

Chassis Switches (S97S93S77) Hardware Installation

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Foreword

- Huawei S9700, S9300, S7700 switches (S series chassis switches for short) are types of intelligent routing high-end Ethernet switch used for multi-services.
- This course takes S7700 as an example to introduce the hardware installation.



Objectives

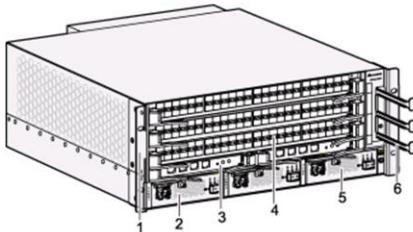
- Upon completion of this course, you will be able to:
 - Describe S7700 switches basic installation.
 - Understand the notes during the installation.
 - Complete the hardware installation.



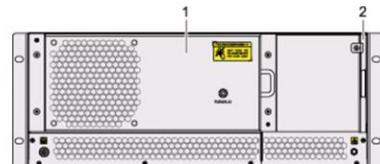
Contents

- **S7700 Switches Product Introduction**
- S7700 Switches Hardware Installation

Product Introduction - S7703



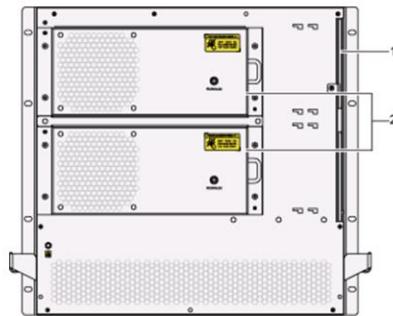
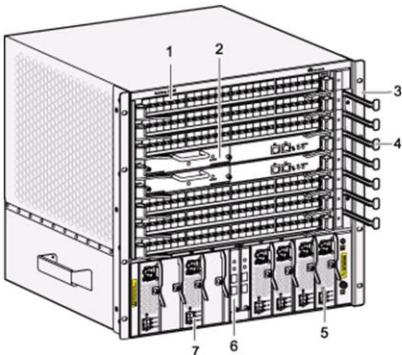
1. Rack-mounting ear
2. Power supply
3. MCU
4. LPU
5. PoE Power Module
6. Cable tray



1. Fan
2. Air filter

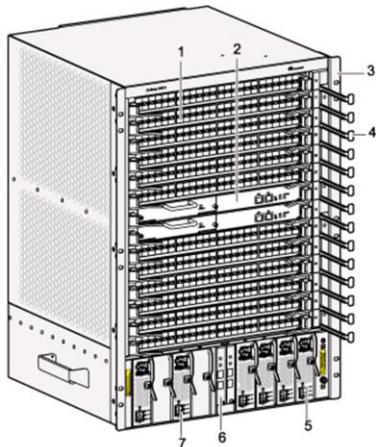
- The S7703 is 4 U (1 U = 44.45 mm) high, with dimensions of 442 mm x 476 mm x 175 mm (width x depth x height).
- The front appearance from the top are LPUs, MCU and Power supply.
- Fan in the back of chassis.

Product Introduction - S7706



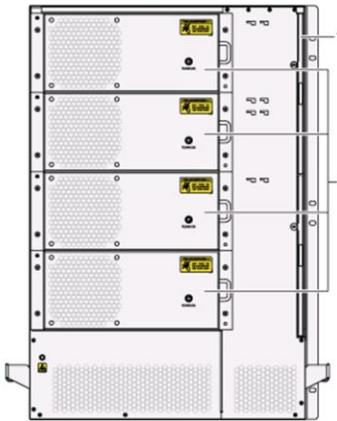
- The S7706 is 10 U (1 U = 44.45 mm) high, with dimensions of 442 mm x 476 mm x 441.7 mm (width x depth x height).
- The front appearance from the top are LPUs, CMU and Power supply.
- Fan in the back of chassis.

Product Introduction - S7712



1. LPU
3.Rack-mounting ear
5.PoE Power Module
7.Power supply

2.SRU
4.Cable tray
6.CMU

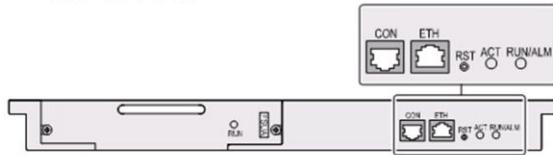


1. Air filter
2. Fan

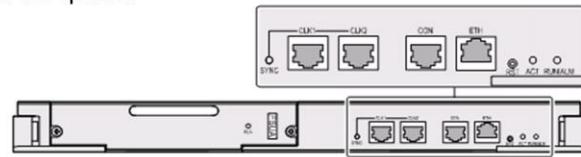
- The S7712 is 15 U (1 U = 44.45 mm) high, with dimensions of 442 mm x 476 mm x 663.95 mm (width x depth x height).
- The front appearance from the top are LPUs, SRU and Power supply.
- Fan in the back of chassis.

Board Introduction - SRU

- The SRU is the control and switching platform of the S7712 and the S7706.



Appearance of the ES02SRUA panel

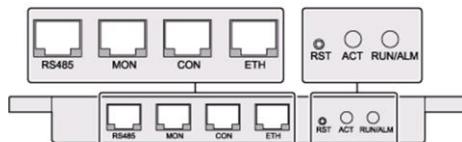


Appearance of the ES03SRUA and ES02SRUB panel

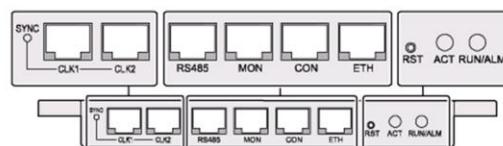
- The SRU integrates the control and switching functions and provides the control plane, management plane, and switching plane.
- The SRU is the core component for system control and management. In addition, as the clock source and maintenance unit of the system, the SRU is the control plane and maintenance plane of the system.
- There are two types of SRUs, namely, SRUA and SRUB. The SRUA is divided into two types: ES02SRUA and ES03SRUA. The SRUB has only one type, that is, ES02SRUB.
- SRUA provide 512Gbit/s Switching Capacity bidirectional, and SRUB provide 1Tbit/s Switching Capacity bidirectional.
- ES03SRUA and ES02SRUB integrated support for time synchronization and clock synchronization of the clock board.

