

ZXR10 5900/5200 Series All Gigabit-Port Intelligent Routing Switch Hardware Manual

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Contents

About This Manual	i
Safety Introduction	1
Safety Introduction	1
Safety Description	1
System Overview	3
Product Overview	3
Functions	4
Technical Features and Parameters	5
Structure and Principle	9
Working Principles	
Hardware Structure	10
ZXR10 5924/5224	10
ZXR10 5928/5228	11
ZXR10 5928-PS	12
ZXR10 5928-FI/5228-FI	12
ZXR10 5952/5252	13
Units/Components Description	15
Control and Switching Board	15
Line Interface Card	18
SC-1XGS-CX4	18
SC-1XGL-XFP	19
Power Module	21
Power Module Overview	21
	24
ZXR10 5900/5200 Active Power	
ZXR10 5900/5200 Active Power ZXR10 5900/5200 Standby Power	21 23
ZXR10 5900/5200 Active Power ZXR10 5900/5200 Standby Power 550w Power Supply Unit for ZXR10 5928-PS	21 23 23
ZXR10 5900/5200 Active Power ZXR10 5900/5200 Standby Power 550w Power Supply Unit for ZXR10 5928-PS Installation and Debugging	21 23 23 25
ZXR10 5900/5200 Active Power ZXR10 5900/5200 Standby Power 550w Power Supply Unit for ZXR10 5928-PS Installation and Debugging Equipment Installation	21 23 23 25
ZXR10 5900/5200 Active Power ZXR10 5900/5200 Standby Power 550w Power Supply Unit for ZXR10 5928-PS Installation and Debugging Equipment Installation Desktop Installation	21 23 23 25 25
ZXR10 5900/5200 Active Power ZXR10 5900/5200 Standby Power 550w Power Supply Unit for ZXR10 5928-PS Installation and Debugging Equipment Installation Desktop Installation Cabinet Installation	21 23 23 25 25 25 25

Power Cable Installation	27
Console Cable Installation	29
Network Cable Installation	
Optical Fiber Installation	31
Power-on Procedure	32
RPS180 Backup Power	35
System Overview	35
Product Overview	35
Functions	35
Technical Features and Parameters	36
Structure and Principle	36
Working Principles	36
Hardware Structure	37
Cards	
Power Conversion Card	
CAPU	
CDPU	
LPDB	
Installation and Debugging	
Equipment Installation	39
Desktop Installation	39
Cabinet Installation	39
Cable Installation	39
Power Cable Installation	39
Power-on Procedure	41
Figures	43
Tables	45
List of Glossary	47

About This Manual

Purpose The hardware manual provides procedures and guidelines that support the operation on ZXR10 5900/5200 All Gigabit-Port Intelligent Routing Switches, including: ZXR10 5924 Gigabit Routing Switch ZXR10 5928 Gigabit Routing Switch ZXR10 5928-Fi Gigabit Routing Switch ZXR10 5952 Gigabit Routing Switch ZXR10 5224 Gigabit Convergence Switch ZXR10 5228 Gigabit Convergence Switch ZXR10 5228-FI Gigabit Convergence Switch ZXR10 5252 Gigabit Convergence Switch ZXR10 5928-PS Gigabit Convergence Switch Intended This manual is intended for engineers and technicians who per-Audience form operation activities on ZXR10 5900/5200 All Gigabit-Port Intelligent Routing Switches. To use the hardware manual effectively, users should have a gen-Prerequisite Skill and Knowledge eral understanding of OSI Model. Familiarity with the following is helpful, Protocols Routing concepts and Data Communication Terminologies What Is in This The hardware manual contains the following chapters: Manual TABLE 1 CHAPTER SUMMARY Chapter Summary Chapter 1 Safety This chapter describes the safety Instructions instructions and signs. This chapter describes the overview and Chapter 2 System Overview software and hardware features of ZXR10 5900/5200 system. Chapter 3 Structure and This chapter describes ZXR10 5900/5200

Principle

Chapter 4 Units/Compo-

Chapter 5 Power Module

nents Description

structure and principles. .

units/components.

modules.

This chapter describes ZXR10 5900/5200

This chapter describes structure and parameters of ZXR10 5900/5200 power

Chapter	Summary
Chapter 6 Installation and Debugging	This chapter describes ZXR10 5900/5200 installation procedure and debugging method.
Chapter 7 RPS180 Backup Power	This chapter describes RPS180 Backup Power, including its structure and installation.

Related Documentation

The following documentation is related to this manual:

- ZXR10 5900/5200(V2.8.23.A) Series All Gigabit-Port Intelligent Routing Switch Hardware Manual
- ZXR10 5900/5200(V2.8.23.A) Series All Gigabit-Port Intelligent Routing Switch User Manual (Ethernet Volume)
- ZXR10 5900/5200(V2.8.23.A) Series All Gigabit-Port Intelligent Routing Switch User Manual (Basic Configuration Volume)
- ZXR10 5900/5200(V2.8.23.A) Series All Gigabit-Port Intelligent Routing Switch User Manual (IPv4 Volume)
- ZXR10 5900/5200(V2.8.23.A) Series All Gigabit-Port Intelligent Routing Switch User Manual (IPv6 Volume)
- ZXR10 Router-Ethernet Switch Command Manual Command Index
- ZXR10 Router-Ethernet Switch Command Manual System Management
- ZXR10 Router-Ethernet Switch Command Manual Functional System I
- ZXR10 Router-Ethernet Switch Command Manual Functional System Volume II
- ZXR10 Router-Ethernet Switch Command Manual Functional System Volume III
- ZXR10 Router/Ethernet Switch Command Manual Functional System IV
- ZXR10 Router/Ethernet Switch Command Manual Protocol Stack I
- ZXR10 Router/Ethernet Switch Command Manual Protocol Stack II
- ZXR10 Router/Ethernet Switch Command Manual Protocol Stack III
- ZXR10 Router/Ethernet Switch Information Manual

Chapter 1

Safety Introduction

Table of Contents

Safety Introduction

In order to operate the equipment in a proper way, follow these instructions:

- Only qualified professionals are allowed to perform installation, operation and maintenance due to the high temperature and high voltage of the equipment.
- Observe the local safety codes and relevant operation procedures during equipment installation, operation and maintenance to prevent personal injury or equipment damage. Safety precautions introduced in this manual are supplementary to the local safety codes.
- ZTE bears no responsibility in case of universal safety operation requirements violation and safety standards violation in designing, manufacturing and equipment usage.

Safety Description

Contents deserving special attention during ZXR10 5900/5200 configuration are explained in Table 2.

