eSpace SoftCo9500 Unified Gateway
V100R001C01
Product Description

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1 Introduction

About This Chapter

This topic describes the positioning and features of the eSpace SoftCo9500.

1.1 Product Positioning

The eSpace SoftCo9500 is VoIP-based communication device developed by Huawei for government agencies, enterprises and public institutions, and various industries including electric power and finance.

1.2 Product Highlights

The eSpace SoftCo9500 has diversified services, open interfaces, advanced architecture, high processing capability, high reliability, and easy maintenance.

1.1 Product Positioning

The eSpace SoftCo9500 is VoIP-based communication device developed by Huawei for government agencies, enterprises and public institutions, and various industries including electric power and finance.

Table 1-1 shows the models and application scenarios of the eSpace SoftCo9500.

Table 1-1 Product models and application scenarios of the eSpace SoftCo9500

| Product Model	Recommended Application
eSpace SoftCo9500	A group of more than 300 and smaller than 10,000 users.

The eSpace SoftCo9500 has the following advantages:

- Basic voice services, abundant supplementary services, media services, and unified message services; open interfaces to meet telecom-level performance requirements.

- Comprehensive QoS, redundancy, load sharing, and overload control functions; powerful management tools to facilitate user operations.
- Differentiated services and flexible networking for different enterprises, helping improve the operation efficiency.
- Integrates the functions of NGN components, connects to the public switched telephone network (PSTN) through digital or analog trunks to provide reliable and high-quality voice services for enterprise networks.

Figure 1-1 shows the network position of eSpace SoftCo9500.

Figure 1-1 Network position of eSpace SoftCo9500
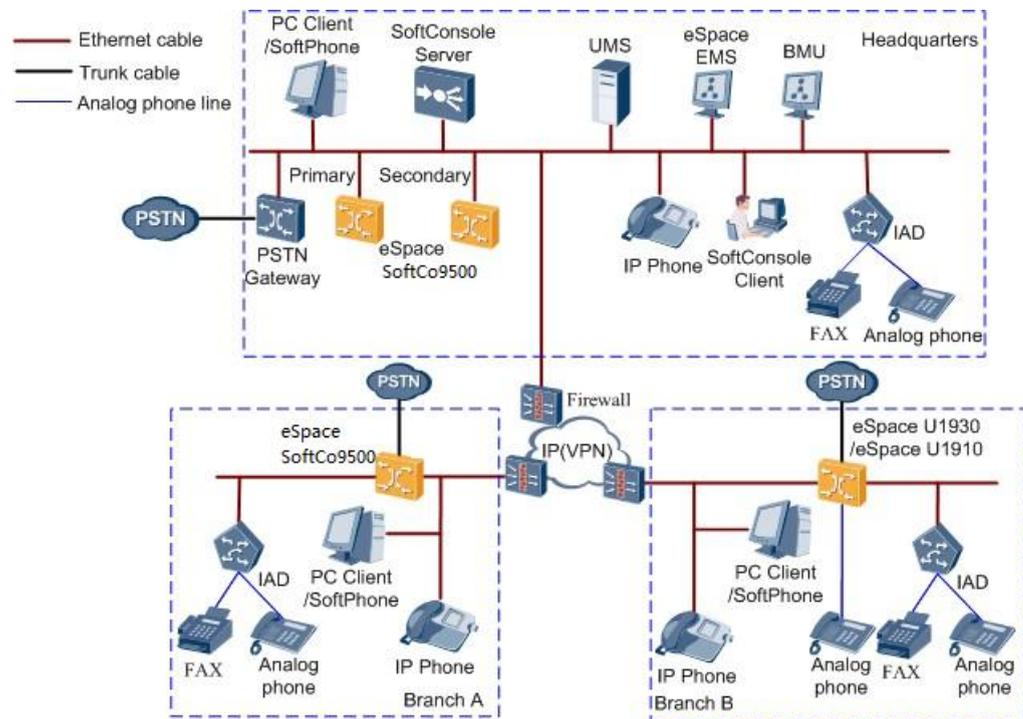
1.2 Product Highlights

The eSpace SoftCo9500 has diversified services, open interfaces, advanced architecture, high processing capability, high reliability, and easy maintenance.

Abundant Services for Better User Experience

The eSpace SoftCo9500 provides abundant services for users.

- Voice conference service

  The voice conference service allows three or more users in a conversation. Huawei eSpace SoftCo9500 provides scheduled and instant conferences. Scheduled conferences can be classified into conferences through individual dialing-in, conferences through host convening, and conferences through system convening.

- Various call limitation policies and intelligent routing service

The eSpace SoftCo9500 provides multiple call limitation functions, including password-based call restriction, anonymous call restriction, and personal blacklist.

With the intelligent routing service, the eSpace SoftCo9500 automatically selects office routes when an IP trunk or a TDM trunk is faulty, and provides routing polices to increase communication reliability and minimize communication costs.

Open Interfaces for Various Application Scenarios

The eSpace SoftCo9500 complies with multiple interface protocols, which enables the device to apply to different application scenarios and to expand easily.

- Compliance with QSIG

  The eSpace SoftCo9500 provides narrowband interfaces to interact with the PSTN and traditional Private Branch Exchanges (PBXs). It can connect to the switch devices through SS7, PRA, R2, and QSIG trunks.

- PRA trunks through T1 cables

  The eSpace SoftCo9500 supports PRA trunks in E1 and T1 transmission mode.

- Interwork with the eSpace Meeting system.

  The eSpace SoftCo9500 connects to the eSpace Meeting system by means of SIP. It helps the eConference to implement announcement playing, digit collection, and management of conference resources.

- Centralized networking

  The eSpace SoftCo9500 can be deployed in centralized mode, which helps expand the system capacity.

  In centralized networking, the eSpace SoftCo9500 works as the central node, and the eSpace U1910 or eSpace U1930 works as a local node.

Reliable and High-Quality Voice Service

The eSpace SoftCo9500 features high reliability and supports multiple media processing modes.

- Power module backup

  The eSpace SoftCo9500 power module supports hot swap and 2+1 backup.

- RTP media stream encryption and TLS signaling encryption

  The eSpace SoftCo9500 provides media stream encryption and TLS signaling encryption for voice services to ensure user data security.

- Support for single-network-port, dual-network-port, and triple-network-port work modes

  In the single-network-port mode, the two network ports work in active/standby mode. In the dual-network-port and triple-network-port modes, service data and maintenance data are separated.

- Support for geographic redundancy and local regeneration

  Two eSpace SoftCo9500s work as active and standby devices and other eSpace U1900 series work as local devices. Normally, the active device synchronizes data to the standby device and local devices in real time. Services are not interrupted when an eSpace SoftCo9500 is faulty, fully meeting requirements on the reliability.

  - Geographic redundancy: When the active device is faulty, the standby automatically device takes over services from the active device and synchronizes data with local

devices. After the active device is restored, services are switched back to the standby device.

- Local survival: When both the active and standby devices are faulty, users connected to one local device cannot call users connected to another local device but users connected to the same local device can call each other. In addition, users connected to a local device can call local PSTN users.

- Support multiple media processing modes

  The eSpace SoftCo9500 supports various codecs such as (G.711(A-Law/U-law), G.729a/b, iLBC) and G.722.1 negotiation. In addition, it supports voice codec change and priority. The eSpace SoftCo9500 provides the adaptive jitter buffer, echo cancellation, voice companding, comfort noise generation, automatic gain control, and packet loss compensation functions to ensure high-quality audio and video data transmission.

Easy to Maintain

The eSpace SoftCo9500 features easy configuration, management, and maintenance.

- Two maintenance modes

  The eSpace SoftCo9500 allows users to maintain it using the Graphical User Interface (GUI)
  or Command Line Interface (CLI) locally or remotely.

- GUI-based management and maintenance

  Navigation trees on the eSpace local maintenance terminal (LMT) release users from the burden of memorizing command lines. Graphical icons that represent actual network components are displayed in topological views and device panel views.

- Multiple troubleshooting methods

  The eSpace LMT provides signal and resource tracing functions to help maintenance personnel to analyze and locate faults, and it displays fault reports in real time, enabling maintenance personnel to locate and rectify faults in time. In addition, the eSpace LMT allows maintenance personnel to query, sort out, delete, and save alarms.

2 Application Scenario

About This Chapter

The eSpace SoftCo9500 is applicable to various application scenarios.

The eSpace SoftCo9500 can be deployed on a single-node network.

The eSpace SoftCo9500 is applicable to centralized networking.

2.1 Single-Node Networking

The eSpace SoftCo9500 can be deployed on a single-node network.

Service Description

A set of the eSpace SoftCo9500 and required service and management servers need to be deployed at enterprise headquarters. Analog phones, IP phones, and soft terminals connected to an IAD that connects to the eSpace SoftCo9500 need to be deployed to implement basic communications and terminal access. This networking is applicable to SMEs without branches or with only several branches.

Networking Diagram

Figure 2-1 shows the single-node networking of the eSpace SoftCo9500.