Board Introduction - MCUA

- The MCUA is the control and switching platform of the S7703.



Appearance of the ES02MCUA panel



Appearance of the ES03MCUA panel

- It integrates the control unit, system clock unit, and system maintenance unit. The MCUA is the core component for system control and management. In addition, as the clock source and maintenance unit of the system, the MCUA is the control plane and maintenance plane of the system.
- The S7703 must have at least one MCUA. You can install one or two MCUs. If only one MCUA is installed, it can be installed in either of the MCUA slots. To improve reliability of a key device, you can install double MCUs. When the master MCUA fails, the slave MCUA substitutes for the master MCUA automatically to prevent service interruption.
- There are two types of the MCUA boards, namely, ES02MCUA and ES03MCUA. The ES03MCUA has a clock board and supports time synchronization and clock synchronization.

Board Introduction - FSUA

- The FSUA is installed on the SRU. The FSUA provides the features such as OAM, BFD and security.



Position of FSU in SRU

- The FSUA provides the following functions:
 - Enhancing Ethernet OAM and BFD
 - Ensuring security of the CPU on the SRU and limiting the rate of packets sent to the CPU
 - Storing and querying the board information
- The FSUA is an optional subcard on the SRU. It does not provide any interface.

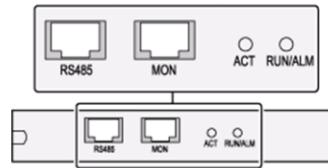
Board Introduction - CMU

- The CMU manages the power supplies and fans of the system uniformly.

The CMU consists of the following modules:

- Equipment management module: sends interface control signals for equipment management.

- Backplane interface module: sends all interface signals on the backplane to control the power supply, fans, and master/slave states of CMUA.

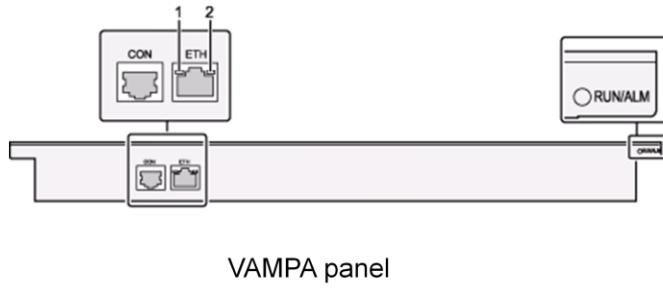


Appearance of the CMU

- The CMU is applied to the S7712 or S7706. There are two CMU slots on the subrack: one for the master CMU and the other for the slave CMU. You can install one or two CMUs as required.

Board Introduction - SPU

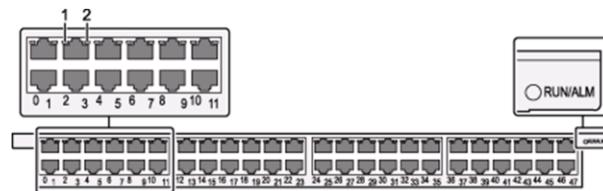
- The Service Process Unit (SPU) provides service functions such as load balancing, firewalls, Network Address Translation (NAT), and IP Security (IPSec), thus meeting requirements of different application scenarios for diverse industry networks.



- Currently, the SPU supports only one board, namely, VAMPA.
- The VAMPA can be installed in any LPU slot of the S7712, S7706, and S7703.

Board Introduction - LPU

- The LPU (Line Process Unit) used to provide a variety of interfaces. According to the needs.



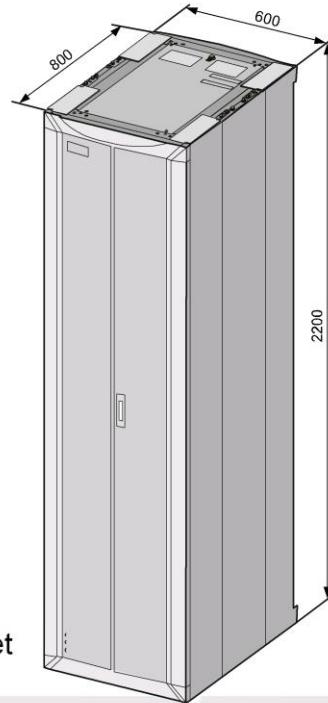
Appearance of the G48T panel

- G48T is one type of LPU boards, provide 48-port GE electrical interfaces, is called G48T for short.

Cabinets Introduction

- N66E/N68E Maximum Installation Height Inside the Cabinet is 46U.
- N66E cabinet dimensions of 600 mm x 600 mm x 2200 mm (width x depth x height).
- N66E cabinet dimensions of 600 mm x 800 mm x 2200 mm (width x depth x height).

Appearance of the N68E cabinet



- The N68E cabinet complies with the requirement of the Dimensions of Mechanical Structures of the 482.6 mm (19 Inch) Series (IEC 60297-2 Standard). The N68E cabinet is designed with a modular structure, which facilitates expansion and maintenance. The surface of the cabinet and the rack is NC purplish grey.
- The N68E and N66E cabinets are standard configurations. The cabinets facilitate maintenance and capacity expansion. In addition, two switches can be located in a cabinet side by side.