TABLE 2 SAFETY DESCRIPTION

Conven- tion	Meaning
Note	It provides additional information.
Important	It provides great significance or consequence.
Result	It provides consequence of actions.
Example	It provides instance illustration.

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Chapter 2

System Overview

Table of Contents

Product Overview	3
Functions	4
Technical Features and Parameters	5

Product Overview

ZXR10 5900/5200 series products are gigabit Ethernet routing switches developed by ZTE independently. The switches can be both used in convergence layer of MAN and used as L3 switch at large-size enterprise network, campus network, and used as access switch for desktop access from gigabit Ethernet network, as well as used in data center which requires gigabit bandwidth (e.g. VOD server, multicast server, file server etc.).

ZXR10 5900/5200 series products provide Gigabit Ethernet interfaces and 10G Ethernet interfaces. All support L2/L3 line-rate forwarding on ports and meet requirements to increasing bandwidth.ZXR10 5900/5200 series products also support multiple unicast and multicast routing protocols.

With the development of network, there are more and more service types in data network, which require better service quality and security to network devices.ZXR10 5900/5200 series products provide abundant policies and resources for QoS and ACL and guarantee service quality and system security.

One of ZXR10 5900/5200 series products, ZXR10 5928-PS Ethernet switch supports PoE. All of the 24 gigabit ports on this switch support PoE power supply, PoE in CISCO standard and IEEE 802.3af standard. The maximum one-port output is 30w. At the same time, 24 30w ports can be supported. This POE switch can be used to connect device on Ethernet receiving end, including CISCO IP telephone, access point and camera. All down-stream Ethernet receiving end switch can be powered through PoE output port. By using PoE switch, you do not need to install wall outlet or purchase a great amount of cables and circuits in IP telephone and WLAN deployment. Additionally, power connector or PoE crossover cables are not required for running IP devices.

ZXR10 5900/5200 series products have the following features:

- Carrier-class reliability
- Full-speed forwarding and filtering capability



- Abundant network protocols
- Open architecture design with greater upgrade capability

Functions

ZXR10 5900/5200 series products contain the following nine products: ZXR10 5924, ZXR10 5928, ZXR10 5928-FI, ZXR10 5952, ZXR10 5224, ZXR10 5228, ZXR10 5228-FI, ZXR10 5252, ZXR10 5928-PS. All the above Ethernet switch series products use the same solution.

ZXR10 5900/5200 series products can switch data in layer 2/3 in full line speed and support multiple protocols and provide various functions.

- 1. Physical Port
 - Supporting port rate, duplex mode and auto-sensing
 - Supporting port mirroring
 - Supporting broadcast storm suppression
 - Supporting line diagnosis & analysis
- 2. VLAN
 - Supporting VLAN based on port, protocol, and subnet
 - Supporting IEEE 802.1Q, allowing up to 4094 VLANs
 - Supporting PVLAN
 - Supporting VLAN double-tag
 - Supporting SuperVLAN
- 3. Layer 2 Protocols
 - Supporting STP, RSTP and MSTP
 - Supporting static Trunk and LACP
 - Supporting IGMP Snooping
- 4. Routing Protocols
 - Supporting unicast routing protocols such as static route, RIP v1/v2, OSPF, IS-IS, BGP
 - Supporting multicast routing protocols such as IGMP v1/v2, PIM-SM, MSDP
- 5. ACL
 - Supporting basic ACL, extended ACL, L2 ACL and hybrid ACL
 - Supporting ACL time range limit
- 6. QoS
 - Supporting 802.1p
 - Supporting SP and WRR queue schedule mode
 - Supporting traffic monitoring

- Supporting flow-based egress redirection
- Supporting traffic mirroring and traffic statistics
- 7. Access Authentication
 - Supporting RADIUS Client
 - Supporting DHCP Relay and DHCP Server
- 8. Reliability
 - Supporting VRRP
 - Supporting routing load balance
- 9. Network Management
 - Supporting command line interface (CLI) configuration mode
 - Supporting configuration through the console port, Telnet and SSH
 - Supporting SNMP and RMON
 - Supporting NetNumen N31 unified network management system (NMS)

Technical Features and Parameters

Technical features and parameters are listed in Table 3.

TABLE 3 ZXR10 5900/5200 TECHNICAL FEATURES AND PARAMETERS

Item	Description
Dimensions	ZXR10 5224: 43.6mm (height)×442mm (width)×280mm (depth)
	ZXR10 5228: 43.6mm (height)×442mm (width)×360mm (depth)
	ZXR10 5228-FI: 43.6mm (height)×442mm (width)×320mm (depth)
	ZXR10 5252: 43.6mm (height)×442mm (width)×400mm (depth)
	ZXR10 5924: 43.6mm (height)×442mm (width)×280mm (depth)
	ZXR10 5928: 43.6mm (height)×442mm (width)×360mm (depth)
	ZXR10 5928-FI: 43.6mm (height)×442mm (width)×320mm (depth)
	ZXR10 5952: 43.6mm (height)×442mm (width)×400mm (depth)
	ZXR10 5928-PS: 43.6mm (height)×442mm (width)×400mm (depth)



Item	Description
Weight	ZXR10 5224: 6kg ZXR10 5228: 8kg ZXR10 5228-FI: 8kg ZXR10 5252: 12kg ZXR10 5924: 6kg ZXR10 5928: 8kg ZXR10 5928-FI: 8kg ZXR10 5952: 12kg ZXR10 5952: 6.1kg
Power supply	AC: 100V~240V50Hz ~60Hz DC: -57V~-40V
Power consumption	ZXR10 5224: 80w ZXR10 5228: 100w ZXR10 5228-FI: 100w ZXR10 5252: 150w ZXR10 5924: 80w ZXR10 5928: 100w ZXR10 5928-FI: 100w ZXR10 5952: 150w ZXR10 5952: 150w ZXR10 5952: 820wmain control board: 100wPoE port: 720w, RPS power is needed
Reliability	MTBF: >200000 hours MTTR: <30 minutes
Lightning protection	4KV
Environment temperature	Operating ambient temperature: -5℃~+45℃ Storage temperature: -40℃~+70℃
Environment humidity	Relative humidity: 10% to 90%, non-condensing
Memory size	ZXR10 5224: 128M ZXR10 5228: 128M ZXR10 5228-FI: 128M ZXR10 5252: 128M ZXR10 5924: 256M ZXR10 5928: 256M ZXR10 5928-FI: 256M ZXR10 5952: 256M

