CX621 Switch Module
V100R001

White Paper

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About This Document

Purpose

This document describes the E9000 CX621 IB switch module (CX621 for short) in terms of its functions, advantages, appearance, specifications, internal networking, standards and certifications. You can learn about the CX621 by reading this document.

Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Huawei 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.
☞ 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.

Issue 01 (2017-08-15)

This issue is the first official release.

Contents

1 Overview

About This Chapter

1.1 Functions

This topic describes the functions and ports of the CX621 switch module.

The E9000 CX621 Switch Module (CX621 for short) is the Infiniband (IB) switch module of the E9000 server and provides external IB ports for the compute nodes, storage nodes, or service process nodes installed in the front slots of the E9000. Each CX621 provides up to 18 IB ports on the panel and up to 16 IB ports on the backplane. It also can monitor the hardware operating, software operating and operating environment.

1.2 Advantages

This topic describes the advantages of the CX621 switch module.

The CX621 switch module provides various ports (40 Gbit/s,56 Gbit/s, and 100 Gbit/s) and delivers high performance.

Various Ports (40 Gbit/s, 56 Gbit/s, and 100 Gbit/s)

Underpinned by the leading hardware platform, the CX621 provides high-density ports and and a line-speed forwarding capability.

CX621 provides the external ports as follows:

- BMC serial port: The serial port is used to debug the baseboard management controller (BMC) module and the baud rate of 115200 bit/s.
- 18 QSFP+ ports: These ports are used to connect to the external network. One green indicator is provided for each port.

CX621 provides 16 EDR ports for connecting to the mezzanine cards on the 16 half-width or eight full-width nodes.

High Performance

The CX621 has the following advantages in performance:

- 100 Gbit/s bandwidth
- 6.8 TB switching capacity
- 90 ns time delay
- A built-in switch chip and NIC, removing the need for cables
- Co-Design Scalable Hierarchical Aggregation and Reduction Protocol (SHARP)

1.3 Appearance

This topic describes the CX621 in terms of its appearance, panel, and installation positions in the chassis.

Appearance

Figure 1-1 shows the CX621.

Figure 1-1 Appearance

Installation Positions

The CX621 is installed in a rear slot of the E9000 chassis. Figure 1-2 shows the positions and slots for installing the CX621s in a chassis.

Figure 1-2 Installation positions and slots
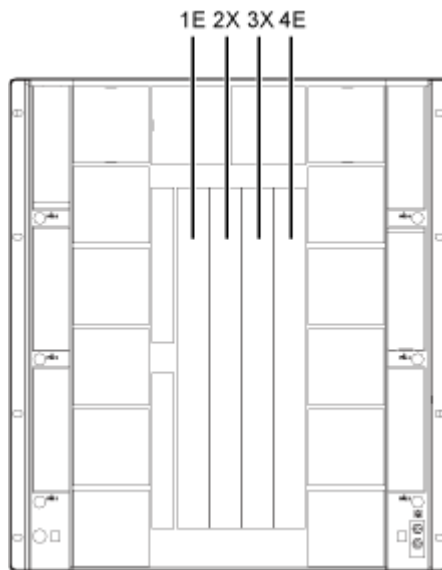
📖 **NOTE**

The CX621 panel provides more ports than other switch modules. For ease of cable routing and maintenance, you are advised to install the CX621 in slot 1E or 4E.

Panel

Figure 1-3 shows the CX621 panel.

