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OfficeServ 7200

System Description

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INTRODUCTION

Purpose

This manual describes the basic overview, hardware configuration, specification, and function of Samsung OfficeServ 7200.

Document Content and Organization

This manual consists of 4 Chapters, an Annex and an Abbreviation as follows:

CHAPTER 1. Introduction to the OfficeServ 7200

This chapter provides a general description for the feature and main function, and brief introduction for the system structure, interface, and programming introduce the system structure of OfficeServ 7200.

CHAPTER 2. Hardware of the OfficeServ 7200

This chapter describes the hardware feature, cabinet configuration, board function, and board pattern of OfficeServ 7200. In addition, this chapter also describes various terminals, wireless LAN equipments, and supplementary equipments, which are used by connecting to OfficeServ 7200.

CHAPTER 3. Specifications of the OfficeServ 7200

This chapter provides the detailed specification such as the OfficeServ 7200 capacity, electrical specification, power resource specification, and equipment specification.

CHAPTER 4. Functions of the OfficeServ 7200

This chapter describes the call function, VoIP function, data function, web management, and the system management function as provided by OfficeServ 7200.

ANNEX A. Open Source Announcement

ABBREVIATION

Abbreviation provides the acronyms used in this manual and their full names.

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Conventions

The following types of paragraphs contain special information that must be carefully read and thoroughly understood. Such information may or may not be enclosed in a rectangular box, separating it from the main text, but is always preceded by an icon and/or a bold title.

WARNING

Provides information or instructions that the reader should follow in order to avoid personal injury or fatality.

NOTE

Indicates additional information as a reference.

Reference

OfficeServ 7200 Installation Manual

Describes the necessary conditions required for installing the system, and the system checking and operating procedure.

OfficeServ 7200 Service Manual

Describes the programming for the system overview, specification, hardware circuit configuration and feature, troubleshooting, maintenance.

OfficeServ 7200 Data Server User Guide

Describes the data server, which is the OfficeServ 7200 application software and describes the installation and operation procedure.

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Revision History

EDITION	DATE OF ISSUE	REMARKS
00	11. 2003.	Original
01	05. 2005.	- Modifying the brand name (Before: OfficeServ SME, After: OfficeServ 7200) - Modifying edit format (Deleting ED at page header) - Modifying cover page design and overall edit format and improving sentence expression - Introduction: Modifying the related documents - Chapter 1: Modifying and supplementing the system function Adding the system structure description - Chapter 2: Modifying various boards and ports specification, LEDs of various boards Modifying the rear side of rack, slot configuration and option board contents Adding RCM2, 8COMBO, 16SLI2, 16DLI2, LIM-P and SVMi-20E board Complementing wireless LAN base station - Chapter 3: Adding external rectifier Modifying system circuit capacity, ISDN transmission attribute and VDSL signal method Modifying system specification Adding abbreviation
02	11. 2008.	- Changed the name of the LIM-P board to ‘PLIM’. - Added PLIM2, 8TRK2, 16TRK,TEPRIa, 4HTRK, MGI16, 8SLI2, 8COMBO2 - Added GPLIM, GPLIMT, GSIM, GSIMT - Deleted 4DSL, WBS24, 4WLI, WIP-5000M due to product discontinuity - Added SMT-R2000 and SMT-W5100 - Deleted MCP due to product discontinuity - Added MP20
03	04. 2009.	Added Turkey RoHS announcement
04	11. 2009.	- Manual name changed from ‘General Description Guide’ to ‘System Description’. - Added MP20S, UNI, 2BRM, 4TRM , 4DLM, 4SL2, 4SLM, 4SWM, and OAS - Deleted TEPRI and MGI due to product discontinuity
05	05. 2010.	- Deleted 8SLI, 16DLI, 16SLI, 8HYB, 8HYB2, 8COMBO, GPLIM, GSIM, 4SWM, MFM, RCM due to product discontinuity - Added CNF24, IRM

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ABBREVIATION I

A ~ C I
D ~ I II
K ~ P III
Q ~ V IV
W V

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CHAPTER 1. Introduction to the OfficeServ 7200

This chapter describes the features and major functions of the OfficeServ 7200 and introduces the system architecture, interfaces, and programming.