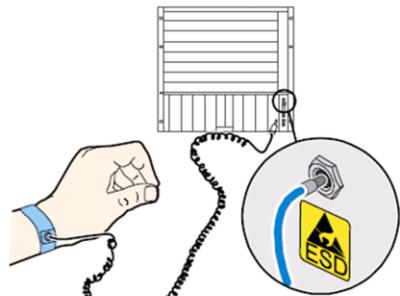
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- **S7700 Switches Hardware Installation**

Note

ESD

- Before touching the device, boards and IC chips, wear the ESD wrist strap to prevent the electrostatic discharge of the human body from damaging the sensitive components. Ensure that the other end of the anti-static wrist strap is well grounded.



Note

Cable bundle

- **Binding the cables inside the cabinet**
 - The distance between cable ties for all cables and corrugated pipes is determined according to the distance between two horizontal beams.
 - For power cables and ground cable, the distance between cable ties is within 250 mm.
- **Binding the cables outside the cabinet**
 - The distance between two tie wraps depends on the distance between the beams beside the cabinet.
 - For the cable trough without beams, bundle the cables with the distance not exceeding 250 mm between cable ties.

Note

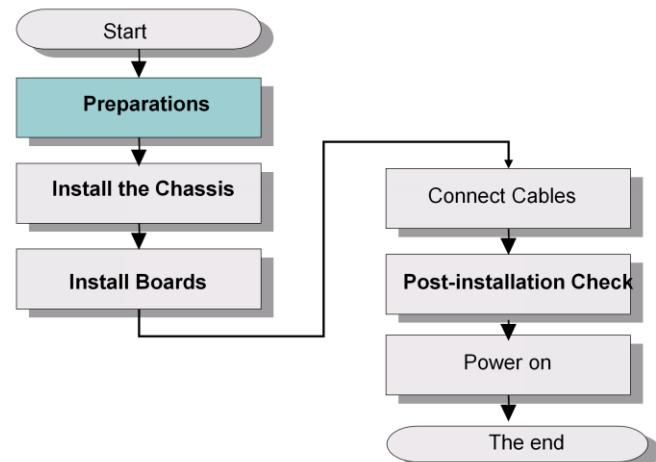
Labels and tags

- Attach the label or tag to the signal cable, 20 mm away from the connector.
- When the cable is placed vertically, the label or tag should point towards the right.
- When the cable is placed horizontally, the label or tag should point downwards.

Caution:

- Do not connect the power cable to the power supply device before the installation is complete.
- It is recommended that you separate the power cables from the signal cables.
- Do not install both the DC power supply and AC power supply on the same equipment.
- When multiple S7703s are installed in the same cabinet, there must be a 1 U (1 U = 44.45 mm) or larger space between the S7703s.

Installation Steps



Preparations - Required Tools



Measuring tape



Philips screwdriver



Flat-head screwdriver



Adjustable wrench



Heat gun



Utility knife



COAX crimping tool



Wire clippers



Wire stripper

Preparations - Required Tools



Socket wrench



RJ45 crimping



Diagonal pliers



Plumb line



Plumb line



Multimeter



Claw hammer



Marker



Optical power meter

Preparations - Installation Environment

- The S7703 can be installed in a 19-inch cabinet.
- Using a Huawei Cabinet

Cabinet	Dimensions	Height
N66E	600mm×600mm×2200mm (width x depth x height)	46U
N68E	600mm×800mm×2200mm (width x depth x height)	46U

- Using a Non-Huawei Cabinet

- There is enough space in the cabinet. The height of the cabinet is at least 5U and the depth is at least 600 mm.
- The guide rails must be installed in the cabinet.
- The cabinet with a middle column is not recommended because it decreases the number of cables in the cabinet.

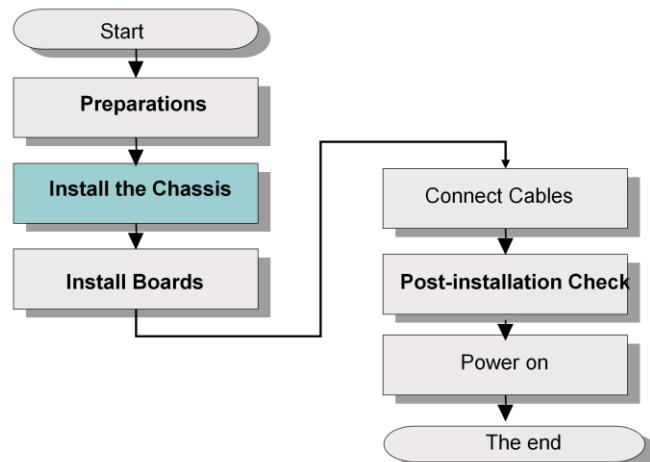
Preparations - Installation Environment

- Check the condition of the equipment room.
- DC voltage:
 - -48 V: -38.4 V to -57.6 V (rated voltage: -48 V)
 - -60 V: -48 V to -72 V (rated voltage: -60 V)
- AC voltage:
 - 100 V to 240 V AC, 50/60 Hz (rated voltage: 110 V/220 V)
- The power distribution cabinet has at least two idle ports.
The current of the air circuit break is between 40 A and 20 A.

Preparations - Installation Environment

- Check that the ODF is installed and enough idle ports are available.
- Check that the ground bar is installed in the equipment room.
- Check that the floating nuts are enough.
- Check that the guide rails and floating nuts are available in the cabinet.
- Check that the installation template is provided, which is used to quickly locate the chassis in the cabinet.

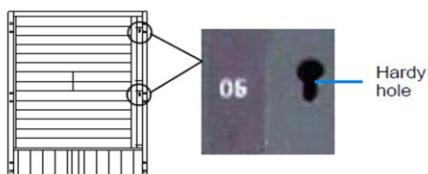
Installation Steps



Preparations for Installing the Chassis

A、Install the Cable Tray

Install a positioning screw into the hardy hole.