Figure 1-3 Panel
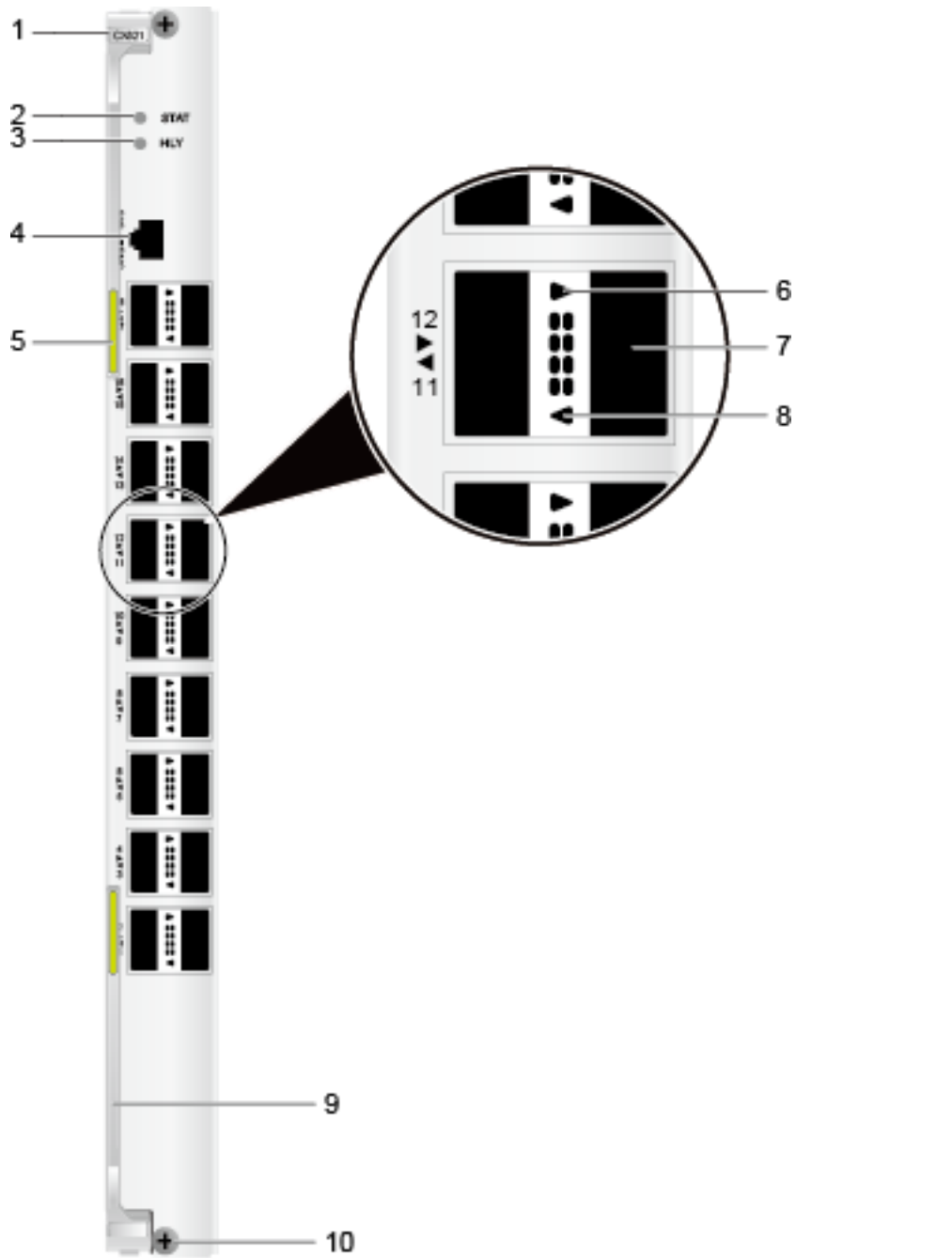
1	Product Model	2	STAT indicator
3	HLY indicator	4	BMC serial port
5	Customization label (with an ESN label)	6	Status indicator of the right optical port
7	Optical port (QSFP+)	8	Status indicator of the left optical port
9	Ejector lever	10	Captive screw

📖 NOTE

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

SNs

A serial number (SN) uniquely identifies a product. An SN is required when you request Huawei technical support.

Figure 1-4 shows the SN format.

Figure 1-4 SN example

No.	Description
1	Category code.
2	Material identification code.
3	Vendor code.
4	Year and month. • The first character indicates the year. Digits 1 to 9 indicate 2001 to 2009, and letters A to Z indicate 2010 to 2035. • The second character indicates the month. Digits 1 to 9 indicate January to September, and letters A to C indicate October to December.
5	Serial number (six digits).
6	RoHS compliance.
7	Internal model number of the board.