1.1 Introduction to the System

The OfficeServ 7200 is a communication device, which is the most suitable for small offices where less than 50 to 100 subscriber lines are used. Also, the OfficeServ 7200 allows the users to receive voice, data, and Internet services, which means that the OfficeServ 7200 makes voice calls, and sends/receives data using data networks.
The users can easily make use of a variety of phone functions and applications on various platforms such as digital phones, IP phones, mobile phones, and PC servers.

1.1.1 Major Functions

The major functions and features of the OfficeServ 7200 are described below:

Integrated Communication Environment

The OfficeServ 7200 makes voice calls and sends/receives data by using the LAN/WAN modules. The users can use the integrated wire/wireless platform (phones, PCs, servers, mobile phones, or peripherals) to make communications easy.

SNMP Agent Function

SNMP agent module is equipped in MP 20 and MP20S, supports NMS (Network Management System). MP 20 and MP20S can connect NMS, especially the OfficeServ NMS of Samsung with SNMP.

Higher Quality IP Phone

The OfficeServ 7200 ensures the Quality of Service (QoS) of the voice calls depending on the priorities and grouping of data and voice packets.

- Layer 2 QoS: Priority Processing (802.1p), VLAN (802.1q)
- Layer 3 QoS: Class Based Queuing (CBQ), RTP Priority Queuing, or the on-demand management of the bandwidth Wide Area Network (WAN)

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WAN/LAN Functions

The Wide Area Network (WAN) and Local Area Network (LAN) interface modules are installed in the OfficeServ 7200; thus, data can be sent/received via the interface of the 10/100 BASE-T in both the external Internet and the internal Intranet without any data equipment.
When interworking with the WAN Interface Module (WIM), the LAN Interface Module (LIM) is operated as the managed LAN mode. At this time, WIM is mounted in the slot 1 and LIM is mounted in the slot 2 in the same rack.
If the LIM module does not interwork with WIM, and is used in any other slot, the LIM module is operated as the unmanaged LAN switch mode.
The PLIM module is the switch that provides the Power over Ethernet (PoE) function.

Wireless LAN Services

The OfficeServ 7200 offers a wireless LAN solution for both wire and wireless services at offices. The OfficeServ 7200 uses an Access Point (AP), which supports handoff and QoS. Because the OfficeServ 7200 uses a wireless LAN base station, it allows the users to make wire/wireless voice/data communications or access the Internet without establishing the LAN. Also, an efficient and convenient working environment can be made at any time or place because sophisticated mobile stations are used for the OfficeServ 7200.

A Variety of Application Solutions

The OfficeServ 7200 offers a variety of application solutions such as OfficeServ News, OfficeServ EasySet, Internet Call Center, R-NMS, internal board-type voice mail solutions, integrated facsimile servers, and digital integrated recording systems.

NOTE

About Integrated and References

- 'Integrated' means that the OfficeServ 7200 interworks with the external solution server and the system and server perform one integrated function.
- For detailed information about how to use each application solution, refer to the User's Guide of each application.

Easy Installation and Expandability

The OfficeServ 7200 can be easily installed as follows: the basic cabinet and expansion cabinet of the OfficeServ 7200 are mounted on the 19-inch rack. Multiple service boards can be additionally installed in universal slots of the cabinets.

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1.1.2 System Architecture

The OfficeServ 7200 with MP20 is configured with a basic cabinet and expansion cabinet mounted in a 19-inch rack. The Main Control Processor (MP20) is installed into the basic cabinet and manages the entire OfficeServ 7200. It performs switching, processes signals, or manages the phones. The expansion Local Control Processor (LCP), which is the sub-control part, is installed into the expansion cabinet, controls boards, or sends/receives data to/from the MP20. The OfficeServ 7200 with MP20S is configured with only a basic cabinet mounted in a 19-inch rack. The Main Control Processor (MP20S) is installed into the basic cabinet and manages the basic cabinet of OfficeServ 7200.
The other components are various interface boards, power modules, and fans.