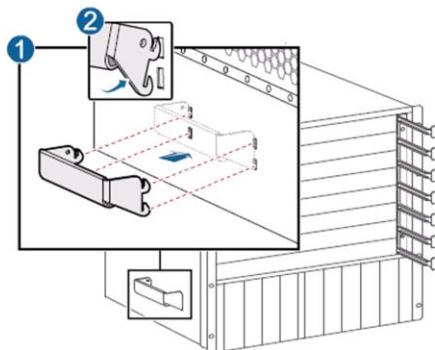


Installation method:



B、Install the Removable Handles

Install a removable handle on the left and right sides of the cabinet respectively.
The maximum load of the handle is 160 kg.



Preparations for Installing the Chassis

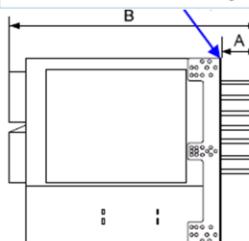
• C、Adjust the Location of the Rack-Mounting Ear

- The location of the rack-mounting ear on the S7712 can be adjusted so that the S7712 can be installed in different types of cabinets.

When a Huawei cabinet is used, the distance between the mounting bar and the front door is 95 mm.

B = 585 mm; A = 88 mm

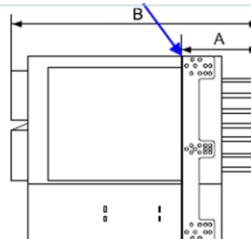
Install the rack-mounting ear here



When a 600 mm deep non-Huawei cabinet is used, the distance between the mounting bar and the front door is 193 mm. Reverse the rack-mounting ear.

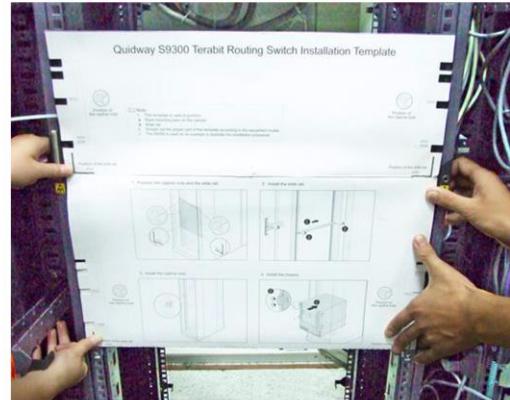
B = 585 mm; A = 186 mm.

Install the rack-mounting ear here



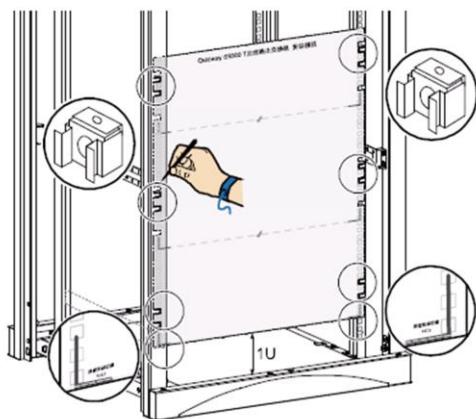
Locating the equipment in the Cabinet

- Cut the Installation Template
- Fix the Installation Template
- Two people are required to align the holes and fix the installation template.



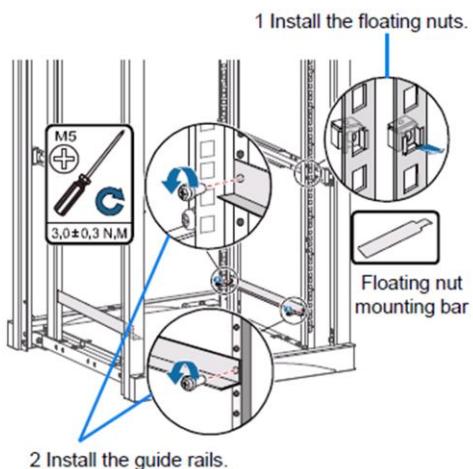
Locating the equipment in the Cabinet

- **Mark the Accessory Locations**



Locating the equipment in the Cabinet

- **Install the Floating Nuts and**
- **Guide Rails**



Installing the Cabinet

• Move the Chassis to the Cabinet

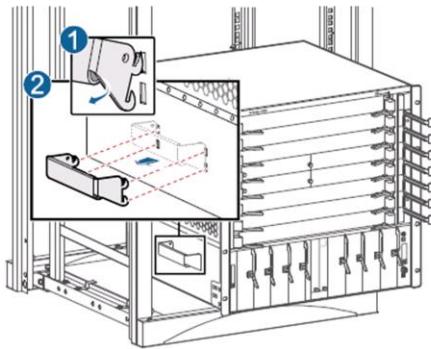


- Install boards only after the chassis is mounted to the cabinet to reduce the chassis weight.
- After installing handles, grasp and lift the handles to secure them to the slot.
- Before lifting the chassis, ensure that the handles are secured.