Item	Description
Backplane bandwidth	ZXR10 5224: 160G ZXR10 5228: 160G ZXR10 5228-FI: 160G ZXR10 5252: 320G ZXR10 5924: 160G ZXR10 5928: 160G ZXR10 5928-FI: 160G ZXR10 5952: 320G ZXR10 5952: 160G
Switching Capacity	ZXR10 5224: 48G ZXR10 5228: 128G ZXR10 5228-FI: 128G ZXR10 5252: 176G ZXR10 5924: 48G ZXR10 5928: 128G ZXR10 5928-FI: 128G ZXR10 5952: 176G ZXR10 5928-PS: 128G
Packet forwarding rate	ZXR10 5224: 36M ZXR10 5228: 96M ZXR10 5228-FI: 96M ZXR10 5252: 132M ZXR10 5924: 36M ZXR10 5928: 96M ZXR10 5928-FI: 96M ZXR10 5952: 132M ZXR10 5952: 96M
Routing table entry	ZXR10 5900: 20K ZXR10 5200: 2.5K
MAC address table depth	ZXR10 5900: 16K ZXR10 5200: 8K

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Chapter 3

Structure and Principle

Table of Contents

Working Principles

ZXR10 5900/5200 series products are the box line-rate Ethernet switches developed by ZTE. This series switches adopt modular design and have strong capability in service control and user management so as to provide networking solutions to convergence of enterprise network, IP MAN network and residential block.

This series products have powerful functions and sound performance. According to system functions, the products contain the following modules: control module, switching module, interface module and power module.

- 1. Control module: the module contains main processor and some other external functional chips and is used for system to process various applications. It provides console port for data manipulation and maintenance.
- 2. Switching module: the main part of switching module is packet processor, used for processing and switching of packets sent from ports.
- 3. Interface module: It is composed of interface chips and peripherals circuits to connect the external user and receive/send packets.
- 4. Power module: The module adopts 220V AC or -48V DC to supply needed power to the other components within the system.

ZXR10 5900/5200 system principle diagram is shown in Figure 1.



FIGURE 1 ZXR10 5900/5200 SYSTEM PRINCIPLE

ZXR10 5900/5200 system adopts standard 19-inch plug-in box, which can be installed outside separately or within the standard cabinet.

Hardware Structure

ZXR10 5924/5224

The front panels of ZXR10 5924 and ZXR10 5224 are different, but their backplanes are basically same. The standard chassis height is 1U. Both ZXR10 5924 and ZXR10 5224 provide 24 gigabit Ethernet electrical interfaces and 4 gigabit Ethernet optical or electrical ports. There is no slot on the backplane.

The front panel of ZXR10 5924 is shown in Figure 2.

FIGURE 2 ZXR10 5924 FRONT PANEL



The front panel of ZXR10 5224 is shown in Figure 3.

FIGURE 3 ZXR10 5224 FRONT PANEL



The backplane of AC power in ZXR10 5924 is shown in Figure 4.

FIGURE 4 ZXR10 5924 BACKPLANE (AC)



The backplane of DC power in ZXR10 5924 is shown in Figure 5.

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FIGURE 5 ZXR10 5924 BACKPLANE (DC)
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The backplane of AC power in ZXR10 5224 is shown in Figure 6.

FIGURE 6 ZXR10 5224 BACKPLANE (AC)



The backplane of DC power in ZXR10 5224 is shown in Figure 7.

FIGURE 7 ZXR10 5224 BACKPLANE (DC)



ZXR10 5928/5228

ZXR10 5928 and ZXR10 5228 are totally identical in appearance except for product name ID. Their standard chassis height is IU(1U=44.45mm). ZXR10 5928 and ZXR10 5228 provide 24 gigabit Ethernet electrical interfaces and 4 gigabit Ethernet optical or electrical ports. There are 4 10G Ethernet Interface board slots on the backplane. All 4 slots can be configured with 10G Ethernet optical interfaces or 10G stacking electrical interfaces.

The front panel of ZXR10 5928 is shown in Figure 8.

FIGURE 8 ZXR10 5928 FRONT PANEL



The front panel of ZXR10 5228 is shown in Figure 9.

FIGURE 9 ZXR10 5228 FRONT PANEL

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The backplane of AC power in ZXR10 5928/5228 is shown in Figure 10.

FIGURE 10 ZXR10 5928/5228 BACKPLANE (AC)



The backplane of DC power in ZXR10 5928/5228 is shown in Figure 11.

FIGURE 11 ZXR10 5928/5228 BACKPLANE (DC)



ZXR10 5928-PS

The chassis height of ZXR10 5928-PS is the standard IU(1U=44.45mm). It provides 24 gigabit Ethernet electrical interfaces and 4 gigabit Ethernet optical or electrical ports. There are 4 10G Ethernet Interface board slots on the backplane. All 4 slots can be configured with 10G Ethernet optical interfaces or 10G stacking electrical interfaces. Additionally, it supports CISCO standard PoE and meets IEEE 802.3af standard.

The front panel of ZXR10 5928-PS is shown in Figure 12.

FIGURE 12 ZXR10 5928-PS FRONT PANEL



The backplane of ZXR10 5928-PS is shown in Figure 13.

FIGURE 13 ZXR10 5928-PS BACKPLANE



ZXR10 5928-FI/5228-FI

ZXR10 5928-FI and ZXR10 5228-FI are totally identical in appearance except for product name ID. Their standard chassis height is IU. ZXR10 5928-FI and ZXR10 5228-FI provide 24 gigabit Ethernet optical interfaces and 4 gigabit Ethernet optical or electrical ports. There are 4 10G Ethernet Interface board slots on the backplane. All 4 slots can be configured with 10G Ethernet optical interfaces or 10G stacking electrical interfaces.

The front panel of ZXR10 5928-FI is shown in Figure 14.

FIGURE 14 ZXR10 5928-FI FRONT PANEL



The front panel of ZXR10 5228-FI is shown in Figure 15.

FIGURE 15 ZXR10 5228-FI FRONT PANEL



The backplane of AC power in ZXR10 5928-FI/5228-FI is shown in Figure 16.

FIGURE 16 ZXR10 5928-FI/5228-FI BACKPLANE (AC)



The backplane of DC power in ZXR10 5928-FI/5228-FI is shown in Figure 17.