1.4 Ports

This topic describes the name, type, quantity, description, and the naming rules of the ports on the CX621.

Overview

Table 1-1 describes the external ports on the CX621.

Table 1-1 Ports

Port	Type	Quantity	Description
BMC serial port	RJ-45	1	The serial port is used to debug the baseboard management controller (BMC) module and the baud rate of 115200 bit/s.
Optical port	QSFP+	18	These ports are used to connect to the external network. One green indicator is provided for each port.

Figure 1-5 shows the CX621 port naming rules.

Figure 1-5 Port naming rules
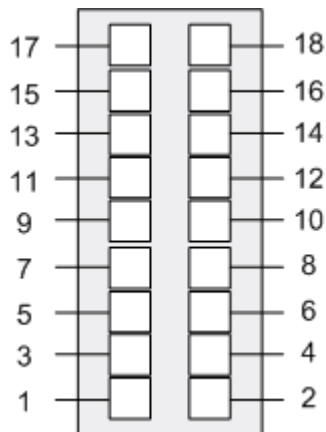
1.5 Indicators

This topic describes the names, meanings, colors, descriptions and working status of the indicators on the CX621.

You can observe the indicators to determine the current operating status of the CX621. Table 1-2 describes the indicators.

Table 1-2 Indicators

Indicator	Meaning	Color	Description
STAT indicator	Power status indicator	Green	• Off: The module is not powered on. • Blinking green: The module is being powered on. • Steady green: Power is properly supplied to the module.

Indicator	Meaning	Color	Description
HLY indicator	Healthy indicator	Red and green	• Off: The module is not powered on. • Steady green: The module is working properly. • Blinking red (1 Hz): A major alarm is generated. • Blinking red (4 Hz): A critical alarm is generated. • Blinking red (5 Hz): The CX621 is not installed properly. **NOTE** It is difficult to identify the difference between blinking frequencies of 4 and 5 Hz. If the indicator is blinking red quickly, check whether the device has been installed properly and then check whether a critical alarm has been generated.
Status indicator of the optical port	The status indicator of the optical port	Green	• Off: The port is not properly connected, or the **opensm** command is not executed in the OS. • Steady green: The port is properly connected. • Blinking green: Data is being sent or received over the port.

1.6 Networking in the Chassis

This topic describes the networking between the CX621 and other devices in the chassis.

Switch Chip Port Allocation

The 34 ports for the CX621 are provided by the Switch-IB2 chip, numbered 1 to 34. The ports are allocated as follows:

- Eighteen EDR ports (1 to 18) on the panel connect to external devices.
- Sixteen EDR ports (19 to 34) connect to the mezzanine cards on the 16 half-width or eight full-width nodes.

Figure 1-6 shows the allocation of the ports provided by the Switch-IB2 chip.