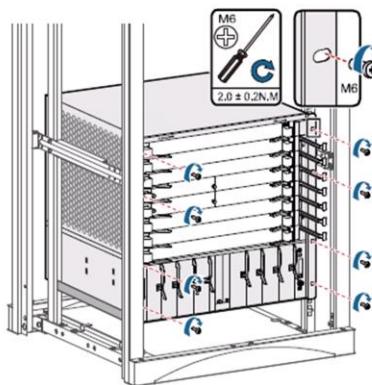


Installing the Cabinet

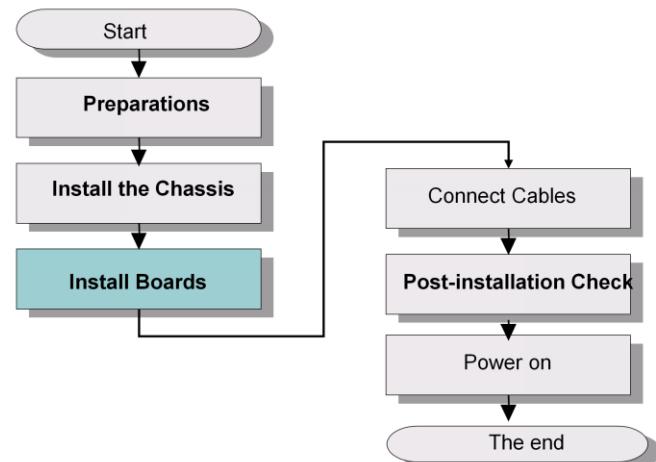
- Remove the Handles



- Fix the Chassis



Installation Steps

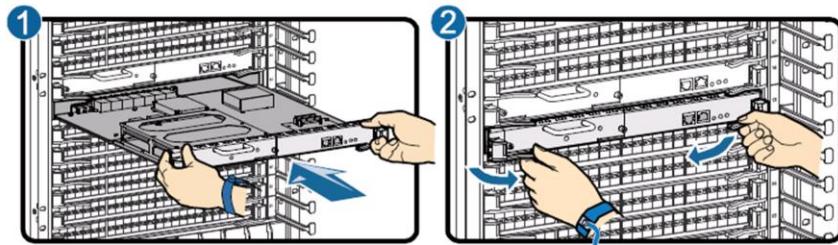


Preparations

- Learn the slot distribution in the S7712 chassis by reading “Device Structure” in the *Quidway S7700 Hardware Description*.
- Remove the filler panel before installing a board.
- Attach an ESD wrist strap or wear ESD gloves when you touch a board.
- Slide the board into a slot slowly and horizontally along the guide rail. Prevent the board from colliding with the chassis; otherwise, board components may be damaged.
- Do not touch board components during installation; otherwise, the board components may be damaged.

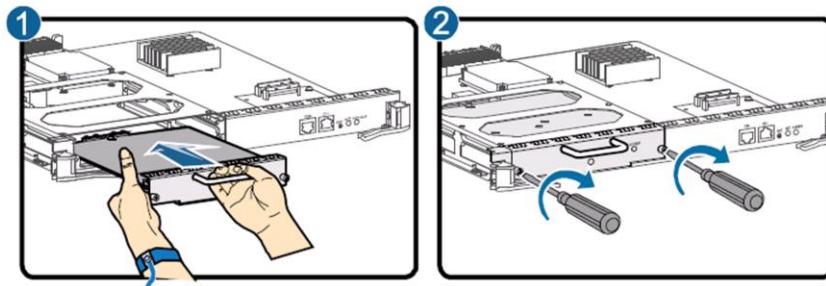
Install the SRU

- S7706 Install an SRU into slot 7 and 8.
- S7712 Install an SRU into slot 13 and 14.



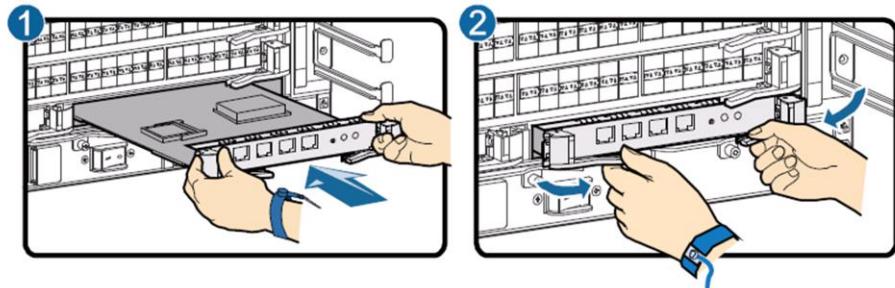
Install the FSU (Optional)

- The FSU is a subcard installed on the SRU.



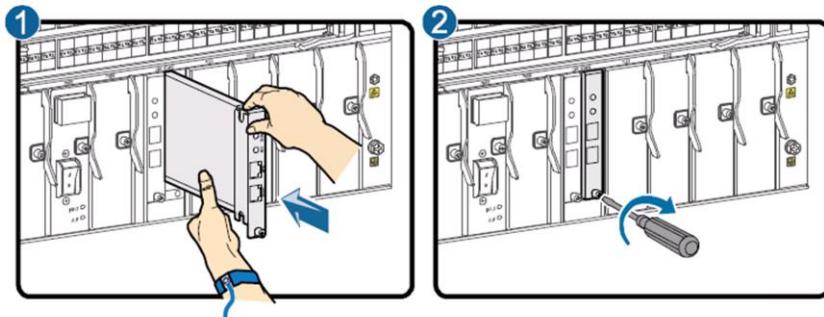
Install the CMU

- S7703 Install the CMU into slot 4 and 5.



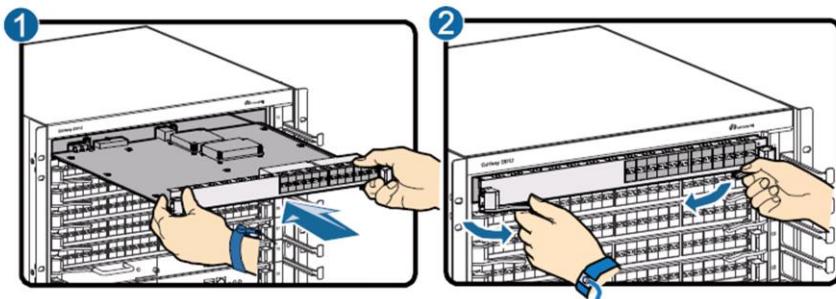
Install the CMU

- S7706 and S7712 Install the CMU beside PWR4.

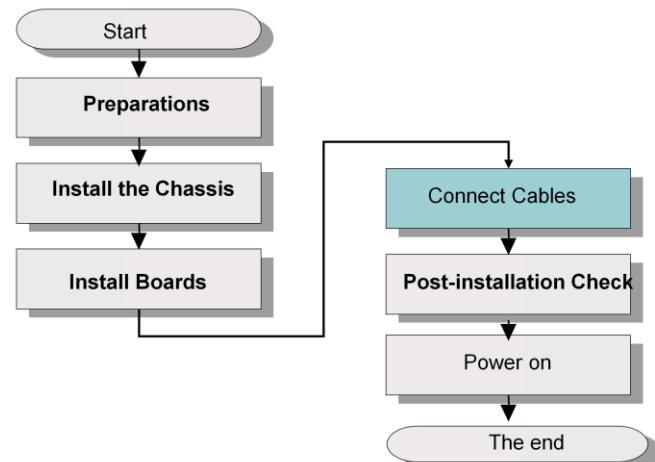


Install the LPU

- The S7703 has 3 LPU slots, which are numbered from 1 to 3.
- The S7706 has 6 LPU slots, which are numbered from 1 to 6.
- The S7712 has 12 LPU slots, which are numbered from 1 to 12.