The service configuration diagram of the OfficeServ 7200 is shown in the figure below:

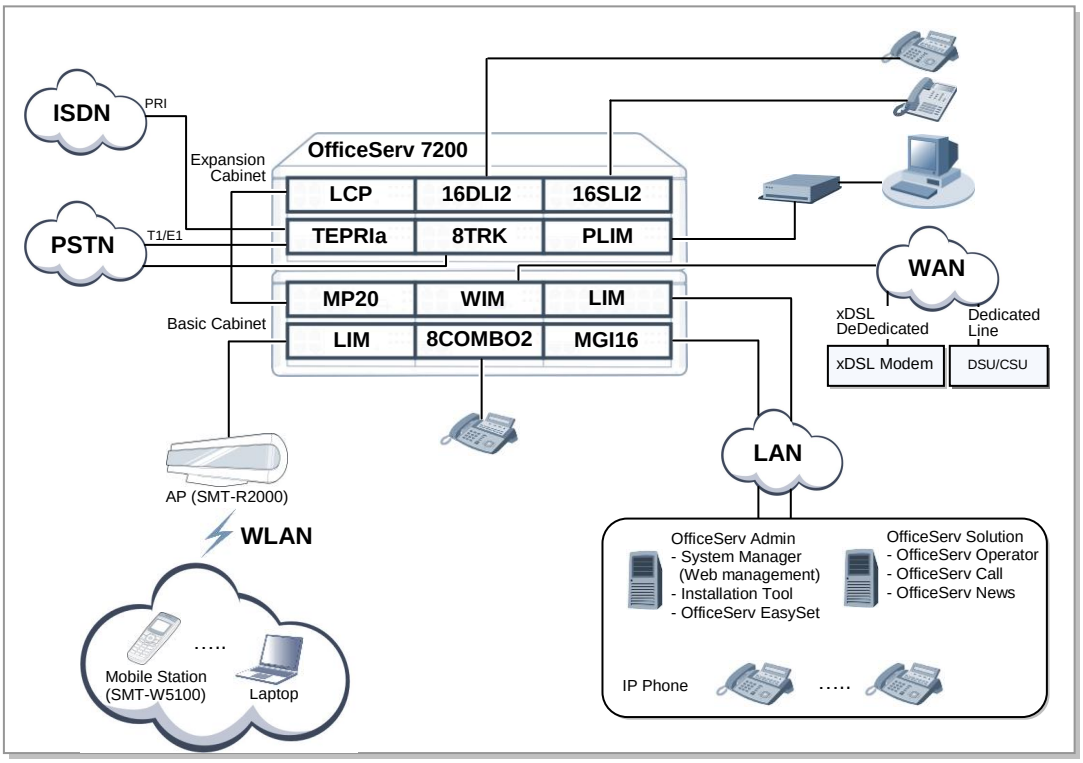

Figure 1.1 Service Structure of the OfficeServ 7200 with MP20

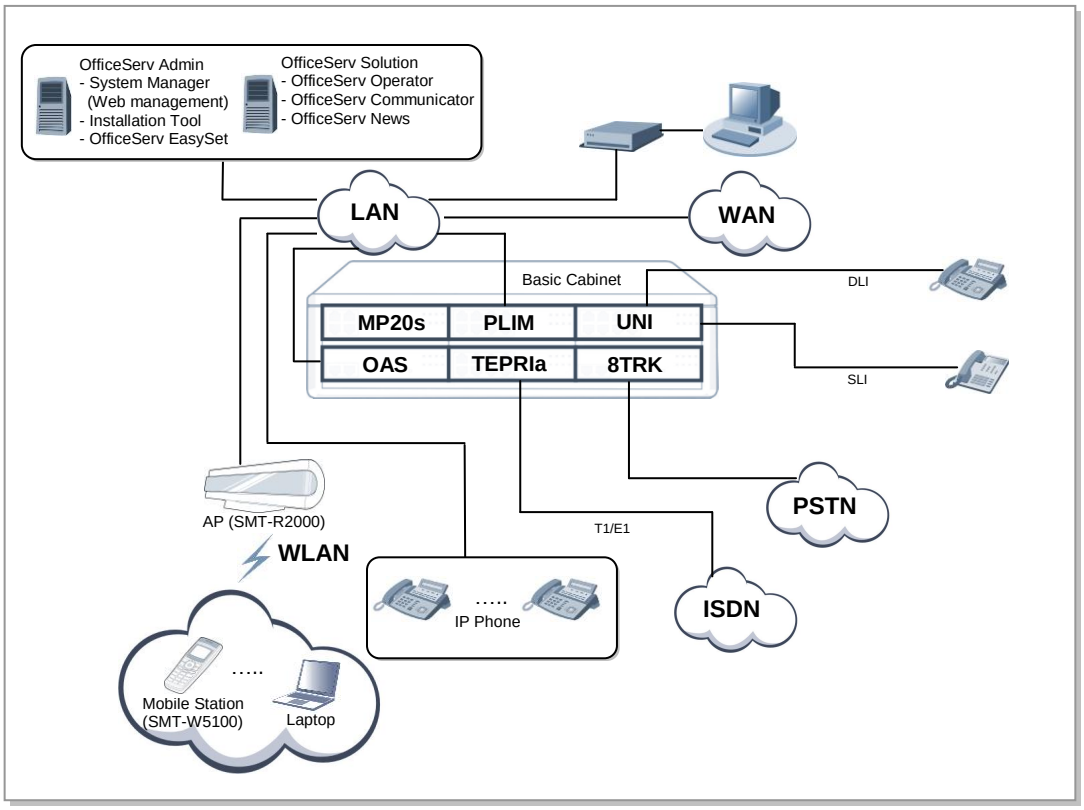

Figure 1.2 Service Structure of the OfficeServ 7200 with MP20S

Voice Trunk Line Part

The voice trunk line part is configured with digital trunk lines and analogue trunk lines. The TEPRI modules interface the E1, T1, or PRI digital trunk lines and send/receive voice data through the trunk lines**.** They transmit the voice data of 64 Kbps per channel. 8 TRK (8 Trunk) provides the Caller ID (CID) Path function and provides the Polarity Reverse Signal (PRS) and Metering Pulse Detection (MPD) function as options. 8 TRK transmits/receives voice by the analogue office line, and transmits 64 Kbps data information per each channel. 8 TRK2/16 TRK (8 Trunk2/16 Trunk) provides the Caller ID (CID) Path function and provides the Polarity Reverse Signal (PRS) detection Metering Pulse Detection (MPD) function is not supported. If 4TRM option board is mounted on the UNI board, it operates as a voice trunk board and supports an analogue trunk line, and provides the CID & PRS.

Voice Station Part

The voice station part is configured with a Digital Line Interface (DLI), which interfaces digital voice stations, and Subscriber Line Interface (SLI), which interfaces analogue voice stations. Multiple DLI and SLI boards can be mounted in any slots of the main or expansion cabinet depending on the numbers of analogue/digital voice stations. 16DLI2 and 8DLI are Digital Line interface boards. 16SLI2, 16MWSLI, and 8SLI2 are analogue Subscriber Line interface boards. In addition, the hybrid-type 8COMBO2, which contains interface circuits for analogue and digital stations. The UNI board equipped with 4SLM and 4DLM operates as a voice station board in the same way.