Figure 2-1 Single-node networking
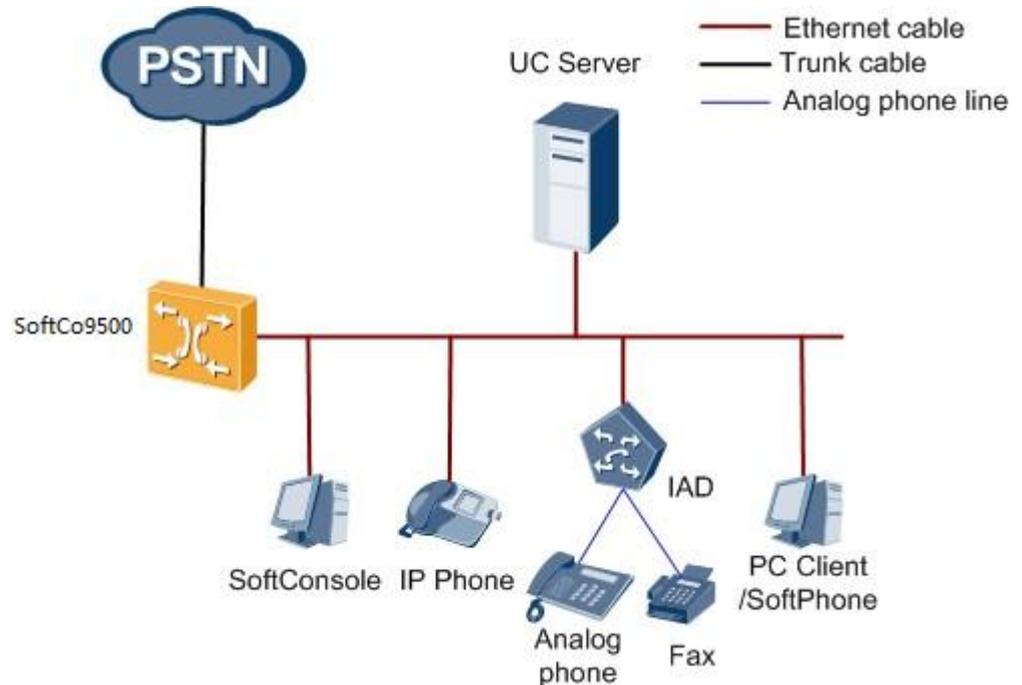
Network Description

- Use UC1000, UC3000, or UC10000 as the UC server based on the number of users.
- To connect to analog trunks, deploy IAD132 or IAD1224 with FXO ports.
- The device supports a maximum of 10000 users.

2.2 Centralized Networking

The eSpace SoftCo9500 is applicable to centralized networking.

Service Description

In centralized networking, the eSpace SoftCo9500 works as the central node, and the eSpace U1910 or eSpace U1930 works as a local node. Deploying the eSpace U1900 series and SoftCo9500 on the same network helps implement different specifications on nodes and ensures two-node cluster redundancy and local regeneration functions.

Networking Diagram

Figure 2-2 shows the network for centralized networking.

Figure 2-2 Centralized networking
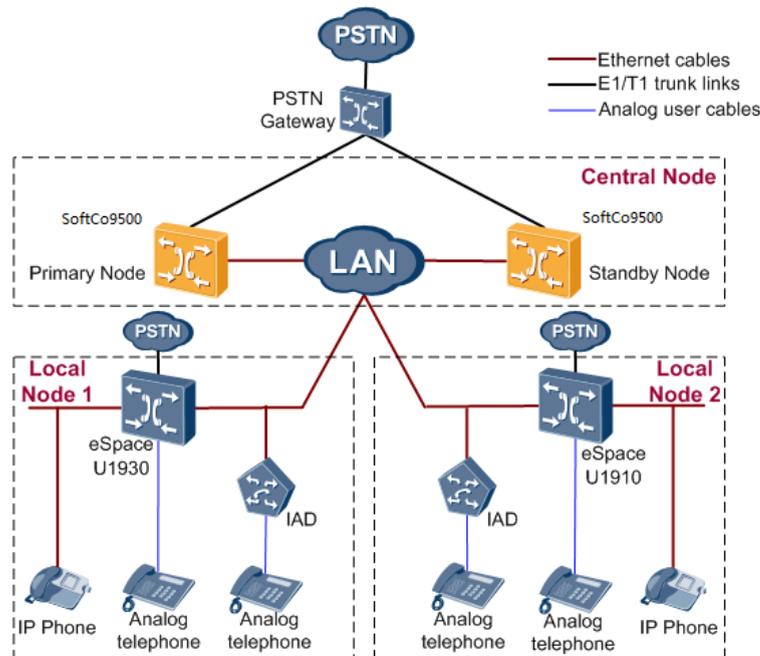

Network Description

The network is described as follows:

- The central and local nodes are directly connected to the PSTN.

- The central and local nodes are connected through the SIP trunk, and use the heartbeat mechanism to monitor the running status of the peer device.

- The two-node cluster redundancy function is supported. Two eSpace SoftCo9500s are deployed in active and standby mode on the central node.

- The active node, standby node, and local node are set as SIP servers whose priorities are in descending order on the local IAD. The local IAD provides the local regeneration function for users on the local node.

- A maximum of 200 local nodes are supported in a centralized network.

- When the central and local nodes are connected properly:

  - Users and services are configured and controlled in a unified manner on the central node.

  - SIP users cannot register with local nodes. Local nodes cannot be set to the IMS mode.

  - The license information about the central and local nodes can be viewed on the central node. License information about the central node cannot be viewed on local nodes.

  - The number of users on a local node registered with the central node cannot exceed the number allowed by the license on the local node.

- Local nodes synchronize SIP user data from the central node, and register POTS user on local nodes with the central node.

- When the central and local nodes are disconnected:
  - Each local node becomes an independent IP PBX. SIP users can register with local nodes.
  - The status of users on local nodes is displayed as **FAULT**.
  - License information about local nodes cannot be viewed on the central node.
  - The basic call function is not affected for POTS users on local nodes.
  - When detecting that the central node is disconnected, the local IAD automatically sets the local node as the SIP server. The basic call function is not affected for SIP users on the local node.

- When the central nodes are fault:
  - Each local node becomes an independent IP PBX. SIP users can register with local nodes.
  - The basic call function is not affected for POTS users on local nodes.
  - When detecting that the central node is disconnected, the local IAD automatically sets the local node as the SIP server. The basic call function is not affected for SIP users on the local node.

3 Product Architecture

About This Chapter

This topic describes the hardware structure of the eSpace SoftCo9500.

The shelf provides a space for placing and connecting the internal components of the eSpace SoftCo9500. It can also protect the components from contamination and external damage.

The boards of the eSpace SoftCo9500 include IP PBX-SMCU, SC1-DTU-4, SC1-DTU-8.

The eSpace SoftCo9500 uses the 100-240 V AC power distribution system. The power distribution system is at the top of the shelf. It comprises a power distribution frame (PDF) and power modules.

The fan tray assembly dissipates heat and improves the device stability.

The air filter protects the device from dusts.

3.1 Shelf

The shelf provides a space for placing and connecting the internal components of the eSpace SoftCo9500. It can also protect the components from contamination and external damage.

Appearance

The shelf of the eSpace SoftCo9500 is a standard 6U shelf. It is 436 mm in width, 420 mm in depth, and 264 mm in height.Figure 3-1 shows the front panel of the shelf.Figure 3-2 shows the rear panel of the shelf.

Figure 3-1 Schematic drawing of the eSpace SoftCo9500 front panel

1	Indicator	2	Mount angle

Figure 3-2 Schematic drawing of the eSpace SoftCo9500 rear panel

1	Power switch	2	Power module
3	Fan tray assembly	4	Slot

Slots

Slots are at the back of the shelf, as shown in Figure 3-2.

The eSpace SoftCo9500 provides two SMCU slots and eight slots for interface boards:

- Slots 0-1 are SMCU slots used to install the IP PBX-SMCU boards.
- Slots 2-9 are interface board slots used to install interface boards, SC1-MRS boards, these boards can be used together.

Figure 3-3 shows the slot distribution of the eSpace SoftCo9500.

Figure 3-3 Slot distribution of the eSpace SoftCo9500

8 (I/F or MRS)	9 (I/F or MRS)
6 (I/F or MRS)	7 (I/F or MRS)
4 (I/F or MRS)	5 (I/F or MRS)
2 (I/F or MRS)	3 (I/F or MRS)
1 (SMCU)	
0 (SMCU)	

When only one SMCU slot is installed on the IP PBX-SMCU board, the system runs in single control mode. When two SMCU slots are installed on SMCU boards, the system runs in the active/standby control mode and has a higher reliability.

The eSpace SoftCo9500 needs to be installed on at least one IP PBX-SMCU board and one SC1-MRS board for operation. You can install other boards according to the system capacity. If slots cannot be installed on boards, you need to install blank filler panels first.

Indicators

The POWER, RUN, and ALARM indicators are located on the front panel of the eSpace SoftCo9500 shelf. Table 3-1describes the indicators in the eSpace SoftCo9500 shelf.

Table 3-1 Indicators status in the eSpace SoftCo9500 shelf

Indicator	Identifier	Color	Status Description
Power indicator	POWER	Green	• On: The power supply is normal. • Off: There is no power supply.
Running indicator	RUN	Green	• On: The board is faulty. • Flashing (at 4 Hz): The board is writing data to the Flash Memory when the system is running. • Flashing (at 0.5 Hz): The system runs normally. • Off: There is no power input, the board is faulty, or the system is starting.
Alarm indicator	ALARM	Red	• Flashing (at 4 Hz): A critical alarm is generated. • Flashing (at 0.5 Hz): A major alarm is generated. • Flashing (at 0.25 Hz): A minor alarm is generated. • Off: No alarm is generated.