Figure 1-6 Port allocation
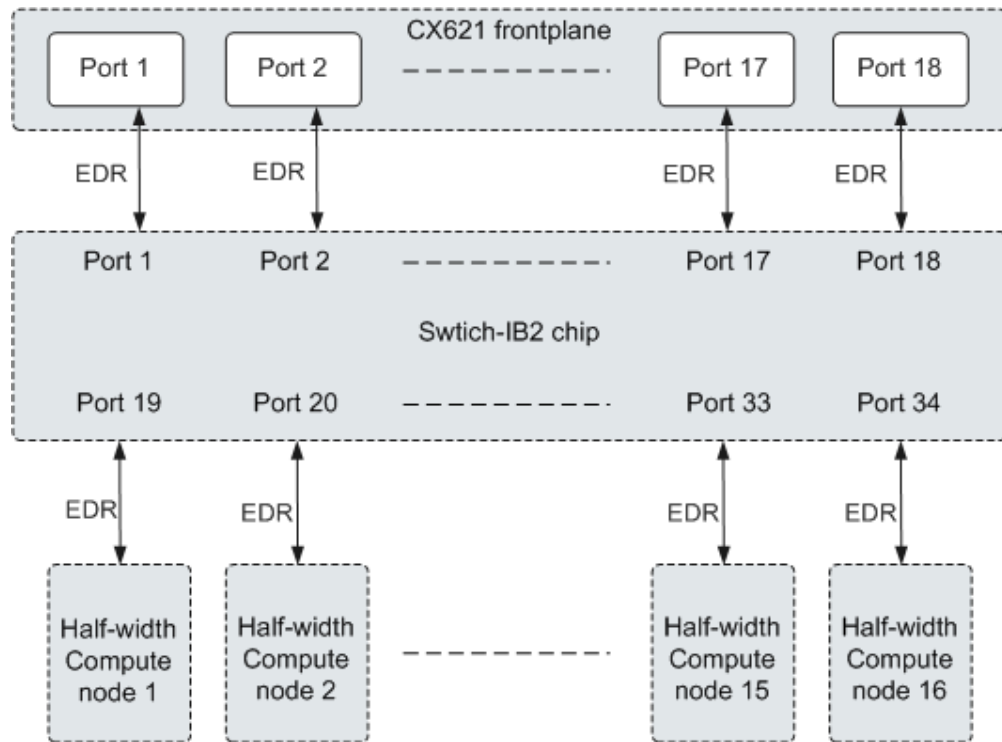
☐ **NOTE**

The mapping between full-width nodes and ports is the same as the mapping between half-width nodes in corresponding slots and ports.

Port mapping between switch modules and mezzanine cards

Port mapping between the CX621s and the mezzanine cards

Mezz1 and Mezz3 each connect to four EDR ports of the CX621 switch modules in slots 2X and 3X. Mezz2 and Mezz4 each connect to four EDR ports of the CX621 switch modules in slots 1E and 4E.

Figure 1-7, Figure 1-8, Figure 1-9, and Figure 1-10 show the port mapping between the CX621s and the mezzanine cards.