FIGURE 17 ZXR10 5928-FI/5228-FI BACKPLANE (DC)



ZXR10 5952/5252

ZXR10 5952 and ZXR10 5252 are totally identical in appearance except for product name ID. Their standard chassis height is IU. ZXR10 5952/5252 provide 44 gigabit Ethernet electrical interfaces and 4 gigabit Ethernet optical or electrical ports. There are 4 10G Ethernet Interface board slots on the backplane. All 4 slots can be configured with 10G Ethernet optical interfaces or 10G stacking electrical interfaces.

The front panel of ZXR10 5952 is shown in Figure 18.

FIGURE 18 ZXR10 5952 FRONT PANEL



The front panel of ZXR10 5252 is shown in Figure 19.

FIGURE 19 ZXR10 5252 FRONT PANEL



The backplane of AC power in ZXR10 5952/5252 is shown in Figure 20.

FIGURE 20 ZXR10 5952/5252 BACKPLANE (AC)



The backplane of DC power in ZXR10 5952/5252 is shown in Figure 21.

FIGURE 21 ZXR10 5952/5252 BACKPLANE (DC)



Chapter 4

Units/Components Description

Table of Contents	4 -
Control and Switching Board	15
Line Interface Card	

Control and Switching Board

Functions Control and switching board (the main control board) is the core of ZXR10 5900/5200 and it mainly implements the functions of module control and switching module.

In ZXR10 5900/5200 system, the control & switching board is installed in a box without an individual panel and its related interface and signal indicator are located on the system front panel.

Interfaces
Console Port

Management terminal operates and maintains ZXR10 5900/5200 through Console port. The console port is the RJ45 socket, which is connected to the COM port on the background management terminal through a serial cable. One end (RJ45 connector) of the serial cable is connected to ZXR10 5900/5200 and the other end (DB9 female connector) is connected to the background management terminal.

• 10/100/1000 Base-T Ethernet Interface

ZXR10 5900/5200 main control board supports 24~48 10/100/1000 Base-T Ethernet interfaces and 1000Base-T, 100 Base-TX, 10Base-T on CAT 5. The attributes are described in Table 4.

TABLE 4 ZXR10 5900/5200	ATTRIBUTES OF	10/100/	1000BASE-T
ON MAIN CONTROL BOARD			

Port	Attributes
10/100/1000Base-T	Attributes Standard: • 1000BASE-T IEEE 802.3ab • 1000BASE-X IEEE 802.3z • 100BASE-TX IEEE 802.3u • 100BASE-FX IEEE 802.3u • 100BASE-FX IEEE 802.3u • 100BASE-T IEEE 802.3u • 10BASE-T IEEE 802.3u • 10BASE-T IEEE 802.3u
	Category-5 UTP cables Maximum transmission distance: 100 m MDI/MDIX

Indicators There are 50 indicators on front panel of ZXR10 5924/5224/5928/5228/5928-FI/5228-FI system. There are 54 indicators on ZXR10 5952/5252 system. Their functions are described in Table 5.

TABLE 5 ZXR10 5900/5200 MAIN CONTROL BOARD INDICATORDESCRIPTION

Indicator	Description
RUN	Off: The main control board is faulty. Flash: The main control board is operating normally.
PWR	Permanently on: The system power supply works well. Off: The system power supply is faulty.
LINK/ACT	Flash: Packets are being transmitted or received on the interface.On: A link is established on the interface.Off: There is no connection between this interface and others.
FDX/COL	On: The interface link is full-duplex. Off: The interface link is half-duplex. Flash: there is a conflict in sending and receiving packets on this interface.

There are 39 indicators on front panel of ZRX10 5928-PS. The board supports three display modes: rate display, duplex display and POE display. These indicators on port are double-color LEDs. There are five indicators: mode, RUN, PWR, RPS, M/S. The indicator functions are shown in Table 6.

Electrical Interface	Rate Mode Off: no connection		Green: 1G connection	Yellow: 10/100M connection
			Green- flash: link/ACT	Yellow- flash: link/ACT
	Duplex Mode	Off: no connection	Green: full duplex	Yellow: Half duplex
			Green- flash: link/ACT	Yellow flash: link/ACT
	POE Mode	No connection or disable	Green: POE power supply	Yellow: Non PD Check failure
Optical Interface	Rate Mode	Off: no connection	Green: 1G connection	Yellow: 2.5G connection
			Green- flash: link/ACT	Yellow- flash: link/ACT
	Duplex Mode	Off: no connection	Green: full duplex	Yellow: Half duplex
			Green- flash: link/ACT	Yellow flash: link/ACT
	POE Mode	None	Off	Off
10G Sub-card	LINK	Off: No connection	Green: connected	
	ACT	Off: No data	Green flash: data are transmitted	
RUN	RUN	NO DC	Flash: board works well 1HZ	
AC	PWR	None	Perma- nently on: AC works well	
			Flash: Power alarm	

TABLE 6 ZXR10 5928-PS MAIN CONTROL BOARD INDICATOR DESCRIPTION

DC	RPS	None	Perma- nently on: DC works well	
Master/Slave	M/S	Slave	Green: Master	

Line Interface Card

Line interface cards are the external interfaces of switches. They serve as 10G Ethernet optical interface and 10G stacking electrical interface.

ZXR10 5900/5200 line interface cards contain: 1-port 10G Ethernet optical interface card and 1-port 10G Ethernet extension interface card.

Both interface cards can be inserted in the same slots.

The line interfaces card are described in <u>Table 7</u>.

TABLE 7 CARD FUNCTION

Card	Function	Applicable Device
SC-1XGS- CX4	1-port 10G Ethernet extension interface card	7XR10 5928/5228/5928
SC-1XGL- XFP	1-port 10G Ethernet optical interface card	FI/5228FI /5952/5252

SC-1XGS-CX4

- **Functions** SC-1XGS-CX4 (1-port 10G Ethernet extension interface card) provides users with one 10G Ethernet extension interface , which is used for stacking. Four cards can be configured in ZXR10 5928/5228/5928-FI/5228-FI/5952/5252 system as maximum.
 - **Panel** The SC-1XGS-CX4 panel is shown in Figure 22.

FIGURE 22 SC-1XGS-CX4 PANEL



Interface SC-1XGS-CX4 card interface attributes are shown in <u>Table 8</u>.

Port	Attributes		
CX4	Output	Signal Rate: 3.125 ± 100 ppm Different output voltage peak-to-peak value max 1200mV; min: 800mV Different output voltage peak-to-peak value difference: 150mV Common mode output voltage limit value: max: 1.9V; min: -0.4V Voltage level shift time: max: 130ps; min:60 Output dithering peak-to-peak value: random dithering: 0.27UI intrinsic dithering: 0.17UI all dithering: 0.35UI	
	Input	Error rate: 10 ⁻¹² Signal rate: 3.125 ± 100 ppm End coupling: AC Different input voltage peak-to-peak value, max: 1200mV	

TABLE 8 SC-1XGS-CX4 CARD INTERFACE ATTRIBUTES

Indicators There are two indictors on SC-1XGS-CX4 panel, their functions are described in Table 9.