3.2 Boards

The boards of the eSpace SoftCo9500 include IP PBX-SMCU, SC1-DTU-4, SC1-DTU-8.

3.2.1 IP PBX-SMCU

The IP PBX-SMCU board is a main control board of the eSpace SoftCo9500. It provides three 100/1000Base-TX service network interfaces and two debugging interfaces.

Main Functions

The main functions of IP PBX-SMCU (eSpace SoftCo9500 main control unit) are as follows:

- It provides the SoftSwitch.
- It processes the media control protocols.
- It provides the functions of L3 switching and TDM exchange.
- It supports hot swap.
- It supports 1+1 hot backup. When the active board is faulty, the standby board automatically replaces the active board.

Panel

Figure 3-4shows the panel of the IP PBX-SMCU board.

Figure 3-4 Panel of the IP PBX-SMCU board

1	Indicator	2	Alarm tone mute button	3	Reset button
4	Spanner	5	Debugging serial interface	6	Debugging network interface
7	Service network interface				

Interfaces

There are three service network interfaces, one debugging network interface, and one debugging serial interface on the panel of the IP PBX-SMCU board.

Table 3-2 lists the interfaces on the IP PBX-SMCU board.

Table 3-2 Interfaces on the IP PBX-SMCU board

Interface	Symbol	Attribute	Purpose
Service network interface	100/1000BASE-TX	RJ-45 FE interface. The maximum transmission distance is 100 meters.	It is used to connect to a LAN switch.
Debugging network interface	ETHERNET	RJ-45 FE interface. The maximum transmission distance is 100 meters.	It is used to configure and debug the eSpace SoftCo9500.
Debugging serial interface	COM	RS-232 serial interface. The maximum transmission distance is 10 meters.	It is used to configure and debug the eSpace SoftCo9500 and can be connected to a modem for remote debugging.

The service data flows processed on the IP PBX-SMCU service network ports are classified into the following four types:

- Signaling packet: SIP

- Media stream packet: RTP/RTCP/SRTP

- NMS packet: Telnet/private protocol used for communicating with the BMU and OMU/SNMP/TFTP

- Protocol packet: RADIUS/DIAMETER/SNTP

In the three application scenarios of the network ports of the IP PBX-SMCU, Table 3-3 describes the data flows processed on each network port. Some data flows can be transmitted from different network port according to the configuration.

Table 3-3 Application scenarios of the network ports of the IP PBX-SMCU

Application Scenario	Network Port 0	Network Port 1	Network Port 2
Single-network-port mode	This network port processes all the preceding types of data flows.	The functions of this network port are the same as those of network port 0. The two network ports are in mutually redundant mode.	This network port is not used.
Dual-network-port mode	This network port processes the following data flows: - NMS packet: Telnet/private protocol used for communicating with BMU and OMU/SNMP - Protocol packet: RADIUS/DIAMETE	This network port processes all the preceding types of data flows.	This network port is not used.

Application Scenario	Network Port 0	Network Port 1	Network Port 2
	R/SNTP		
Triple-network-port mode	This network port processes the following data flows: • NMS packet: Telnet/private protocol used for communicating with BMU and OMU/SNMP/TFTP • Protocol packet: RADIUS/DIAMETER/SNTP	This network port processes all the preceding types of data flows.	This network port processes the following data flows: • NMS packet: Telnet/private protocol used for communicating with BMU and OMU/SNMP/TFTP • Protocol packet: RADIUS/DIAMETER/SNTP

The IP PBX-SMCU board works in single-network-port mode by default. If it works in dual-network-port mode or triple-network-port mode, the network ports need to be configured on different network segments.

Indicators

The RUN, alarm (ALM), and active (ACT) indicators are located on the panel of the IP PBX-SMCU board. Table 3-4 describes the statuses of the indicators.

Table 3-4 Statuses of the indicators on the IP PBX-SMCU board

Indicator	Identifier	Color	Status Description
Run indicator	RUN	Green	• Steady on: indicates that the board is faulty. • Blinking (at 4 Hz): indicates that the board is writing data into the Flash Memory when the system is running. • Blinking (at 2 Hz): indicates that the board is writing data into the Flash Memory when the system starts. • Blinking (at 1 Hz): indicates that the board is starting. • Blinking (at 0.5 Hz): indicates that the system runs normally. • Off: indicates that there is no power input or the board is faulty.
Alarm	ALM	Red	• Blinking (at 4 Hz): indicates that a critical alarm is

Indicator	Identifier	Color	Status Description
indicator			generated during the running of the system. • Blinking (at 0.5 Hz): indicates that a major alarm is generated. • Blinking (at 0.25 Hz): indicates that a minor alarm is generated. • Off: indicates that no alarm is generated.
Active and standby indicator	ACT	Green	• Steady on: indicates that the current board is an active board. • Off: indicates that the current board is a standby board.

Button

There is a reset button and an alarm tone mute button (with the symbol of BUZZ OFF) on the panel of the IP PBX-SMCU. The functions of each component are described as follows:

⚠ **CAUTION**

Be careful while operating the reset button. Pressing this button when the system is running normally may interrupt the services.

- The reset button is used to restart the board and load programs and data.
- The alarm tone mute button is used to mute the alarm tone.

3.2.2 SC1-MRS

The SC1-MRS is a media resource system board of the eSpace SoftCo9500 and provides two debugging interfaces.

Main Functions

The SC1-MRS provides the following functions: number allocation, digit collection, voice playing, Color Ring Back Tone (CRBT) playing, recording, voice conference, conversion from the TDM signaling to the VoIP signaling, T.30 fax, supporting G.711, G.729, G.722/G.722.1 and iLBC. The SC1-MRS provides 256 channels for processing the media resources.

The SC1-MRS supports load sharing. When all the boards run normally, they share loads evenly. When a board is faulty, other normal boards share the load to ensure the normal running of the system.

The universal DSP is embedded to implement the following functions:

- Checking and sending the dual tone multi-frequency signals
- Checking and sending the caller ID in FSK

- Checking and sending signal tones
- Checking and sending the MFC signaling
- Recording and announcement playing
- Supports RTP and SRTP event report

Panel

Figure 3-5 lists the interfaces on the SC1-MRS board.

Figure 3-5 Panel of the SC1-MRS board
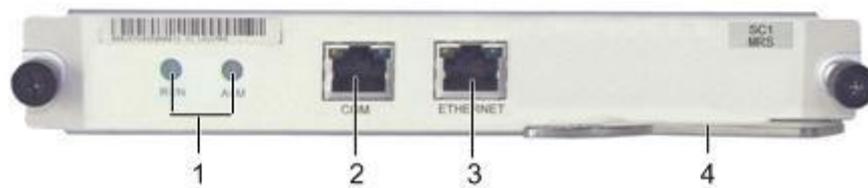
| 1 | Indicator | 2 | Debugging serial interface |
| 3 | Debugging network interface | 4 | Spanner |

Interfaces

One service network interface and one debugging serial interface are on the SC1-MRS board.

Table 3-5 lists the interfaces on the SC1-MRS board.

Table 3-5 Interfaces on the SC1-MRS board

Interface	Symbol	Attribute	Purpose
Debugging network interface	ETHERNET	RJ-45 FE interface. The maximum transmission distance is 100 meters.	It is used to access the LAN to communicate with other servers.
Debugging serial interface	COM	RJ-45 RS-232 serial interface. The maximum transmission distance is 10 meters.	It is used to debug the SC1-MRS board.

Indicators

The ALM and RUN indicators are located on the panel of the SC1-MRS board. Table 3-6 describes the statuses of the indicators.

Table 3-6 Indicators on the SC1-MRS board

Indicator	Identifier	Color	Status Description
Run indicator	RUN	Green	• Steady on: indicates that the board is faulty. • Blinking (at 4 Hz): indicates that the board is writing data into the Flash Memory when the system is running. • Blinking (at 2 Hz): indicates that the board is writing data into the Flash Memory when the system starts. • Blinking (at 0.5 Hz): indicates that the board runs normally. • Off: indicates that there is no power input or the board is faulty.
Alarm indicator	ALM	Red	• Blinking: indicates that the board is starting or the subscriber does not add the board by using a command after the board starts. • Off: indicates that the board runs normally.

3.2.3 SC1-DTU-4

The SC1-DTU-4 board is a digital trunk interface board. It provides four E1/T1 interfaces and a debugging interface.

Main Functions

The SC1-DTU-4 board provides access for digital trunk.

The rate of an E1 interface is 2.048 Mbit/s. The E1 interfaces comply with G.703 or G.704 and support signaling such as SS7, PRA, R2, and QSIG.

The rate of an T1 interface is 1.544 Mbit/s. The T1 interfaces comply with G.703 or G.704 and support PRA signaling.

Panel

Figure 3-6 shows the panel of the SC1-DTU-4 board.

