNET | Remote terminal protocol (By default, it is disabled. You can run a command to enable it.) |
| TFTP | Trivial File Transfer Protocol (By default, it is disabled. You can run a command to enable it.) |
| UDP | User Datagram Protocol |

# 2.2 Certifications

This topic describes the certifications that the E9000 has passed.

Table 2-4 lists the certifications.

**Table 2-4** Certifications

| Country /Region | Certification | Standard |
| --- | --- | --- |
| Europe | WEEE | 2002/96/EC, 2012/19/EU |
| Europe | RoHS | 2002/95/EC, 2011/65/EU, EN 50581: 2012 |
| Europe | REACH | EC NO. 1907/2006 |
| Europe | CE | Safety: EN 60950-1:2006+A11:2009+A1:2010+A12:2011<br>EMC:<br>● EN 55022:2010<br>● CISPR 22:2008<br>● EN 55024:2010<br>● CISPR 24:2010<br>● ETSI EN 300 386 V1.6.1:2012<br>● ETSI ES 201 468 V1.3.1:2005 |
| China | RoHS | SJ/T-11363-20006<br>SJ/T-11364-20006<br>GB/T 26572-2011 |
| China | China Environmental Labeling | GB/T24024:2001 idt ISO14024:1999<br>HJ 2507-2011 |
| Australia | C-tick | AS/NZS CISPR22: 2009 |
| America | UL | UL 60950-1 |
| America | FCC | FCC Part 15 (Class A) |

| Country /Region | Certification | Standard |
|---|---|---|
| America | NTRL-UL | UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements)<br>CSA C22.2 No.60950-1-07,2nd Edition,2011-12 (Information Technology Equipment-Safety-Part 1:General Requirements) |
| Canada | IC | ICES-003 Class A |
| Nigeria | SONCAP | IEC 60950-1: 2005 (2nd Edition) + A1:2009<br>EN 60950-1:2006+A11:2009+A1:2010 + A12:2011 |
| Kingdom of Saudi Arabia (KSA) | SASO | IEC 60950-1: 2005 (2nd Edition) + A1:2009<br>EN 60950-1:2006+A11:2009+A1:2010 + A12:2011 |
| Global | CB | IEC 60950-1 |
| Japan | VCCI | VCCI V-4:2012 |