TABLE 9 SC-1XGS-CX4 INDICATORS FUNCTIONS

Indicators	Functions
LINK/ACT	On: A link is established on the interface Off: This interface is not connected to others. Flash: Packets are being transmitted or received on the interface.

SC-1XGL-XFP

- **Functions** SC-1XGL-XFP(1-port 10G Ethernet optical interface card) provides users with one 10G Ethernet XFP optical interface, which is used for uplink cascading. Four cards can be configured in ZXR10 5928/5228/5928-FI/5228-FI /5952/5252 system as maximum, providing four 10G Ethernet XFP optical interfaces.
 - **Panel** The SC-1XGL-XFP panel is shown in Figure 23.

FIGURE 23 SC-1XGL-XFP PANEL



Interface SC-1XGL-XFP uses swappable XFP modules, their attributes are shown as follows:

Single mode fiber: 1310nmnm, max transmission distance: 10km Range of transmit power: -8.2dBm~0.5dBm, receive sensitivity: <-10.3dBm

Indicators There are two indictors on SC-1XGL-XFP panel, their functions are described in Table 10.

TABLE 10 SC-1XGL-XFP INDICATORS FUNCTIONS

Indicators	Functions
LINK/ACT	On: A link is established on the interface Off: This interface is not connected to others. Flash: Packets are being transmitted or received on the interface.

Chapter 5

Power Module

Table of Contents

Power Module Overview	
ZXR10 5900/5200 Active Power	21
ZXR10 5900/5200 Standby Power	23
550w Power Supply Unit for ZXR10 5928-PS	23

Power Module Overview

ZXR10 5900/5200 series products provide built-in active power supply. This active power supports -48V DC power and 220V AC power. Additionally, ZXR10 5900/5200 series products also support 12V standby DC power input.

ZXR10 5900/5200 Active Power

ZXR10 5900/5200 series products provide built-in active power supply. They adopt independent power supply. The power supply input interfaces are located on back plane, supporting 48V DC and 220V AC.

The AC power board on ZXR10 5900/5200 is shown in Figure 24.

FIGURE 24 ZXR10 5900/5200 AC POWER SUPPLY INTERFACE



The DC power board onZXR10 5900/5200 is shown in Figure 25.

FIGURE 25 ZXR10 5900/5200 DC POWER SUPPLY INTERFACE



1. DC

ZXR10 5900/5200 series products support the same DC power except for ZXR10 5224. The parameters are described as follows:

- Rated Voltage: -48V
- Permitted Voltage Range: -57V~-40V
- Input Current: 5A
- Max Power Consumption: 200W

The DC power supply parameters of ZXR10 5224 are described as follows:

- Rated Voltage: -48V
- Permitted Voltage Range: -57V~-40V
- Input Current: 2.5A
- Max Power Consumption: 100W
- 2. AC

ZXR10 5924/5928/5228/5928-FI/5228-FI support the same AC power. The parameters are described as follows:

- Input Voltage: single phase 100VAC ~240VAC
- ▶ Input Current: 1.5A
- Frequency: 50Hz-60Hz
- Max Power Consumption: 200W
- ▶ Line Voltage Waveform Deviation Factor (WDF)<5%

The AC power parameters of ZXR10 5952/5252 are described as follows:

- Input Voltage: single phase 100VAC ~240VAC
- Input Current: 2.0A
- Frequency: 50Hz-60Hz
- Max Power Consumption: 250W
- ▶ Line Voltage Waveform Deviation Factor (WDF)<5%

The DC power parameters of ZXR10 5224 are described as follows:

- Input Voltage: single phase 100VAC ~240VAC
- Input Current: 1.0A
- ▶ Frequency: 50Hz-60Hz

- Max Power Consumption: 150W
- ► Line Voltage Waveform Deviation Factor (WDF)<5%

ZXR10 5900/5200 Standby Power

ZXR10 5900/5200 series products support 12V standby DC power supply input. 12V standby power supply interface is shown in $\frac{\text{Fig-ure } 26}{\text{Fig-ure } 26}$.

FIGURE 26 ZXR10 5900/5200 12V STANDBY DC POWER SUPPLY INTERFACE



The parameters of 12V standby DC power supply interface are described as follows:

- 1. Rated Voltage: 12V
- 2. Permitted Voltage Range:10.5V~13.5V
- 3. Max Input Current: 15A
- 4. Max Power Consumption: 180W

550w Power Supply Unit for ZXR10 5928-PS

The active power supply on ZXR10 5928-PS is swappable 550W power supply. The power supply input interface is located on system back plane, supporting 200V AC.

The AC power supply board on ZXR10 5928-PS is shown in Figure 27.

FIGURE 27 ZXR10 5928-PS AC INTERFACE



The AC power parameters on 5928-PS are described as follows:



- Input Voltage: single phase 90VAC ~264VAC
 Input Current: Max 7.2A
 Frequency: 43Hz-67Hz
 Max Power Consumption: 647W
 Line Voltage Waveform Deviation Factor (WDF) <5%

Chapter 6

Installation and Debugging

Table of Contents

Equipment Installation	25
Cable Installation	27
Power-on Procedure	32

Equipment Installation

ZXR10 5900/5200 series switches can be placed on desks or fixed in 19-inch standard cabinets.

Where, the 19-inch standard cabinet can be provided by the user. If ZTE's cabinet is to be used, you need refer to the 19-Inch Standard Cabinet Installation Manual for cabinet installation.

Desktop Installation

Install four plastic bottom blocks (plastic bottom blocks are strews are provided together with device) on the bottom plate of switch to form an air passage, for which heat generated by power module can be dissipated efficiently. For the installation method, refer to Figure 28.

FIGURE 28 DESKTOP INSTALLATION



1. Case

2. Pad

Cabinet Installation

To install the ZXR10 5900/5200 switch into the 19-inch cabinet, it is necessary to install flanges to each side of the switch shell

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(flange and screws are part of the accessories), as shown in Figure 29.

FIGURE 29 INSTALLING THE FLANGES



Install two symmetrical brackets at the two sides of the 19-inch cabinet to support the switch, as shown in Figure 30.