Figure 3-6 Panel of the SC1-DTU-4 board
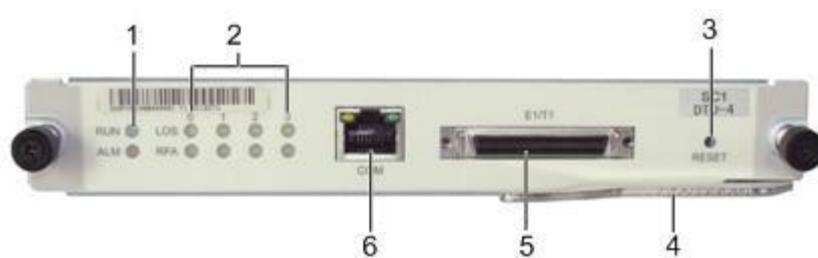
| 1 | Running indicator | 2 | Signal indicator | 3 | Reset button |

| 4 | Spanner | 5 | Digital trunk interface | 6 | Debugging serial port |

Interfaces

The digital trunk interface and debugging serial port are located on the SC1-DTU-4 board.
Table 3-7 describes the interfaces.

Table 3-7 Interfaces on the SC1-DTU-4 board

Interface	Identifier	Number	Attribute	Function
Digital trunk interface	E1/T1	1	DB50 socket, supporting the connection to a digital trunk cable of 75 ohm or 120 ohm. The digital trunk interface provides four E1 interfaces and supports the SS7, PRA, QSIG and R2 signaling. DB50 socket, supporting the connection to a digital trunk cable of 100 ohm. The digital trunk interface provides four T1 interfaces and supports the PRA signaling.	This interface achieves the connection to the digital trunk of an upper level office, for example, the LE.
Debugging serial port	COM	1	RS-232 standard serial port and RJ-45 socket. In addition, the transmission distance is less than 10 meters.	This interface is used to debug the functions of the SC1-DTU-4 board.

☐ NOTE
LE is short for local exchange

Indicators

Four types of the indicators are located on the SC1-DTU-4 board: RUN, ALM, loss of signal (LOS), and remote fail alarm (FRA). An LOS indicator and an RFA indicator reflect the status of an E1/T1 interface. For example, the LOS and RFA indicators that are indicated by 0 reflect the status of the first E1/T1 interface; the LOS and RFA indicators that are indicated by 1 reflect the status of the second E1/T1 interface.

Table 3-8 Indicators on the SC1-DTU-4 board

Indicator	Identifier	Color	Status Description
Running indicator	RUN	Green	• On: The board is faulty. • Flashing (at 4 Hz): The board is writing

Indicator	Identifier	Color	Status Description
			data to the Flash Memory when the system is running. • Flashing (at 2 Hz): The board is writing data to the Flash Memory when the system starts. • Flashing (at 0.5 Hz): The board runs normally. • Off: There is no power input or the board is faulty.
Alarm indicator	ALM	Red	• Flashing: The board is starting or the subscriber does not add the board by using a command after the board starts. • Off: The board runs normally.
Signal loss indicator	LOS	Yellow	• When the indicator is on, there is signal loss. • When the indicator is off, there is no signal loss.
Remote alarm indicator	RFA	Green	• When the indicator is on, the peer equipment fails in receiving the signals. • When the indicator is off, the peer equipment is running normally.

Button

The reset button is used to restart the board and load programs and data.

⚠ CAUTION

Press the reset button only when necessary. Pressing this button when the system is running normally may stop the system running.

3.2.4 SC1-DTU-8

The SC1-DTU-8 board is a digital trunk interface board. It provides eight E1 interfaces and a debugging interface.

Main Functions

The SC1-DTU-8 board connects to digital trunk of upper layer offices.

The rate of an E1 interface is 2.048 Mbit/s. E1 interfaces complies with G.703 and G.704 and support signaling such as SS7, PRA, R2, and QSIG.

Panel

Figure 3-7 shows the panel of the SC1-DTU-8 board.

Figure 3-7 Panel of the SC1-DTU-8 board

1	Running status indicator	2	Signal indicator	3	Reset button
4	Spanner	5	Digital trunk interface	6	Debugging serial port

Interfaces

The SC1-DTU-8 board has one digital trunk interface and one debugging serial port. Table 3-9 describes the interfaces.

Table 3-9 Interfaces on the SC1-DTU-8 board

Interface	Identifier	Number	Attribute	Function
Digital trunk interface	E1	1	DB50 socket, connecting to the digital trunk cable of 75 ohm or 120 ohm.The digital trunk interface provides eight E1 interfaces and supports the SS7, PRAand R2 signaling.	Connects to the digital trunk of an upper layer office, for example, the LE.
Debugging serial port	COM	1	RS-232 standard serial port and RJ-45 socket. The maximum transmission distance is 10 meters.	Debugs the functions of the SC1-DTU-8 board.

📖 **NOTE**

LE = local exchange

Indicators

Four types of the indicators are located on the SC1-DTU-8 board: RUN, ALM, loss of signal (LOS), and remote fail alarm (FRA). An LOS indicator and an RFA indicator reflect the status of an E1 interface. For example, the LOS and RFA indicators that are indicated by 0 reflect

the status of the first E1 interface; the LOS and RFA indicators that are indicated by 1 reflect the status of the second E1 interface.

Table 3-10 Indicators on the SC1-DTU-8 board

Indicator	Identifier	Color	Status Description
Running indicator	RUN	Green	• On: indicates that the board is faulty. • Flashing (at 4 Hz): indicates that the board is writing data to the FLASH when the system is running. • Flashing (at 2 Hz): indicates that the board is writing data to the FLASH when the system starts. • Flashing (at 0.5 Hz): indicates that the board runs normally. • Off: indicates that there is no power input or the board is faulty.
Alarm indicator	ALM	Red	• Flashing: indicates that the board is starting or the subscriber does not add the board by using a command after the board starts. • Off: indicates that the board runs normally.
Signal loss indicator	LOS	Yellow	• When the indicator is on, it indicates that there is signal loss. • When the indicator is off, it indicates that there is no signal loss.
Remote alarm indicator	RFA	Green	• When the indicator is on, it indicates that the peer equipment fails in receiving the signals. • When the indicator is off, it indicates that the peer equipment is running normally.

Button

The reset button is used to restart the board and load programs and data.

> ⚠ **CAUTION**
>
> Be careful while operating the reset button. Pressing this button when the system is running normally may stop the running of the services.

3.3 Power Distribution System

The eSpace SoftCo9500 uses the 100-240 V AC power distribution system. The power distribution system is at the top of the shelf. It comprises a power distribution frame (PDF) and power modules.

3.3.1 PDF

There is one power switch, three power module slots, and one alarm tone mute button on the PDF.

Figure 3-8 shows the power distribution system, which is at the top of the shelf.

Figure 3-8 power distribution system

| 1 | Power switch | 2 | Power module slot | 3 | Alarm tone mute button |

The functions of each component are described as follows:

⚠ CAUTION

Be careful with the power switch when the device is running normally. Powering off the device will stop all the services.

- The power switch is used to power on and power off the eSpace SoftCo9500.
- The power module slots are used to install power modules. The numbers of the three slots from left to right are 0, 1, and 2. If there is a vacant slot, insert a blank filter panel into it. If there is no vacant slot, inserting a blank filter panel will generate a power alarm.
- The alarm tone mute button is used to mute the alarm tone when the equipment gives out alarms.

3.3.2 Power Supply

The uses two power supply modules that can be swapped and work in active/standby mode. The AC and DC power supplies are supported.

Figure 3-9 shows an AC power supply module.

Figure 3-9 A AC power supply module

1	AC power socket

Figure 3-10 a DC power supply module.

Figure 3-10 A DC power supply module

1	DC power socket

If DC power supplies are used, the DC power cables shown in Figure 3-11 must be used.

The power supply module provides the following functions:

- Equalizing currents and backing up power supplies

  By default, the eSpace SoftCo9500 is installed on one power supply module in slot 0. If an eSpace SoftCo9500 is installed on two power supply modules, it can equalize currents and back up power supplies. When working normally, each power supply module shares the load with the current output. When a power supply module stops working, the other power supply module continues to work.

- Supporting hot swapping

  You can insert a power supply module directly into a vacant slot of the power distribution frame without powering off the eSpace SoftCo9500. When a backup power
  supply module is installed, you can remove a power supply module without affecting the running of the eSpace SoftCo9500.

⚠ CAUTION

When two power supply modules are configured, you cannot configure the AC or DC power supply modules on an eSpace SoftCo9500.

3.4 Fan Tray Assembly

The fan tray assembly dissipates heat and improves the device stability.

The fan tray assembly of the eSpace SoftCo9500 is vertically mounted on the left of the rear panel of the device. Four fans are installed in the fan tray assembly. Figure 3-12 shows the fan tray assembly.
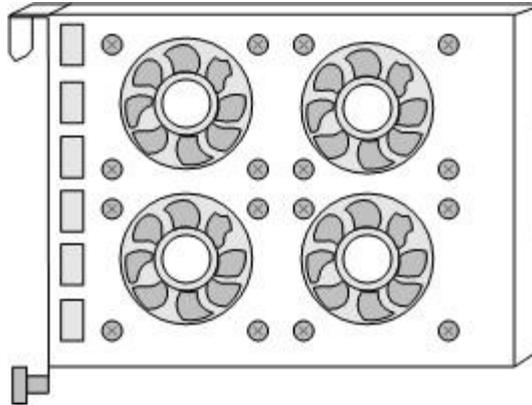
When the system runs, the fans draw out the hot air inside the device and expel the air to the left. At the same time, cool air comes in from the right side. The fans ensure the heat dissipation and improve the device stability.