Installation Steps



Connecting the Ground Cable

- Preparing Cables



Ground cable of the cabinet



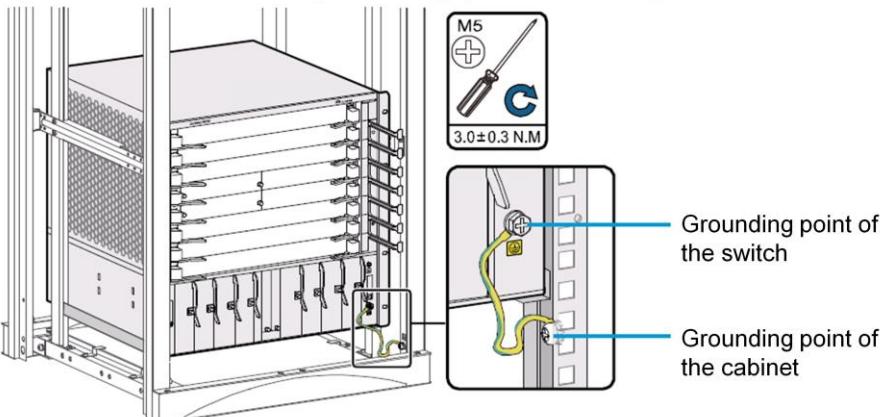
Ground cable of the Switch

- Connecting the Cabinet to the Ground



Connecting the Ground Cable

- **Connecting the Switch to the Ground:** Connect the ground cable to the grounding point on the guide rail inside



Connecting Power Cables

• Laying Out DC Power Cables

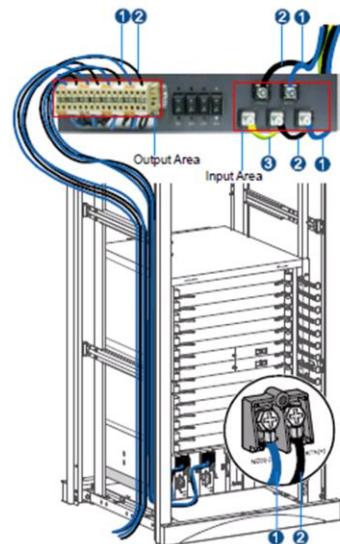
Situation	Connecting terminal of DC power module	External terminal of DC power distribution box	Cross-sectional area of cables	Distance between user distributor and DC power module	Distance between user distributor and DC power distribution box of the cabinet
Multiple S7712s are installed in a cabinet	OT terminal	OT terminal	16 mm ²	—	≤ 14.8m
			25 mm ²	—	≤ 23.1 m
			35 mm ²	—	≤ 32.4 m
The idle power output channels of the user distributor are enough	OT terminal	—	6 mm ²	≤ 10 m	—
			16 mm ²	≤ 35 m	—

Connecting Power Cables

- Laying Out DC Power Cables



- ① Blue cable (NEG)
- ② Black cable (RTN)
- ③ Yellow green ground cable

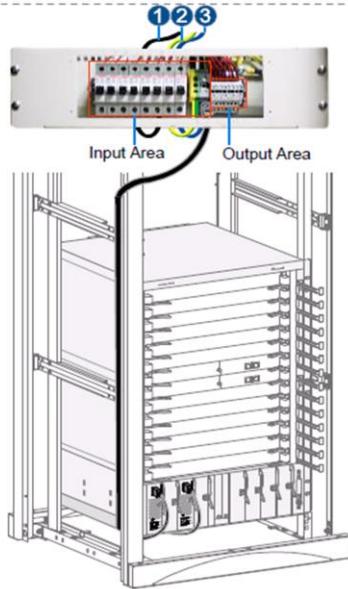


Connecting Power Cables

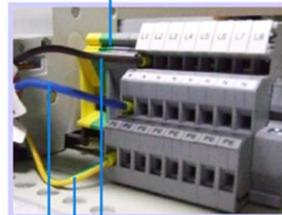
• Laying Out AC Power Cables

Scenario	Situation	Connecting terminal of AC power module	External terminal of AC power distribution box	Distance between user distributor and AC power module	Distance between user distributor and AC power distribution box of the cabinet
The power distribution box is used	Multiple S7712s are installed in a cabinet	AC connector	Cord end terminal	-	$\leq 25 \text{ m}$
No power distribution box is used	The idle power output channels of the user distributor are enough.	AC connector	-	$\leq 30 \text{ m}$	-

Connecting Power Cables



Connect the output terminal of the power distribution box



- ① Black Cable (L)
- ② Yellow Green Cable (PE)
- ③ Blue Cable (N)



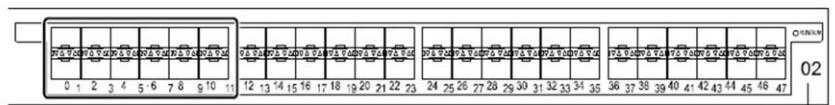
Deployment of external power cables and ground cables:

1. Lead the cable into the chassis from the top of the rack, and route the cable at the rear of the power distribution box.
2. Route the cable from rear to front at the bottom of the power distribution box.
3. Connect the cable to the terminal.