FIGURE 30 INSTALLING THE BRACKETS



2. Rack

After the installation, push in the switch along the bracket, and fix the flanges to the cabinet, as shown in Figure 31 (taking ZXR10 5224 as example).

FIGURE 31 FIXING THE SWITCH



Cable Installation

ZXR10 5900/5200 cables consist of the power cable, console cable, network cable and fiber.

Power Cable Installation

The power cables consist of AC and DC power cables based on the power modules:

1. AC power cable installation

The AC power cable adopts the standard printer power cable, as shown in Figure 32.

FIGURE 32 AC POWER CABLE



One end of the AC power cable connects the AC power socket of ZXR10 5900/5200 AC power module and the other end connects the 220V AC power socket.

- 2. DC power cable installation
 - i. DC -48V power cable C-PWR-084 is shown in Figure 33.

FIGURE 33 DC CABLE C-PWR-084



The correspondence between two ends of DC cables are shown in Table 11.

TABLE 11 TWO ENDS CORRESPONDENCE OF DC CABLES

End A	End B	Power Signal
1	End B1	-48VGND
2	End B2	-48V

The end A is connected to -48V input socket. Connect two terminals on end B according to labels pasted on each conductor. The B1 is connected to -48VGND of DC power supply, and B2 is connected to -48V. The conductor labels on end B are described in Table 12.

TABLE 12 LABEL

End B1	End B2	
-48VGND	-48V	

ii. DC standby power C-PWR-072 is shown in Figure 34.

FIGURE 34 DC STANDBY POWER C-PWR-072



The correspondence between two ends of DC cables are shown in Table 13.

End A	Conductor Color	End B	Power Signal
1	black	B1	12V -
2	black (read sleeve)	B2	12V +

TABLE 13 TWO ENDS CORRESPONDENCE OF DC CABLES

Make sure whether this DC standby cable is needed according to on-site configuration. In installation, connect end A to the standby DC input socket of device, connect end B1 to cathode of external 12V power source, and connect end B2 with red sleeve to a node of external 12V power source.

Console Cable Installation

Serial console cables are basic cables in ZXR10 5900/5200 configuration, which are used to configure and maintain ZXR10 5900/5200.

Serial console cables are delivered together with ZXR10 5900/5200, with one end to be DB9 console port (connected to serial port of PC) and the other end to be RJ45 port (connected to Console port on MP Board of ZXR10 5900/5200).

Serial console cables is shown in Figure 35.

FIGURE 35 ZXR10 5900/5200 SERIAL CONSOLE CABLE STRUCTURE DIAGRAM



The serial console cable sequence is shown in Table 14.

TABLE 14 SERIAL CONSOLE CABLE SEQUENCE

End A	Cable Chroma- togram	End B
2	White	3
3	Blue	6
_	White	4
5	orange	5

End A	Cable Chroma- togram	End B
4	White	7
6	Green	2
7	White	8
8	Brown	1

Network Cable Installation

RJ45 plugs are crimped on both ends of the cable with the structure as shown in Figure 36.

- Cable name: 8P8C straight cable solder plug
- Specification: E5088-001023
- Technical parameters:

rated current: 1.5A, rated voltage: 125V, crimped with AWG24-28# wire gauge round cable.

FIGURE 36 NETWORK CABLE STRUCTURE DIAGRAM



Cables can be classified into the following two types according to different cable crimping order in the plug:

 Straight-through network cable RJ45: the cable connection relationship is in the one-to-one correspondence at both ends. The specific connection relationship is shown in <u>Table 15</u>.

End A	Cable Chroma- togram	End B
1	White-orange	1
2	Orange	2
3	White-green	3
6	Green	6
4	Blue	4
5	White-blue	5
7	White-brown	7
8	Brown	8

TABLE 15 STRAIGHT-THROUGH NETWORK CABLE RJ45 CABLE SEQUENCE

 Crossover network cable RJ45J: cable connection relationship is cross correspondence between two twisted pairs at both ends. The specific connection relationship is shown in <u>Table</u> 16.

End A	Chromatogram	End B
1	White-orange	3
2	Orange	6
3	White-green	1
6	Green	2
4	Blue	4
5	White-blue	5
7	White-brown	7
8	Brown	8

TABLE 16 CROSSOVER NETWORK CABLE RJ45J CABLE SEQUENCE

Optical Fiber Installation

Each optical fiber interface in ZXR10 5900/5200 contains two fibers; one is used for receiving data and the other one is used for transferring data. Note that there are TX, RX on the panel. Do not mix them. There are two kinds of fibers: single-mode fiber and multi-mode fibers. Users can use them according to practical conditions. Six fibers are shown in <u>Table 17</u>.

TABLE 17 FIBER TYPES

Mode	Switch Connector	End Connector Type	
		FC/PC	
Single Mode	SC-PC (square adapter)	SC/PC	
		ST/PC	
		FC/PC	
Multi-mode	SC-PC (square	SC/PC	
		ST/P	

As for fiber out of the cabinet, make sure to protect the fiber against any damages with plastic corrugated sleeve. The fiber within the protect sleeve must not be wound up and the corners must be radian. The labels at two ends of the fiber must be clear. The meaning of the label must correctly reflect corresponding serial numbers and relationship between cabinets and between rows.

Power-on Procedure

Check the equipment room environment and hardware installation before powering on the ZXR10 5900/5200.

 Check whether the equipment room temperature, humidity and voltage meet the installation requirements, as shown in <u>Table 18</u>.

TABLE 18 TEMPERATURE AND HUMIDITY

	Temperature (℃)		RH (%)	
Item	Long-Term Working Condition (Note 1)	Short-Term Working Condition (Note 2)	Long-Term Working Condition	Long-Term Working Condition Short-Term Working Condition
Scope	15℃~30℃	-5℃~45℃	30%~70%	20%~90%

1. Under the normal working environment of the ZXR10 5900/5200, the measurement values of temperature and humidity refer to those measured at 2 m above the floor and 0.4 m in front of the device (the measurement is done with no protective board in the front or at the back of the cabinet).

- 2. The short-term working condition means a continuous running period of not more than 48 hours, and accumulated running periods a year of no more than 15 days.
- 2. Check whether the power cables and the cables are connected correctly and reliably or not.
- 3. Check other hardware.
- 4. Power on the ZXR10 5900/5200 in the following steps:

- i. Turn on the external power supply.
- ii. Turn on the power switch on the back plane of switch.
- 5. Power off procedure is shown as follows:
 - i. Turn off the power switch on the back plane of switch.
 - ii. Turn off the external power supply.