3.5 Air Filter

The air filter protects the device from dusts.

The air filter is vertically mounted on the left of the device front. It protects the boards and backplane inside the shelf.
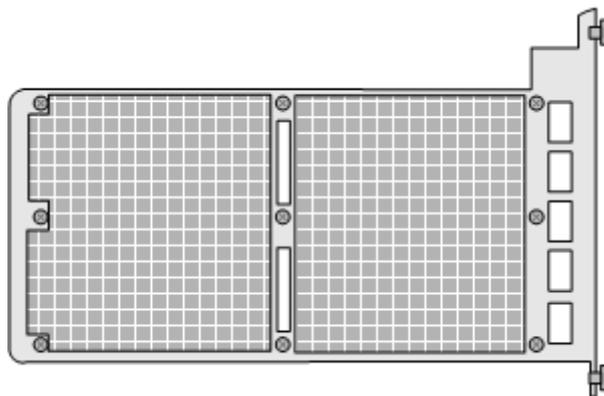
Figure 3-13 shows the air filter.

📖 **NOTE**

Before the device is delivered to customers, the air filter is already installed and is blocked by the front panel. Therefore, you cannot see the air filter.

Figure 3-13 Air filter

4 Functions and Features

About This Chapter

The eSpace SoftCo9500 provides comprehensive voice services and supplementary services for users.

4.1 Basic Voice Services

eSpace SoftCo9500 supports basic voice services.

4.2 Supplementary Services

The eSpace SoftCo9500 provides dozens types of supplementary services.

4.3 Advanced Services

eSpace SoftCo9500 supports User Rights Management by Level and Call Barring Policies.

4.4 Intelligent Routing

The intelligent routing service automatically selects office routes when an IP trunk or a TDM trunk is faulty, and provides routing polices to increase communication reliability and minimize communication costs.

4.5 Voice Conference

The voice conference service allows three or more users in a conversation.

4.6 Security

The eSpace SoftCo9500 provides enhanced security measures for users.

4.1 Basic Voice Services

eSpace SoftCo9500 supports basic voice services.

Voice Communication

eSpace SoftCo9500 supports basic voice communication, including:

- Intra-office call

Intra-office users under eSpace SoftCo9500 can call each other. A user terminal can be a broadband or narrowband terminal that the IP PBX supports. Voice calls can be made between intra-office users.

- Narrowband trunk-based communication

  eSpace SoftCo9500 connects to the PSTN or TDM PBX through digital trunks such as PRA, R2, SS7 (ISUP/TUP), or Q Signaling (QSIG). SS7 is short for signaling system No. 7, ISUP for integrated services digital network user part, and TUP for telephone user part. Users can make voice calls and receive incoming calls based on narrowband trunks.

- Broadband trunk-based communication

  eSpace SoftCo9500 uses the SIP trunk to connect to the IP PBX, softswitch, or IMS. Voice calls can be made between intra-office users and the users under other devices.

📖 **NOTE**

eSpace SoftCo9500 can be connected to narrowband and broadband terminals (including analog phones, SoftPhone, IP phones, eSpace Desktops, and SIP SoftConsole), and access devices (including IAD).

Point-to-Point Video Call

eSpace SoftCo9500 supports point-to-point video communication between intra-office users and enables users to use eSpace Desktops and eSpace 8850 to communicate with each other through the SIP trunk. The video codec is H.263.

Call Rights Control

eSpace SoftCo9500 allows users to make intra-office calls, local calls, national toll calls, and international toll calls. In addition, a maximum of 32 types of call rights can be defined to restrict users from making specified types of calls.

Number Analysis and Processing

eSpace SoftCo9500 analyzes the calling and called numbers based on their prefix and length to control incoming and outgoing call rights. The calling number is analyzed before the called number. Numbers with the same prefix are analyzed based on the length.

- A number prefix is the first digit or first few digits in a number to specify the number attribute.
- eSpace SoftCo9500 can analyze and process a regular number or prefix containing a maximum of 32 digits and an intra-office number containing a maximum of eight digits.
- eSpace SoftCo9500 can analyze a maximum of 1024 calling numbers and a maximum of 2048 called numbers.
- Prefixes can identify emergency, intra-office, local, intra-office and local, national, and international calls, and support 32 levels of customized call rights. The intra-office and local prefixes are applied when the intra-office prefix is the same as the local outgoing prefix.
- eSpace SoftCo9500 can insert, change, or delete digits in calling and called numbers. The length of a changed number cannot exceed the maximum value. A maximum of 1024 change types are supported.

Voice Processing and Codec

eSpace SoftCo9500 supports various codec formats including G.711 (A-Law/U-Law), G.729a/b, and Internet Low Bitrate Codec (iLBC), and G.722.1 negotiation. In addition, eSpace SoftCo9500 supports voice codec switch and selection of their priorities.

eSpace SoftCo9500 supports voice activity detection (VAD), comfort noise generator (CNG), echo cancellation (EC), automatic gain control (AGC), jitter buffer, and packet loss compensation (PLC) to provide high-quality voice services. In addition, eSpace SoftCo9500 supports type of service (TOS) and differentiated services code point (DSCP) to make voice streams be transmitted preferentially, supports Real-Time Transport Control Protocol (RTCP), and provides statistical items including the number of received and sent RTP packets, number of received and sent bytes, time delay, jitter, and packet loss rate.

SNTP

eSpace SoftCo9500 can function as both the Simple Network Time Protocol (SNTP) server and the SNTP client to synchronize time to or from other network devices. Time synchronization is implemented in the unicast mode.

Fax

eSpace SoftCo9500 supports T.30 faxes in the circuit switched domain and T.38 faxes in the packet switched domain, and transparent transmission of G.711 faxes.

- The end-to-end delay for transmitting signals using a fax machine cannot exceed 3 seconds.It is recommended that no more than four T.38 code switching gateways be deployed on the network.
- For transparent transmission, eSpace U19xx series IP PBX converts voice calls in G.723 and G.729 encoding modes into G.711 faxes.

4.2 Supplementary Services

The eSpace SoftCo9500 provides dozens types of supplementary services.

Table 4-1 lists the supplementary services provided by the eSpace

SoftCo9500.

Table 4-1 Supplementary services

Service Type	Supplementary Service
Calling services	Local Number Query Service
	CLIP Service
	CLIR Service
	CLIRO Service
	CNIP Service
	CONP Service
	CNIR Service
	CFC Service
	CFU Service
	CFNR Service
	CFB Service

Service Type	Supplementary Service
	CFO Service
	Call Transfer Service
	Call Hold Service
	Call Park Service
	Call Waiting Service
	Three-Party Conversation Service
Conference call services	Individuals Dialing-In
	System Convening
	Host Convening
	Instant Conference
Call restriction service	Call-out Restriction Service
	Password-based Call Restriction Service
	Anonymous Call Restriction Service
	Password Change Service
	Simple-Card-Number-based Call Restriction Service
	Outgoing Call Duration Restriction Service
	Rights-based Call Restriction Service
	Toll Fraud Prevention Service
	Personal Blacklist Service
Call back services	RCB Service
	CBB Service
	ACB Service
Pickup services	Co-Group Pickup Service
	Designated Pickup Service
Number replacement service	Service of Number Replacement on the Same Phone
	Service of Number Change on the Same Phone
Secretary service	Secretary Service
	Secretary Station Service
	Advanced Secretary Service
Hotline services	Delay Hotline Service
	Instant Hotline Service

Service Type	Supplementary Service
Agent service	Break-in Service
	Forced Release Service
	Privileged User Service
	Recording Playback Service
Ringing service	Simultaneous Ringing Service
	Sequential Ringing Service
	Distinctive Ring Tone Service
Unified message service	CTVMU Service
	CTVMNR Service
	CTVMB Service
	CTVMO Service
	One-Terminal-One-Number Fax Mailbox Service
	Fax Mailbox Service With Unified Access Code
IVR service	IVR Service
Enhanced service	DND Service
	Absent User Service
	Listening Service
	Alarm Service
	Multi-Number Service
	Number Portability Service
	ABD Service
	PBX Group Line Selection Service
	ONLY Service
	Hunt Group Service
	Fax Service
	Group Call Service
Management and setting	IP Phone Status Detection Service
	Remote Activation Service
	Service of Deactivating All Services

4.3 Advanced Services

eSpace SoftCo9500 supports User Rights Management by Level and Call Barring Policies.

User Rights Management by Level

- Right Levels for Supplementary Services

  eSpace SoftCo9500 users are assigned four right levels in ascending order: default, normal, advanced, and super. Users at different right levels have different rights to use new services or make calls. If no right level is configured for a user, the user is at the default level.

  Users of a higher right level have more new service rights and all the service rights of a lower level. Table 4-2 lists the mapping between service rights and user levels.

Table 4-2 Mapping between service rights and user levels

Call Right User Level	Service Rights
Default	Users have rights to use local number query, call transfer, call forwarding, call waiting, abbreviated dialing, outgoing call barring, alarm clock, CLIP, password change, phone conference, unified access to the fax mailbox, call park, call right, ONLY, DND, and absent user services.
Normal	In addition to services that users can use at the default level, users at the normal level have rights to use RCB, CBB, designated pickup, and instant conference services.
Advanced	In addition to services that users can use at the normal level, users at the advanced level have rights to use three-party call, call hold for multiple calls, simultaneous and sequential ringing, break-in, and forced release services.
Super	Super level: In addition to services that users can use at the advanced level, users at the super level have rights to use privileged user, secretary, and secretary station services.