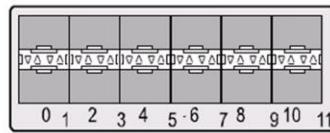
Connecting Signal Cables

- The interface number of the S7706 is in the format slot ID/subcard ID/interface sequence number. The subcard ID is 0 or 1.

	LPU	3
	LPU	2
	LPU	1

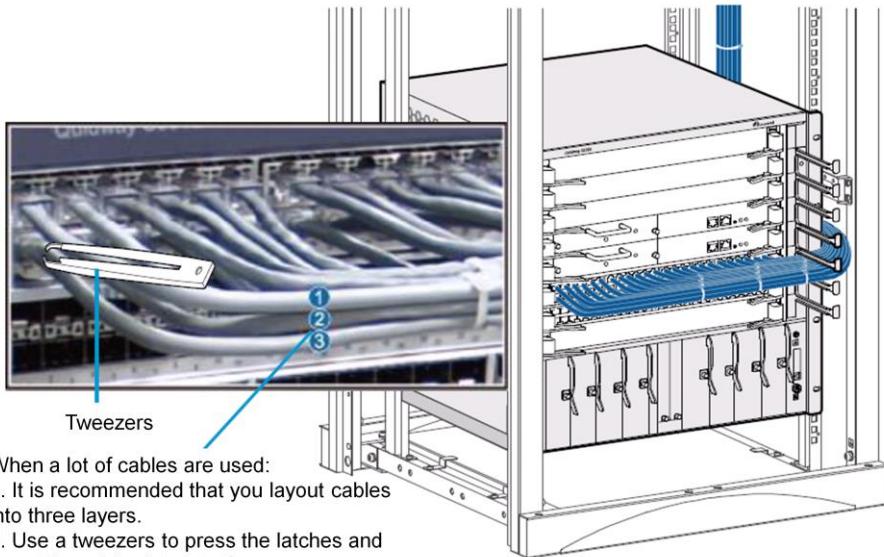


Slot number



Interface sequence

Connecting Signal Cables -Lay Out Network Cables



When a lot of cables are used:

1. It is recommended that you layout cables into three layers.
2. Use a tweezers to press the latches and insert the cables into interfaces.

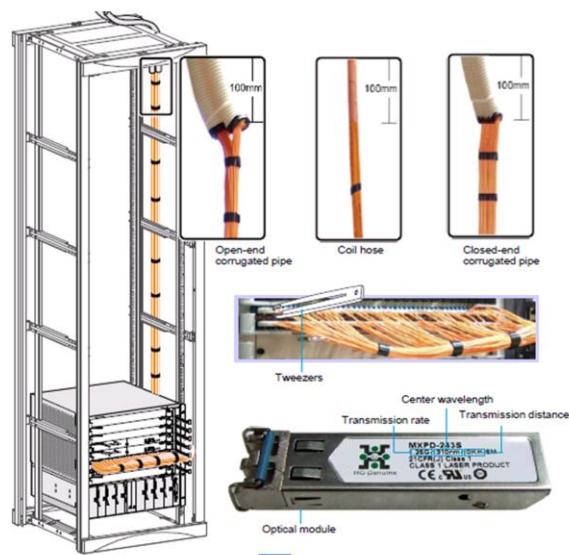
Connecting Signal Cables - Lay Out Fibers

- The fibers are inserted in the corrugated pipe. The two ends of the corrugated pipe must be covered by the adhesive tape.
- Do not look straight into the optical fiber from which the light beam shoots out when you install and maintain the optical fiber.
- The curvature radius of an optical fiber should be 20 times greater than its diameter. Generally, the curvature radius should be not less than 40 mm.

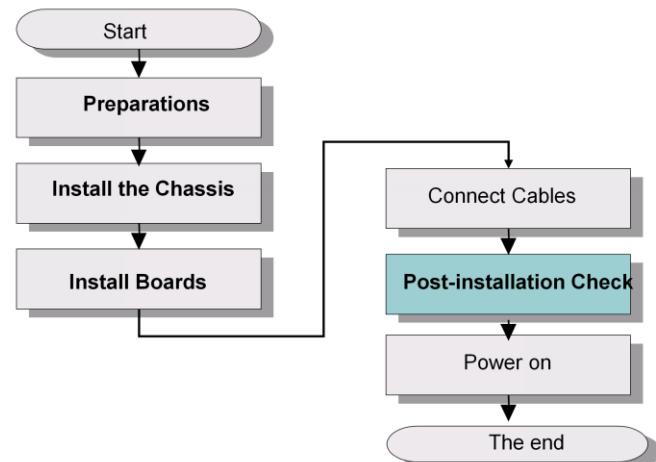
The following protection pipes can be used 100 mm far away from the cabinet.

Type	Maximum number of fibers
Open-end corrugated pipe	50
Closed-end corrugated pipe	20
Coil hose	10 (6 mm outer diameter) or 20 (12 mm outer diameter)