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RPS180 Backup Power

Table of Contents

System Overview	35
Structure and Principle	
Cards	
Installation and Debugging	

System Overview

Product Overview

ZXR10 RPS180 (redundant power) is enhancement providing standby power supply. This device can use AC(100VAC-240VAC/60HZ~50HZ), DC(-48VDC) input, 12VDC output. The power box contains power unit, voltage distribution unit, fans and fan monitoring unit. It adopt three power-outputs, which can be used to support ZXR10 5900/5200 series products.

The height and width of the standby power supply box are 1U and 19 inch respectively. Thus, it can be configured on the 19–inch rack together with ZXR10 5900/5200 switches to provide them with needed standby 12V power input.

Functions

- 1. Input:
 - DC model supports standard 48V input.
 - Supporting 36V-72V wide range voltage input
 - AC model supports 110V/220V input.
 - Supporting 90V-264V wide range voltage input
 - Supporting 50Hz/60Hz voltage frequency input
- 2. Output:
 - Outputting standard 12V voltage, in the range of 11V-13V
 - Supporting ZTE switches such as 5100, 3900, 5900, which have standby 12V power supply.

- Each output provides 15A loading current.
- ▶ 15A load current is provided in total.

Technical Features and Parameters

Technical features and parameters of ZXR10 RPS180 are listed in Table 19.

TABLE 19 ZXR10 RPS180 TECHNICAL FEATURES AND PARAMETERS

Item	Description
Dimensions	43.6mm (height)×442mm (width)×280mm (depth)
Weight	6kg
Input	AC power supply: 100V~240V50Hz ~60Hz DC power supply: -57V~-40V
Power consumption	Full Configuration Consumption: 220W
Reliability	MTBF>1000000h
Lightning protection	4KV
Environment temperature	Operating ambient temperature: 0°C~45°C Storage temperature: -40°C~70°C
Environment humidity	Relative humidity: 10% to 90%, non-condensing

Structure and Principle

Working Principles

ZXR10 RPS180 is a multi-purpose 12V output redundancy power device. It contains two types: input 220V AC model and -48V input DC model. Each model has two cards.

1. The DC model contains power supply distribution card LPDB and DC power card CDPU.

CDPU corresponds to convert input -48V DC voltage to +12V available DC power.

LPDB corresponds to output +12V power in three outputs and maintain them.

2. The AC model contains power supply distribution card LPDB and AC power card CAPU.

CAPU corresponds to convert input 110V/220V AC power to +12V DC power output.

LPDB corresponds to output +12V power in three outputs and maintain them.

ZXR10 RPS180 AC model system diagram is shown in Figure 37.

FIGURE 37 ZXR10 RPS180 AC MODEL SYSTEM DIAGRAM



ZXR10 RPS180 DC model system diagram is shown in Figure 38.

FIGURE 38 ZXR10 RPS180 DC MODEL SYSTEM DIAGRAM



Hardware Structure

The chassis height of ZXR10 RPS180 is 1U (1U=44.45mm). It adopts standard 19-inch box, which can be installed outside separately or within the standard cabinet.

- It contains two cards: power supply card and power distribution card.
- It provides two 12V DC power supply.
- The input could be AC or standard -48V power supply.

The front panel of ZXR10 RPS180 is shown in Figure 39.

FIGURE 39 ZXR10 RPS180 FRONT PANEL



The back plane of ZXR10 RPS180 is shown in Figure 40.

FIGURE 40 ZXR10 RPS180 BACKPLANE



Cards

Power Conversion Card

The power conversion card is the core of ZXR10 RPS180. It is mainly used to convert line voltage or -48V to 12V DC power .

CAPU

CAPU is used to convert inputted AC power to the needed +12V DC power.

- 1. Standard three-core input socket is used.
- 2. The wide voltage range supports 100V-240V input voltage environment.
- 3. It has high power factor and PFC modulation to reduce interface to electric network.

CDPU

CDPU is used to convert inputted -48V to the needed +12V DC power.

- 1. Standard three-core DC input socket is used.
- 2. The wide voltage range supports -36V—72V DC input voltage.

LPDB

LPDB is mainly used to output +12V DC power converted by CAPU or CDPU into three outputs through filtering, which can be used by three lower-power switches.

- 1. Supporting fan monitoring function
- 2. Supporting input voltage monitoring function
- 3. The LED indicators on front panel of drive indicates respectively the status of three fans and input voltage.

Installation and Debugging

Equipment Installation

ZXR10 RPS180 can be placed on desks or fixed in 19-inch standard cabinets.

Where, the 19-inch standard cabinet can be provided by the user. If ZTE's cabinet is to be used, you need refer to the 19-Inch Standard Cabinet Installation Manual for cabinet installation.

Desktop Installation

Install four plastic bottom blocks (plastic bottom blocks are strews are provided together with device) on the bottom plate of switch to form an air passage, for which heat generated by power module can be dissipated efficiently.

Cabinet Installation

To install the ZXR10 RPS180 into the 19-inch cabinet, it is necessary to install flanges to each side of the switch shell (flange and screws are part of the accessories).

Cable Installation

ZXR10 RPS180 cable consists of the power cable, console cable.

Power Cable Installation

The power cable consists of AC and DC power cables based on the power modules:

1. AC power cable installation

The AC power cable adopts the standard printer power cable, as shown in Figure 41.

FIGURE 41 AC POWER CABLE



One end of the AC power cable is connected to the AC power socket of ZXR10 RPS180 AC power module and the other end is connected to the 220 VAC power socket.

- 2. DC power cable installation
 - i. DC -48V power cable C-PWR-084 is shown in Figure 42.

FIGURE 42 DC CABLE C-PWR-084



The correspondence between two ends of DC cables are shown in Table 20.

TABLE 20 DC CABLES TWO ENDS CORRESPONDENCE

End A	End B	Power Signal
1	B1	-48VGND
2	B2	-48V

The end A is connected to -48V input socket. Connect two terminals on end B according to labels pasted on each conductor. The B1 is connected to -48VGND of DC power supply, and B2 is connected to -48V. The conductor labels are described in Table 21.

TABLE 21 LABEL

End B1	End B2
-48VGND	-48V

ii. DC standby power supply C-PWR-072 is shown in Figure 43.

FIGURE 43 DC STANDBY POWER SUPPLY C-PWR-072



The correspondence between two ends of DC cables are shown in Table 22.