Figure 1-7 Port mapping between the CX621s and the MZ611 mezzanine cards
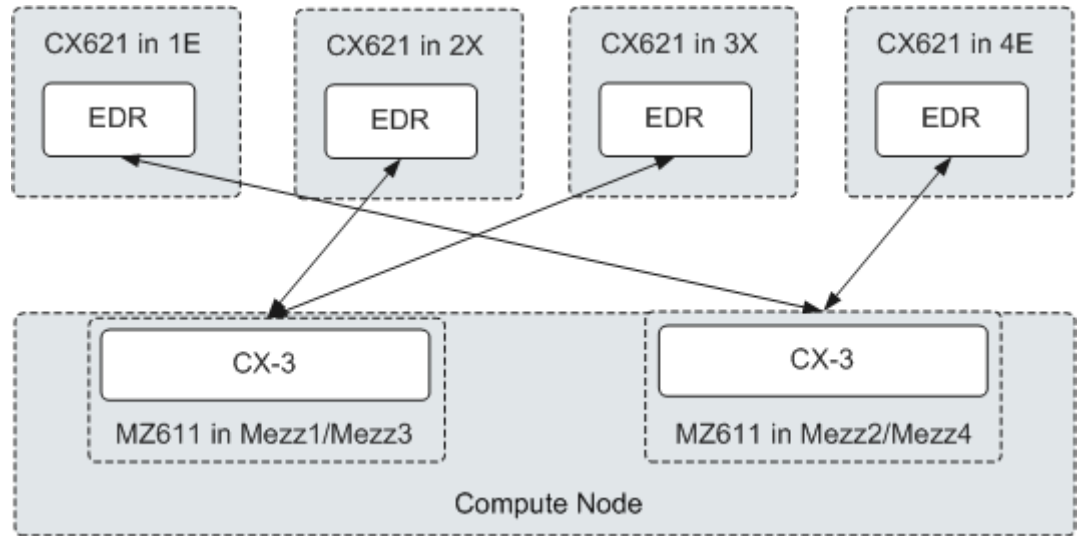
Figure 1-8 Port mapping between the CX621s and the MZ612 mezzanine cards
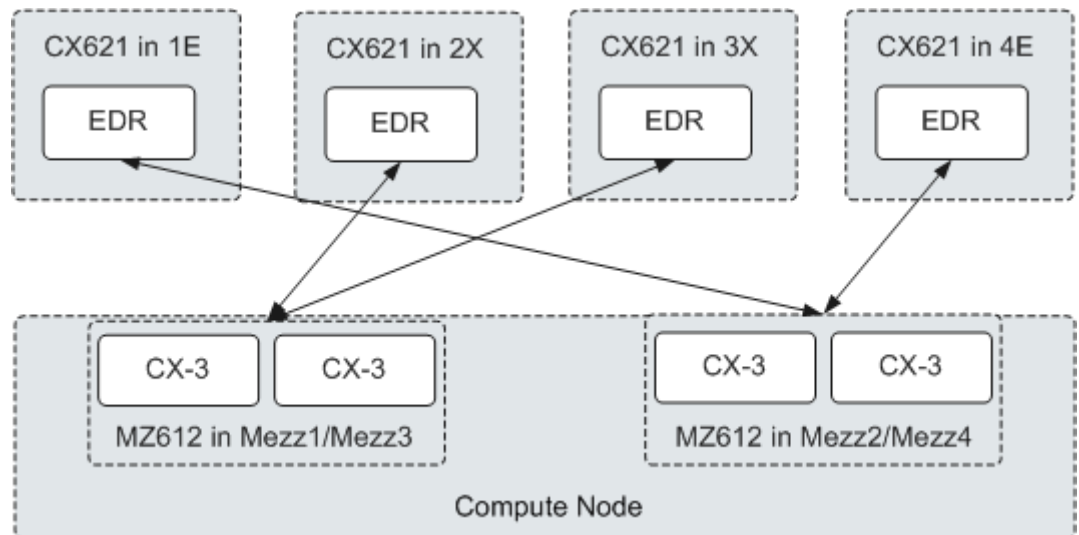
Figure 1-9 Port mapping between the CX621s and the MZ620 mezzanine cards
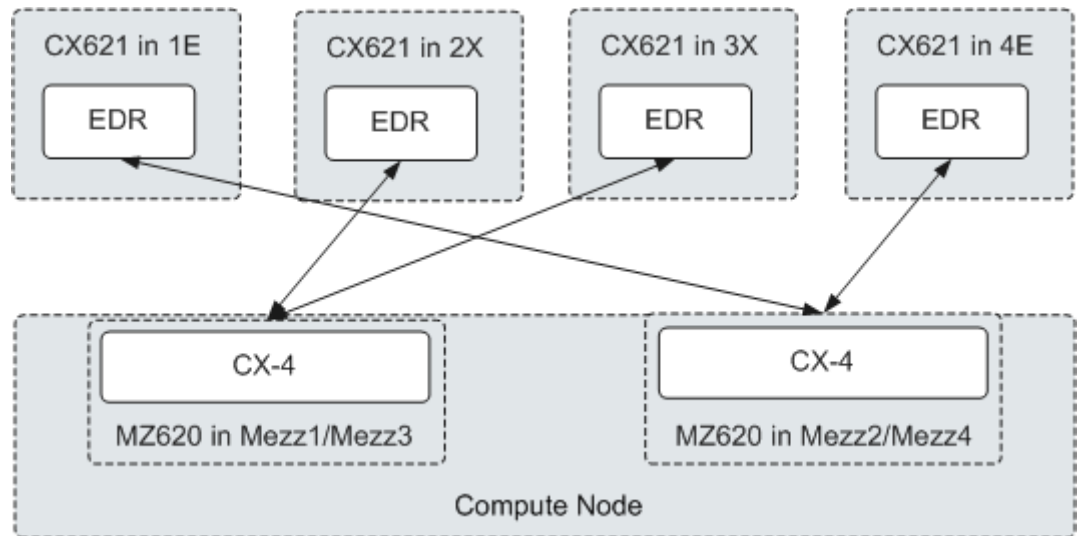
Figure 1-10 Port mapping between the CX621s and the MZ622 mezzanine cards
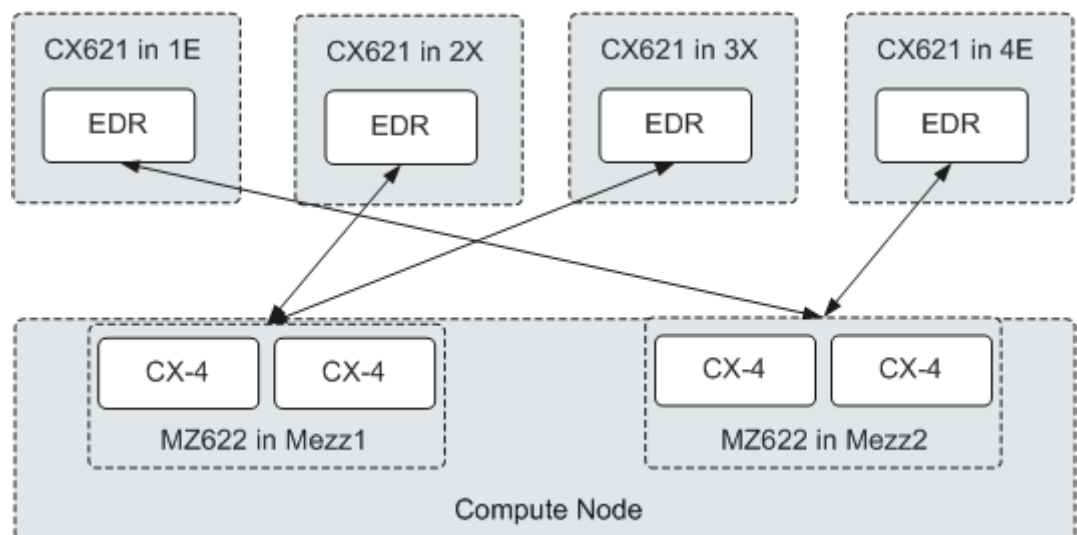
1.7 Software and Hardware Compatibility