Connecting Signal Cables - Lay Out Fibers



Installation Steps



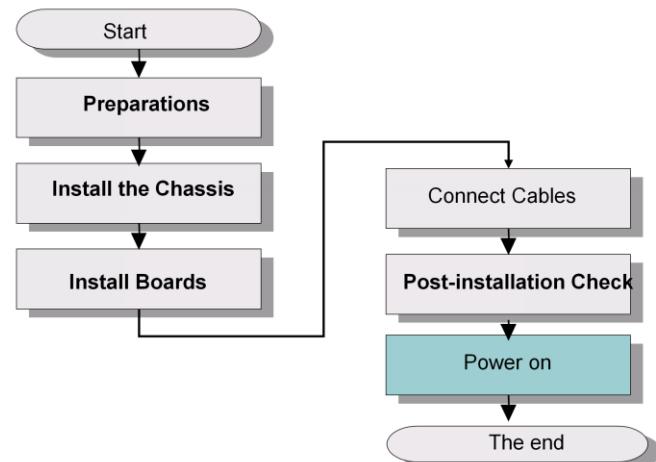
Post-installation Check

SN	Check Item	How to Check
1	The installation location of the cabinet and chassis conform to the engineering design document.	View
2	The components are correctly installed in the cabinet and comply with the standards. No component is loosened or damaged.	View
3	All the bolts are tightened.	View
4	The vertical deviation of the cabinet should be less than 3 mm. You can use a plumb line to measure the vertical deviation.	Measure
5	The cabinets on the sides of the main path are aligned. The position error should be less than 5 mm.	Measure
6	The surfaces of the cabinets in the same row should be on the same plane. The cabinets are arranged closely and tidily.	View
7	The front door of a cabinet can be opened and closed easily.	View
8	The cable outlets on the top and bottom of the cabinet are covered.	View
9	The cabling route of signal cables confirms to the engineering design document.	View
10	The signal cables are not damaged or broken and have no splice.	View
11	The plugs of signal cables are clean and are not damaged. The signal cables are inserted into interfaces safely. The cores of cables are fixed.	View
12	The signal cables should not be crossed and the bent part of the cables should be loose. The outside cables within 1 m from the cabinet can be crossed.	View
13	The tail fiber outside the cabinet cannot be pressed by cables or other things.	View
14	The fibers are covered by the corrugated pipe and inserted into the cabinet. The length of the corrugated pipe cannot exceed 100 mm. In addition, the corrugated pipe must be bound and fixed.	View and measure

Post-installation Check

SN	Check Item	How to Check
15	The curvature radius of an optical fiber should be 20 times greater than its diameter. Generally, the curvature radius should be not less than 40 mm. In addition, the cabling paths cannot be blocked by components.	View and measure
16	A pair of fibers is bound by binding straps. The bundle cannot be excessively loose or tight.	View
17	The two ends of a signal cable are marked correctly and clearly.	View
18	The cabling route of the power cables and the ground cables conforms to the engineering design document, facilitating maintenance and capacity expansion.	View
19	The power cables and ground cables must be the copper wires. The copper wires should be complete and cannot have splices.	View
20	The power cables and ground cables are connected properly and are in good contact.	View
21	The cabling route of the power cables and the ground cables conforms to the engineering design document, meeting the power distribution requirement.	View
22	The power cables and ground cables are separated from the signal cables.	View
23	The power cables and ground cables are not crossed and are bound tidily. The bent part of the cables should be loose.	View
24	The power cables, ground cables, and power distribution switches are labeled correctly and clearly.	View
25	The handles are installed in the correct positions.	View

Installation Steps



Powering On the Switch -Check Before Power-on

No.	Check Item	Check Method
1	The power cables and ground cables must be the copper wires and have no splice. The cables are safely connected complying with standards.	View
2	The power cables and ground cables are connected safely. The spring washer of the ground cable terminal is on the flat washer.	View
3	The lugs of the power cables and ground cables are soldered or crimped tightly.	View
4	The power cables and ground cables are not crossed and are separated from other cables.	View
5	The unneeded part of the power cables and ground cables should be cut. The cables cannot be circled.	Measure
6	The ground cables must be tightly connected to the doors of the cabinet.	View

Powering On the Switch -Check Before Power-on

• Signal cables

No.	Check Item	Check Method
1	All the signal cables to be deployed pass the continuity check.	View
2	No signal cable is placed on the heat dissipation holes of the cabinet.	View
3	The bent part of a signal cable cannot be too tight.	View
4	The cables in the cabinet cannot be crossed and the cables outside the cabinet are bound.	Measure
5	The two ends of a signal cable are clearly identified by labels and the texts on the labels are in the same direction.	View
6	The bolts that fix the cables are tightened.	View

• Networking

No.	Check Item	Check Method
1	The newly added device will not cause a loop on the network. For example, a newly added device cannot be connected to another device using two links because this will cause a loop.	View the networking diagram.

Powering On the Switch



The diagram shows a network switch with its front panel indicators highlighted. A legend below the switch identifies the indicators:

Indicator	Color	Meaning
RUN	Green	On: The AC power input is normal. Off: If the FAULT indicator or ALARM indicator is on, a fault occurs or an alarm other than the over-current alarm is generated.
ALARM	Yellow	On: A PS-off alarm, over-temperature alarm, over-voltage alarm, under-voltage alarm, or over-current alarm occurs. Blinking: The communication is interrupted. Off: The power supply is normal.
FAULT	Red	On: The power supply is faulty and cannot be rectified. Off: The power supply does not have any fault that cannot be rectified.

Indicator/Button	Color	Meaning
RUN/ALM	Green	On: The board is powered on but the software is not running. Blinking (4 Hz): The system is being started. Blinking (0.5 Hz): The system is in normal state.
RUN/ALM	Red	On: The board is faulty.
RUN/ALM	Orange	On: The board is installed in the slot and is powered on.
ACT	Green	On: The MPU is the master MPU. Off: The MPU is the slave MPU.
RST	-	Press this button to reset the board.

Powering On the Switch



Indicator	Color	Meaning
RUN/ALM	Green	Blinking (0.5 Hz): The fan modules work normally, and the communication is normal. Blinking (4 Hz): The fan module works normally, but the communication is abnormal
RUN/ALM	Red	Blinking (0.5 Hz): An alarm is generated; however, you cannot determine whether to replace the fan module. It is recommended that you view the situation for certain time. On: A fan module is faulty and you need to replace it.



Summary

- S7700 Series Switches product
 - Switch models
 - Type of the boards
- S7700 Switch installation
 - **Preparations**
 - Install the Chassis
 - Install the Boards
 - Connect the cables

Questions

- How many types of boards S7706 have?
- Can we configure NAT function in S7700 series Switch?

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- How many types of boards S7706 have?
 - The boards of S7706 can be divided into SRUs, LPUs, SPUs, FSUs and CMUs.
- Can we configure NAT function in S7700 series Switch?
 - Yes, but an SPU is needed.

Thank you

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