TABLE 22 DC CABLES TWO	ENDS CORRESPONDENCE
------------------------	---------------------

End A	Conductor Color	End B	Power Signal
1	black	B1	12V -
2	black (read sleeve)	B2	12V +

Make sure whether this DC standby cable is needed according to on-site configuration. In installation, connect end A to the backup DC input socket of device, connect end B1 to cathode of external 12V power source, and connect end B2 with red sleeve to anode of external 12V power source.

Power-on Procedure

Check the equipment room environment and hardware installation before powering on ZXR10 RPS180.

1. Check whether the equipment room temperature, humidity and voltage meet the installation requirements, as shown in Table 23.

	Temperature (℃)		RH (%)	
Item	Long-Term Working Condition (Note 1)	Short-Term Working Condition (Note 2)	Long-Term Working Condition	Long-Term Working Condition Short-Term Working Condition
Scope	15℃~30℃	-5℃~45℃	30%~70%	20%~90%

TABLE 23 TEMPERATURE AND HUMIDITY

1. Under the normal working environment of ZXR10 RPS180, the measurement values of temperature and humidity refer to those measured at 2 m above the floor and 0.4 m in front of the device (the



measurement is done with no protective board in the front or at the back of the cabinet).

- The short-term working condition means a continuous running period of not more than 48 hours, and accumulated running periods a year of no more than 15 days.
- 2. Check whether the power cables and the cables are connected correctly and reliably or not.
- 3. Check other hardware.
 - i. Check whether equipment labels are complete, clear and correct.
 - ii. Check whether the switch is fixedly installed in the 19-inch standard rack or whether it is stably installed on the desk-top.
 - iii. Check whether the power switch of the switch is disconnected.
 - iv. Check whether the rack is properly grounded, with the grounding resistance meeting relevant technical requirements.
- 4. Power on ZXR10 RPS180 in the following steps:
 - i. Turn on the external power supply.
 - ii. Turn on the power switch on the back plane of switch.
- 5. Power off procedure is shown as follows:
 - i. Turn off the power switch on the back plane of switch.
 - ii. Turn off the external power supply.

Figures

Figure 1 ZXR10 5900/5200 SYSTEM PRINCIPLE	.10
Figure 2 ZXR10 5924 FRONT PANEL	.10
Figure 3 ZXR10 5224 FRONT PANEL	.10
Figure 4 ZXR10 5924 Backplane (AC)	.11
Figure 5 ZXR10 5924 Backplane (DC)	.11
Figure 6 ZXR10 5224 Backplane (AC)	.11
Figure 7 ZXR10 5224 Backplane (DC)	.11
Figure 8 ZXR10 5928 FRONT PANEL	.11
Figure 9 ZXR10 5228 FRONT PANEL	.11
Figure 10 ZXR10 5928/5228 Backplane (AC)	.12
Figure 11 ZXR10 5928/5228 Backplane (DC)	.12
Figure 12 ZXR10 5928-PS FRONT PANEL	.12
Figure 13 ZXR10 5928-PS Backplane	.12
Figure 14 ZXR10 5928-FI FRONT PANEL	13
Figure 15 ZXR10 5228-FI FRONT PANEL	13
Figure 16 ZXR10 5928-FI/5228-FI Backplane (AC)	13
Figure 17 ZXR10 5928-FI/5228-FI Backplane (DC)	13
Figure 18 ZXR10 5952 FRONT PANEL	13
Figure 19 ZXR10 5252 FRONT PANEL	13
Figure 20 ZXR10 5952/5252 Backplane (AC)	.14
Figure 21 ZXR10 5952/5252 Backplane (DC)	.14
Figure 22 SC-1XGS-CX4 Panel	.18
Figure 23 SC-1XGL-XFP Panel	20
Figure 24 ZXR10 5900/5200 AC Power Supply Interface	21
Figure 25 ZXR10 5900/5200 DC Power Supply Interface	.22
Figure 26 ZXR10 5900/5200 12V Standby DC Power Supply	
Interface	23
Figure 27 ZXR10 5928-PS AC Interface	23
Figure 28 Desktop Installation	25
Figure 29 INSTALLING THE FLANGES	26
Figure 30 INSTALLING THE BRACKETS	26
Figure 31 FIXING THE SWITCH	.27
Figure 32 AC POWER CABLE	.27
Figure 33 DC cable C-PWR-084	28

8
9
0
7
7
8
8
0
0
1

Tables

Table 1 CHAPTER SUMMARY	i
Table 2 Safety Description	1
Table 3 ZXR10 5900/5200 TECHNICAL FEATURES AND	
PARAMETERS	5
Table 4 ZXR10 5900/5200 Attributes of 10/100/1000Base-T	
on Main Control Board	16
Table 5 ZXR10 5900/5200 Main Control Board Indicator	
Description	16
Table 6 ZXR10 5928-PS Main Control Board Indicator	
Description	17
Table 7 Card Function	18
Table 8 SC-1XGS-CX4 Card Interface Attributes	19
Table 9 SC-1XGS-CX4 INDICATORS FUNCTIONS	19
Table 10 SC-1XGL-XFP INDICATORS FUNCTIONS	20
Table 11 Two Ends Correspondence of DC Cables	28
Table 12 Label	28
Table 13 Two Ends Correspondence of DC Cables	29
Table 14 Serial Console Cable Sequence	29
Table 15 Straight-through Network Cable RJ45 Cable	
Sequence	31
Table 16 Crossover network cable RJ45J Cable Sequence	31
Table 17 Fiber Types	32
Table 18 TEMPERATURE AND HUMIDITY	32
Table 19 ZXR10 RPS180 TECHNICAL FEATURES AND	
PARAMETERS	36
Table 20 DC cables Two Ends Correspondence	40
Table 21 Label	40
Table 22 DC cables Two Ends Correspondence	41
Table 23 TEMPERATURE AND HUMIDITY	41

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List of Glossary

ACL - Access Control List BGP - Border Gateway Protocol IGMP - Internet Group Management Protocol IS-IS - Intermediate System-to-Intermediate System LACP - Link Aggregation Control Protocol **MSDP - Multicast Source Discovery Protocol MSTP - Multiple Spanning Tree Protocol OSPF - Open Shortest Path First PIM-SM - Protocol Independent Multicast Sparse Mode PVLAN - Private VLAN QoS - Quality of Service RADIUS - Remote Authentication Dial In User Service RIP - Routing Information Protocol RMON - Remote Monitoring RSTP - Rapid Spanning Tree Protocol SNMP - Simple Network Management Protocol SP - Strict Priority SSH - Secure Shell STP - Spanning Tree Protocol** VLAN - Virtual Local Area Network **VRRP - Virtual Router Redundancy Protocol WRR - Weighted Round Robin**