This topic describes the software and hardware supported by the CX621.

For details about the software and hardware that are compatible with the CX621, see *Huawei Server Compatibility Checker*.

Supported Mezzanine Cards

Table 1-3 describes the mezzanine cards supported by the CX621.

Table 1-3 Mezzanine cards supported by the CX621

Module	Description
MZ610	2–port IB quad data rate (QDR) mezzanine card
MZ611	2–port IB fourteen data rate (FDR) mezzanine card
MZ612	2–port IB fourteen data rate (FDR) mezzanine card
MZ613	2–port IB quad data rate (QDR) mezzanine card
MZ620	2–port IB enhanced data rate (EDR) mezzanine card
MZ622	2–port IB enhanced data rate (EDR) mezzanine card

Supported Cables and Transceivers

Table 1-4 describes the cables and transceivers supported by the CX621.

Table 1-4 Cables and transceivers supported by the CX621

| Cable or Transceiver	Description
QSFP+ AOC cable (EDR)	Date rate: EDR; cable length: AOC active optical cable of 5 m, 10 m, or 20 m
QSFP+ DAC cable (EDR)	Date rate: EDR cable: 1 m or 3 m direct attached cable (DAC)
QSFP+ AOC cable (FDR)	Date rate: FDR; cable length: AOC active optical cable of 3 m, 5 m, 10 m, 15 m, 20 m, or 30 m
QSFP+ DAC cable (FDR)	Date rate: FDR; cable: 3 m DAC
Console cable	Supports an RJ45 port and serves as the connection cable for an RS232 serial port

The CX621 supports various pluggable optical modules and DACs. You can choose optical modules and DACs based on site requirements.

- The CX621 provides the following functions for EDR applications:
    - Provides QSFP+ optical ports and supports IB-dedicated EDR optical modules.
    - Supports 1 m or 3 m QSFP+ DACs for connections.
- The CX621 provides the following functions for FDR applications:
    - Provides QSFP+ optical ports and supports IB-dedicated FDR optical modules.
    - Supports 3 m QSFP+ DACs for connections.