- Right Levels for Call Rights and Call Control by Time Segment

  Users at different right levels have different rights to make calls. Call rights can be control by time segment so that users at a level can make calls only in a specified time segment. Table 4-3 lists the mapping between call rights and user levels.

Table 4-3 Mapping between call rights and user levels

Call Right User Level	Intra-Office Call	Local Call	National Toll Call	International Toll Call
Default	Yes	Yes	No	No
Normal	Yes	Yes	Only Working Time	No
Advanced	Yes	Yes	Yes	Only Working Time
Super	Yes	Yes	Yes	Yes

- Trunk Preemption for Higher-Right-Level Users

  If trunks are insufficient, reserved trunks can be used based on the preset user level.

  If there is no available reserved trunk, higher-right-level users who make outgoing calls can preempt the trunks assigned for lower-right-level users. For example, a user at the super level can preempt trunks occupied by users at the advanced, normal, and default levels. When the trunk of a lower-right-level user is preempted, the user hears the busy tone (configurable), and the call is released.

☐ NOTE

Users at the same level cannot preempt trunks of one another; By default, the busy tone is played when a trunk is preempted. An announcement can be also played.

Call Barring Policies

The eSpace SoftCo9500 can restrict calls as required. Table 4-4 describes the call restriction services.

Table 4-4 Call restriction services

Service	Description
Call Barring by Calling Number	Call rights that are classified by calling number include incoming and outgoing call rights, for example, local call rights, toll call rights, and trunk call rights.
Call Barring by Called Number	Call rights that are classified by called number include incoming and outgoing call rights, for example, local call rights, toll call rights, and trunk call rights.
Call Barring by Blacklist or Whitelist	Call barring by blacklist or whitelist allows a user to accept or reject calls made by a list of users. • Users in the blacklist group can call only users in the whitelist group. • Users in the ordinary call barring group can call users in the same group or in the whitelist group, but cannot call users in

Service	Description
	the blacklist group. • Users in the whitelist group can call users in any of the three groups.
Call Barring by Personal Blacklist	Call barring by blacklist or whitelist allows a user to accept or reject calls made by a list of users. The personal blacklist has a lower priority than the system blacklist.
VoIP Domain-based Call Barring	IP PBX logically assigns some local users or office routes to a VoIP domain for barring calls and sets the maximum number of concurrent calls for this VoIP domain. When receiving a new call request, the IP PBX checks the calling and called parties' domains and the maximum number of calls allowed. If the maximum number of calls allowed is reached, the call fails, and the calling party hears an announcement.
Password-based Call Barring	eSpace SoftCo9500 determines whether a user can make calls by asking the user to enter a password. The password is bound to the user's phone.
Call Barring by Card Number and Password	Users can use authorized card numbers and passwords to make calls from any phones in the office. This service supports the following two dialing modes: • IVR navigation dialing mode: Users enter the password-based call barring prefix, and dial a number as prompted. • Full number dialing mode: Users directly enter outgoing prefix*call barring service ID*password*called number# to make a call.
Calling Number Authentication	If the calling number authentication service is configured for the called number prefix involved in an incoming call from a local user or a trunk, the IP PBX initiates a request to the remote authentication dial-in user service (RADIUS) server to authenticate the calling number. If the authentication is successful, the IP PBX connects the call. If the authentication fails, the call fails.
Call Barring by Region	The IP PBX manages call rights for users who use different types of phones in various regions. • After users under the IP PBX are assigned to different VoIP domains, the IP PBX determines whether a call can be

Service	Description
	established based on the calling number, called number, or domain type. • This service meets VoIP restriction requirements of India offices. Incoming and outgoing calls cannot be routed through broadband and narrowband trunks. Different rights can be assigned to trunks to prevent trunk tandem calls.
Anonymous Call Barring	This service allows the system to restrict anonymous calls (including intra-office calls and outer-office calls) to a user.
Restriction on Outer-Office Call Duration	When a user under eSpace SoftCo9500 makes an outgoing call to or receives an incoming call from an outer-office user, the IP PBX controls the call duration as configured and plays an announcement to the user when there is only one minute left.

4.4 Intelligent Routing

The intelligent routing service automatically selects office routes when an IP trunk or a TDM trunk is faulty, and provides routing polices to increase communication reliability and minimize communication costs.

- Routing by Time Segment

  Different time indexes are set for different office routes. Each time index corresponds to a specified time segment (accurate to hour). Based on the current time, the IP PBX searches for the time index for an outgoing call and selects the related office route.

  The IP PBX allows multiple office route selection codes to share one office route. When an office route is added to multiple office route selection codes, multiple routing policies apply to the office route. The IP PBX automatically selects the routing policy based on the outgoing prefix that a user dials.

- Routing by Charge Rate

  Different charge rate reference values are set for different office routes. The IP PBX preferentially selects the office route with the lowest charge rate reference value for outgoing calls. If all trunk circuits are busy for this office route, the IP PBX selects the office route with the second lowest charge rate reference value.

- Rerouting upon Call Failures

  When a call fails to be routed based on the office route selection code, the IP PBX selects a new route based on the standby office route selection code corresponding to the failure processing index.

- Route Load Balancing

  The IP PBX balances traffic among multiple preset routes. The IP PBX polls office routes based on office route IDs in ascending order till an office route that contains idle

circuits is found. The later calls will poll from the next office route after an office route is selected by the preceding call.

- Routing by Percentage

  Different percentages are set for different office routes. The IP PBX selects office routes in turn based on the preset percentages. Except the office routes whose percentages are set to 100%, office routes are polled based on preset percentages in descending order.

- Routing by User Right Level

  Different office routes are set for different user right levels. When a higher-right-level user makes an outgoing call, the IP PBX preferentially selects the office route that is set for the user right level. If selecting the office route fails, the IP PBX selects the office route that is set for a lower user right level.

  When routing by user right level is used, the IP PBX preferentially uses an office route at the user right level to route calls. If no circuit is idle, the office route that is set for a lower user right level is used. Office routes that are set for the same level are polled based on office route IDs in ascending order. To ensure good voice quality of calls for higher-right-level users, these users are allocated with high-performance office routes. Lower-right-level users, however, are not allowed to use these office routes.

- Trunk Link Balancing

  The IP PBX preferentially selects a trunk with more idle circuits to balance loads among available trunk links.

4.5 Voice Conference

The voice conference service allows three or more users in a conversation.

eSpace SoftCo9500 provides scheduled and instant conferences. Scheduled conferences can be classified into the following types:

- Conference through individual dialing-in
- Conference through host convening
- Conference through system convening

Scheduled Conference

- Individual Dialing-In

  Participants dial a conference access code and enter the conference ID and password as prompted to join a conference. If the conference ID or password that a participant enters is incorrect, the participant returns to the upper-level menu.

- Host Convening

  The moderator joins a conference and performs operations on the phone to invite or remove participants.

- System Convening

  The moderator sets a participant list in advance, and the system calls the listed participants at the scheduled time. Participants can simply pick up phones to join the conference.

Instant Conference

Users can directly initiate an instant conference without scheduling the conference in advance.

An authorized user dials the conference prefix and creates an instant conference as prompted. The user who initiates the conference is the moderator. The moderator can invite more participants.

4.6 Security

The eSpace SoftCo9500 provides enhanced security measures for users.

Anti-attack Measures

- The communication port matrix is delivered with the product documentation. The services and ports that are not listed in the communication port matrix should not be enabled.

  The communication port matrix contains the following information: available ports, transport layer protocols used by the ports, network elements (NEs) that use the ports to communicate with peer NEs, application layer protocols used by the ports and description of the services at the application layer, information about whether services at the application layer can be disabled, authentication modes of the ports, and functions of the ports (such as transmitting management traffic, control traffic, or data traffic).

- The Secure Shell (SSH) protocol is used to authenticate user login.

- Passwords sent from the LMT client to the server are encrypted using the Secure Hash Algorithm (SHA).

5 Operation, Maintenance, and Management

About This Chapter

You can manage eSpace SoftCo9500 using eSpace LMT, Telnet, or serial cable.

5.1   LMT

The Local Maintenance Terminal (LMT) is the NE management system for eSpace SoftCo9500. The LMT provides functions such as alarm management, configuration management, security management.

5.2   Local and Remote Maintenance

Users can remotely or locally maintain the eSpace SoftCo9500 using the LMT.

5.1 LMT

The Local Maintenance Terminal (LMT) is the NE management system for eSpace SoftCo9500. The LMT provides functions such as alarm management, configuration management, security management.
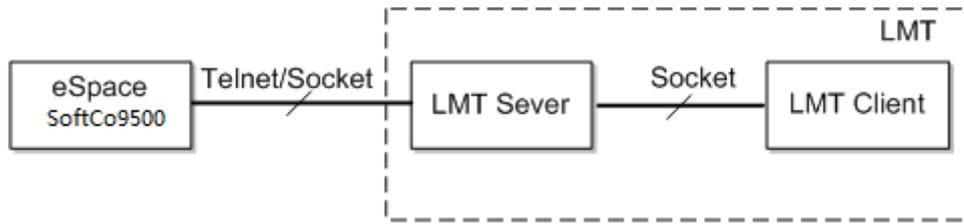
5.1.1 System Architecture and Networking Mode

This topic describes the LMT system architecture and networking mode.