1.8 Technical Specifications

This topic describes the physical, environmental, and power specifications of the CX621.

Table 1-5 describes the CX621 technical specifications.

Table 1-5 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
	Weight	2.9 kg
Environmental specifications	Temperature	• Operating temperature: 5 ℃ to 40 ℃ (41 ℉ to 104 ℉) (ASHRAE Class A3 compliant) • Storage temperature: -40 ℃ to +65 ℃ (-40 ℉ to +149 ℉) • Long-term storage temperature: 21 ℃ to 27 ℃ (69.8 ℉ to 80.6 ℉) • Temperature change rate < 20 ℃/h (36 ℉/h)
	Humidity	• Operating humidity: 5% RH to 85% RH • Storage humidity: 5% RH to 95% RH • Long-term storage humidity: 30% RH to 69% RH (non-condensing) • Humidity change rate < 20% RH/h
	Altitude	At an altitude of 900 m (2952.72 ft), the highest operating temperature is 40 ℃ (104 ℉). When the device is used at an altitude of 900 m to 5000 m, the highest operating temperature decreases by 1 ℃ (1.8 ℉) for every increase of 300 m (984.24 ft).
	Corrosive air pollutant	• Corrosion rate of the copper test piece < 300 Å/month (in compliance with the ANSI/ISA-71.04-2013 gaseous corrosion level G1) • Corrosion rate of the silver test piece < 200 Å/month
	Particulate pollutant	• The ISO14664-1 Class 8 requirements are met. It is recommended that a professional company monitor particulate pollutants in the equipment room. • There is no explosive, conductive, magnetic, or corrosive dust in the equipment room.
Input power supply	Rated input voltage	12 V DC

Category	Item	Specifications
Power consumption	Maximum power consumption	154 W

2 Standards and Certifications

About This Chapter

This topic describes the international and industrial standards and communication protocols that the CX621 complies with.

This topic describes the certifications that the E9000 has passed.

2.1 Standards Compliance

This topic describes the international and industrial standards and communication protocols that the CX621 complies with.

International Standards

Table 2-1 lists the international standards.

Table 2-1 Standards and protocol compliance

Standard	Protocol
IBTA1.3	IB Trade Association 1.3

Industrial Standards

Table 2-2 lists the industrial standards.

Table 2-2 Industrial standards

Organization	Standard
ECMA TR/70	Environment protection

Organization	Standard
EN60950	Safety (Europe)
GR-929	Reliability
IEC60297	Chassis compliance
IEC60950	Safety
IEC60825-1/2/6	Safety
IEC60215	Safety
IEC61000	EMC standard
IEC 863	Reliability, maintainability, and availability compliance 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
FTP	File Transfer Protocol
HTTP	Hypertext Transfer Protocol
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IPMI	Intelligent Platform Management Interface
NTP	Network Time Protocol
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SSL	Secure Socket Layer
TCP	Transmission Control Protocol
TELNET	Remote terminal protocol
TFTP	Trivial File Transfer Protocol
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 EMC: • EN 55022: 2010 • CISPR 22: 2008 • EN 55024: 2010 • CISPR 24: 2010 • ETSI EN 300 386 V1.6.1: 2012 • ETSI ES 201 468 V1.3.1: 2005
China	RoHS	SJ/T-11363-20006 SJ/T-11364-20006 GB/T 26572-2011
China	China Environmental Labeling	GB/T24024: 2001 idt ISO14024: 1999 HJ 2507-2011
Australia	C-tick	AS/NZS CISPR22: 2009
America	UL	UL 60950-1
America	FCC	FCC Part 15 (Class A)
America	NTRL-UL	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) 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 EN 60950-1: 2006+A11: 2009+A1: 2010 + A12: 2011
Kingdom of Saudi Arabia	SASO	IEC 60950-1: 2005 (2nd Edition) + A1: 2009 EN 60950-1: 2006+A11: 2009+A1: 2010 + A12: 2011

Country /Region	Certification	Standard
(KSA)		
Global	CB	IEC 60950-1
Japan	VCCI	VCCI V-4: 2012