System Architecture

Figure 5-1 shows the system architecture of the LMT.

**Figure 5-1** System architecture of the LMT

- LMT server

  The LMT server is installed on an independent computer and connects to an eSpace SoftCo9500 using Telnet or Socket. It can manage alarms, performance data, devices, and logs for the eSpace SoftCo9500. It displays related information to end users on the LMT client.

- LMT client

  The LMT client is installed on an independent computer and communicates with the LMT server using TCP. It provides the alarm, configuration, device, log, and upgrade management functions.

Networking Mode

Figure 5-2 shows the networking between the LTM system and eSpace SoftCo9500.

Figure 5-2 Networking
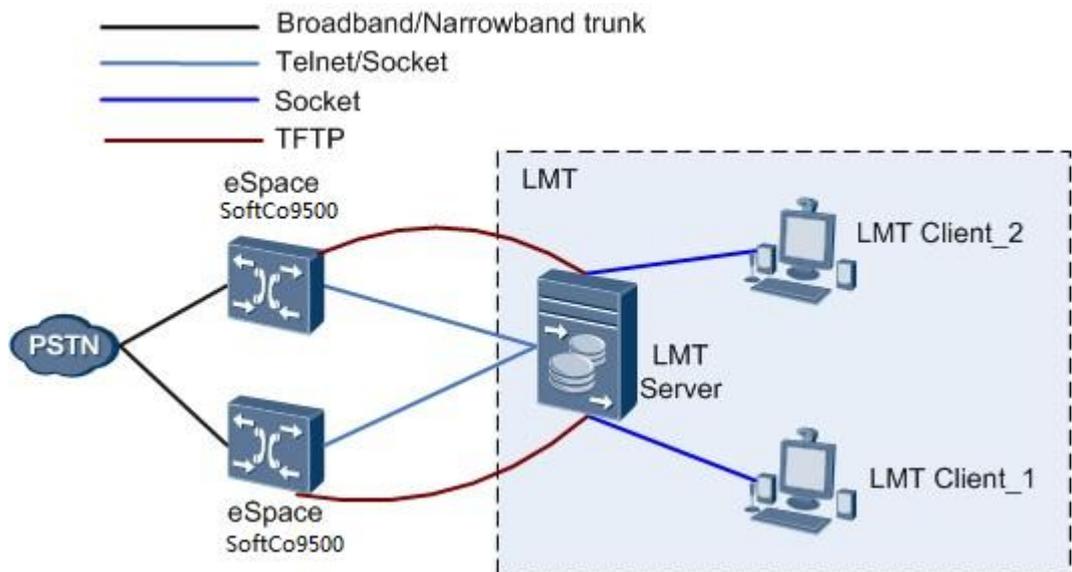
The relationships between the LMT client, LMT server, and eSpace SoftCo9500 are as follows:

- An LMT server and client can be installed on different computers or the same computer.
- An LMT client can be connected to only one LMT server, while an LMT server can be connected to a maximum of four LMT clients.
- An LMT server can manage multiple eSpace SoftCo9500, while an eSpace SoftCo9500 can be managed by only one LMT server.

5.1.2 Management Functions

The LMT provides the following functions: alarm management, surveillance management, performance management, configuration management, security management, signaling tracing, and fault information collection by one click, and   upgrade management.

Table 5-1 lists the LMT main functions.

Table 5-1 LMT main functions

| Management Function	Subfunction
Alarm management	- Displays and queries real-time alarms - Displays and queries historical alarms - Queries alarms by search criteria such as alarm severity, alarm type, alarm occurrence time, and alarm clearance time. - Collects statistics on alarm by level - Sets alarm tones - Acknowledges and clears alarms - Synchronizes and filters alarms - Exports alarms
Surveillance management	- Monitors the board status - Monitors the CPU usage - Monitors the E1/T1 port status - Monitors channel statuses - Monitors trunk link statuses
Performance management	- Views DSP status - Views the status of the CPU and memory - Views the status of E1/T1 circuits
Configuration management	- Adds, delets, modifies, and logs in to the eSpace SoftCo9500 - Configures users, services, and trunks through the wizard - Configures data and queries status through the command navigation tree - Manages patches and versions
Signaling tracing	- Traces and parses the SIP broadband signaling - Traces and parses the SS7, PRA, R2 and QSIG narrowband signaling - Reports the traced messages with a user phone number being the tracing condition - Manages tracing tasks - Displays messages and signaling in real time - Automatically saves messages and signaling - Queries historical messages and signaling

Management Function	Subfunction
	• Deletes messages or signaling
Security management	• Manages users • Manages system run logs and user operation logs
One-click fault information collection	• Collects the CPU usage • Collects the memory usage • Collects the status information about login users • Collects blade statuses • Collects trunk link statuses • Collects the black box information
Upgrade management	• Uploads eSpace SoftCo9500 version files • Backs up version files and patches • Upgrades the eSpace SoftCo9500 and the **data.bin** file • Rolls back the eSpace SoftCo9500 • Generates upgrade logs • Displays the upgrade progress dynamically

5.2 Local and Remote Maintenance

Users can remotely or locally maintain the eSpace SoftCo9500 using the LMT.

Users can Telnet to the service network port of the eSpace SoftCo9500 from a LMT and then configure or commission the system. Users can also connect an LMT directly to the serial port of the eSpace SoftCo9500, use the Super Terminal tool to set up a connection between the LMT
and the eSpace SoftCo9500, and then configure or commission the system. Figure 5-3
shows the networking.

Figure 5-3 Networking
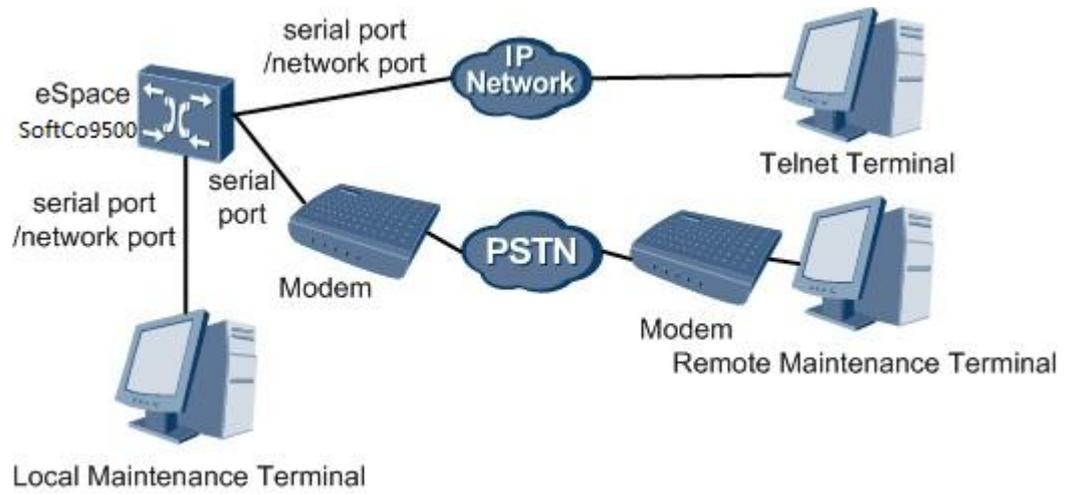
6 Technical Specifications

About This Chapter

This topic provides the key technical specifications of the eSpace SoftCo9500.

6.1 Physical Specifications

This topic describes the dimensions, weight, power supply settings, power consumption, and running environment of the eSpace SoftCo9500.

6.2 Performance and Capacity

This topic describes the performance and capacity for the eSpace SoftCo9500.

6.3 Interfaces and Protocols

This topic describes the interfaces and protocols of the eSpace SoftCo9500.

6.4 Standard Compliance

This topic describes the Electromagnetic Compatibility (EMC) and security standards that the eSpace SoftCo9500 complies with.

6.1 Physical Specifications

This topic describes the dimensions, weight, power supply settings, power consumption, and running environment of the eSpace SoftCo9500.

Table 6-1 lists dimensions, weight, power supply settings, power consumption, and running environment of the eSpace SoftCo9500.

Table 6-1 Physical specifications of the eSpace SoftCo9500

Item	Indicator
Dimensions	264mm (Height) x 436mm (Width) x 420mm (Depth)(19 inch standard network rack compatibility)
Weight	31kg to 32kg
Maximum Power Consumption in Full Configuration	400W

Item	Indicator
Input Voltage (AC power)	100V to 240V AC
Power Frequency (AC power)	50Hz/60Hz
Maximum output power (AC power)	500W
Input Voltage (DC power)	–38V to 75V DC, typical value:–48V DC
Input electricity (DC power)	15A
Maximum output power (DC power)	500W
Storage temperature	–40 ℃ to +70 ℃
Long-term operating temperature	0 ℃ to 45 ℃
Short-term operating temperature	–5 ℃ to +55 ℃(Short-term running means that the device works nonstop for not greater than 48 hours and the cumulated working time of the device in a year does not exceed 15 days)
Relative humidity	5% to 95% (non-condensing)
Ambient particulate concentration	less than 180 mg/m^3

6.2 Performance and Capacity

This topic describes the performance and capacity for the eSpace
SoftCo9500. Table 6-2 lists the performance and capacity for the eSpace
SoftCo9500.

Table 6-2 Performance and capacity

Item	Specification
Max. users	10,000
Max. concurrent intra-office calls	2000
Max. capacity of digital trunks	900 channels(R2 trunks: 680 channels)
Max. capacity of SIP trunks	2000
BHCC	180K
Conference processing capability	Supports a maximum of concurrent 320 conferences and 960 parties when eight MRS boards are configured. A single conference supports a maximum of 120 parties. Each MRS board supports a maximum of 40 conferences and 120 parties.

Item	Specification
Max. number of concurrent SRTP calls	Each MRS board supports a maximum of 150 channels
Max. number of SIP trunks encrypted by TLS	1600

6.3 Interfaces and Protocols

This topic describes the interfaces and protocols of the eSpace SoftCo9500.

Interfaces

The eSpace SoftCo9500 series products provide FE interfaces, E1/T1 digital trunk interfaces, and debugging interfaces. Table 6-3 lists the external interfaces of the eSpace SoftCo9500 series products.

Table 6-3 External interfaces

Interface	Provider	Number of Interfaces	Function
FE interface	IP PBX-SMCU	Three	This interface connects an eSpace SoftCo9500 to the LAN and functions as an external IP service interface. The eSpace SoftCo9500 can work in single-network-port, dual-network-port mode,
E1 interface	SC1-DTU-4	Four E1/T1 interfaces per board	This interface connects an eSpace SoftCo9500 to digital trunks of an upper level office, for example, LE.
	SC1-DTU-8	Eight E1 interfaces per board	This interface connects an eSpace SoftCo9500 to digital trunks of an upper level office, for example, LE.
FXO interface	SC1-ATU-8	8 FXO	This interface connects an eSpace SoftCo9500 to simulant trunks of an upper level office, for example, LE.
Debugging interface	IP PBX-SMCU	Two per board	This interface is used to configure and debug a device. One debugging interface is an Ethernet interface andthe other one is an RS-232 serial interface (RJ45 connector).

Signaling and Protocols

Figure 6-1 shows the distribution of main signaling and protocols.
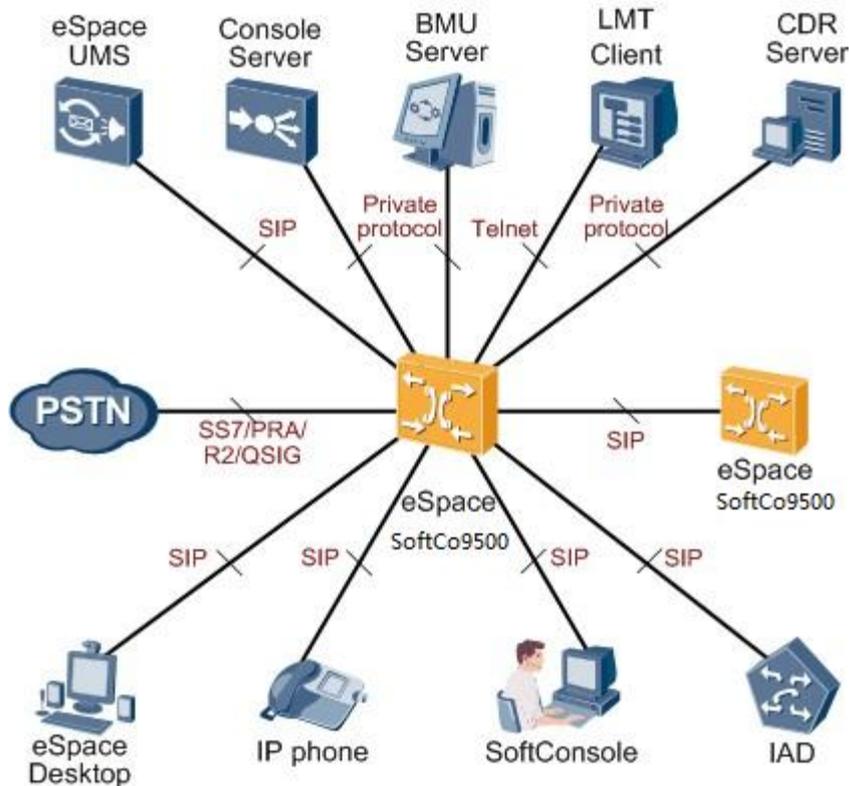
Figure 6-1 Distribution of signaling and protocols

Table 6-4 lists the signaling and protocols supported by the eSpace SoftCo9500.

Table 6-4 Signaling and protocols

Signaling/Protocol	Function
SS7	Enables the communication between eSpace SoftCo9500 and switches supporting the SS7 signaling andenables eSpace SoftCo9500 to access E1 trunks
PRA	Enables the communication between eSpace SoftCo9500 and the switches on the ISDN andenables eSpace SoftCo9500 to access E1/T1 trunks provided by the switches on the ISDN.
R2	Enables the communication between eSpace SoftCo9500 and traditional switching devices andenables eSpace SoftCo9500 to access the E1 trunks provided by the traditional switching devices.
QSIG	Enables the communication between eSpace SoftCo9500 and switches supporting the QSIG signaling andenables

Signaling/Protocol	Function
	SoftCo9500 to access E1 trunks provided by the switches.
SIP(RFC3261)	Enables the interconnections between eSpace SoftCo9500s and connects-eSpace SoftCo9500 to IADs and SIP multimedia packet terminals.
Telnet	Connects LMTs or remote operation and maintenance terminals to eSpace SoftCo9500s.
TFTP	Loads programs and configuration data from the TFTP server.
SFTP	SFTP is used for the CDR access which support SSH encryption
SNTP	Allows eSpace SoftCo9500s to provide the time synchronization service for the client (IP terminal and ...
SNMP(v2, v2c,v3)	Simple Network Management Protocol, which is used by the eSpace SoftCo9500 to communicate with the UCEMS.
RFC2916	E.164 number and DNS (Domain Name Server)
IPv4 and IPv6	Support IPv4 and IPv6 dual stack.

6.4 Standard Compliance

This topic describes the Electromagnetic Compatibility (EMC) and security standards that the eSpace SoftCo9500 complies with.

Table 6-5 lists the standards that the eSpace SoftCo9500 complies with.

Table 6-5 Standard compliance

Item	Standard
EMC	• EN 55022: 1998 + A1: 2000 + A2: 2003 • CISPR 22: 2003 • EN 55024: 1998 + A1: 2001 + A2: 2003 • CISPR 24: 1997 + A1: 2001 + A2: 2002 • ETSI EN 300 386 V1.3.3: 2005 • AS/NZS CISPR 22: 2006
Security	• IEC 60950-1:2005 • EN 60950-1:2006 • CAN/CSA C22.2 No.60950-1/UL 60950-1 • AS/NZS 60950.1-2003 • GB4943

6.5 IP PBX functions supported by the eSpace SoftCo9500

Function	Description
Subscriber service permission control	Operators can add or cancel service permission for subscribers in the operation and maintenance system or service management system.
Local phone number query	A local subscriber can dial a special service prefix such as *125 to query the local phone number.
Calling line identification presentation (CLIP)	If calling parties allow their own numbers to be displayed on phones and called parties enable this function, the calling numbers are displayed on the phones of the called parties.
CLIP restriction	If a calling party enables this function, the calling number is not displayed on called parties' phones.
CLIP overstep	If a called party enables this function, calling numbers are displayed on the called party's phone regardless of whether the calling parties enable the CLIP restriction function or not.
Call forwarding - unconditional	All calls to a subscriber who enables this function are automatically transferred to the number preset for the subscriber regardless of subscriber status.
Call forwarding - busy	All calls to a subscriber who enables this function are automatically transferred to the number preset for the subscriber when the subscriber is busy.
Call forwarding - no reply	All calls to a subscriber who enables this function are automatically transferred to the number preset for the subscriber if the subscriber does not answer the calls within a period. The period is configurable.
Call forwarding - offline	All calls to a subscriber who enables this function are automatically transferred to the number preset for the subscriber when the subscriber is offline.
Call transfer	A subscriber can transfer an ongoing call to a third party and then quit the conversation.
Call hold	A subscriber can hold the current call and then resume the call when necessary. When the call is held, the other party can hear call waiting music.
Call waiting	If a subscriber who enables this function is in a conversation when another subscriber calls the subscriber, the subscriber is notified of the incoming call. The called subscriber can accept, reject, or ignore the incoming call.
Abbreviated dialing	If a subscriber enables this function, other subscribers can call the subscriber by dialing a two-digit number configured by the subscriber instead of the subscriber number.
Outgoing call barring	A subscriber can dial a number on a phone to restrict permission to make outgoing calls on the phone, for example, to restrict permission to make toll calls.
Direct dialing in (DDI)	An outbound subscriber can directly call an inbound subscriber who enables this function by dialing the long number of the inbound subscriber.
Do not disturb	If a subscriber does not want to be disturbed by incoming calls, the subscriber can enable this function. The subscribers who call this subscriber hear do-not-disturb announcements.
Alarm clock	After a subscriber enables this function, the subscriber' phone can ring at preset time.

Function	Description
Absent subscriber	A subscriber can enable this function when unavailable to answer calls. Other subscribers who call the subscriber hear an announcement indicating that the subscriber is unavailable.
Registered service cancellation	A subscriber can cancel all services registered by the subscriber.