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Data Transmitting Part

The data module is configured with the WIM, which is a WAN interface board, and the LIM, PLIM, PLIM2, GPLIMT and GSIMT which is a LAN interface board.
The WIM sends/receives data to/from the external Internet and provides ports for connecting the internal network with a variety of external interfaces.
The LIM sends or receives data to or from the internal Intranet and provides an interface of 10/100 BASE-T. Also, the LIM functions as a switching hub. The PLIM and the PLIM2 provides a PoE functionality, a 10/100 BASE-T interface and a switching hub functionality.
The GPLMT provides a Layer 2 LAN interface to support the internal data network, as well as a 10/100 BASE-T Fast Ethernet (FE) and a 1000 BASE-TX interface for the data transmission. The GPLIMT can also be self-operated as a Managed Switch, regardless of the WIM installation.

NOTE

Board Name Abbreviations

- WIM: WAN Interface Module
- LIM: LAN Interface Module
- PLIM: PoE LAN Interface Module
- PLIM2: PoE LAN Interface Module version 2
- GPLIMT: Gigabit PoE LAN Interface Module TX
- GSIMT: Gigabit Switch Internet Module TX

Voice Application Service Part

The voice application module consists of the VoIP that transmits the voice to the data network. The MGI16 offers the VoIP function by converting voice into data.
The OAS offers the MGI, MFR, MPS function.
SVMi-20E provides the voice recording, AA, and E-mail send function to 12 users at the same time by one SVMi-20E per system, as the voice mail process board of the built-in type.

Configuration of the Application

The OfficeServ 7200 provides the application software below:
The OfficeServ Solution and OfficeServ Admin have separate servers.

- OfficeServ Solution (CTI, OfficeServ Operator)
- OfficeServ Admin (Web Management, Installation Tool, OfficeServ EasySet)

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1.2 Interfaces

This section describes the interfaces between the sub-modules of the OfficeServ 7200 and the ones between the VoIP elements.

1.2.1 Interfaces between the Sub-Modules

Table 1.1 Interfaces between the Sub-Modules

Type	Classification	Interface
LIM/PLIM/PLIM2 Interface	Physical Connection	IEEE 802.3, 10 BASE-T, IEEE 802.3u 100 BASE-T
	Connector Type	RJ-45
WIM Interface	Physical Connection	IEEE 802.3, 10 BASE-T, IEEE 802.3u 100 BASE-T, V.35
	Connector Type	RJ-45, serial 26-pin connector (non-standard cable)
	Access Protocol	PPPoE, PPP, DHCP, HDLC, Frame Relay
GSIMT Interface	Physical Connection	IEEE 802.3z 1000 BASE-SX/LX, IEEE 802.3ab 1000 BASE-TX, IEEE 802.3 10 BASE-TX, IEEE 802.3u 100 BASE-TX
	Connector Type	RJ-45,SFP (Small Form-factor Pluggable Connector)
GPLIMT Interface	Physical Connection	IEEE 802.3 10 BASE-TX, IEEE 802.3u 100 BASE-T, IEEE 802.3ab 1000 BASE-TX
	Connector Type	RJ-45, SFP (Small Form-factor Pluggable Connector)
PSTN Interface TEPRIa	Physical Connection	T1, E1, Foreign Exchange Office (FXO)
	Connector Type	RJ-45
	Access Protocol	T1, E1, Loop Start
ISDN Interface TEPRIa/4BRI /2BRM	Physical Connection	ISDN PRI, BRI
	Connector Type	RJ-45
	Access Protocol	ISDN PRI, BRI
xDSL/Cable Modem Interface	Physical Connection	IEEE 802.3u 100 BASE-T Ethernet
	Connector Type	RJ-45
	Access Protocol	PPPoE, DHCP
Voice Terminal Interface	Analog Phone	Foreign Exchange Station (FXS)
	Digital Phone	Samsung digital phone
	Wireless LAN Access Point (AP)	802.11b
Interface between the call server and data server	Physical Connection	100 BASE-T Ethernet
	Signal Processing	TCP/IP
	Access Protocol	UDP IPC

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Table 1.1 Interfaces between the Sub-Modules (Continued)

Type	Classification	Interface
Interface between the call server and SIP server	Physical Connection	100 BASE-T Ethernet
	Signal Processing	SIP
	Access Protocol	User Agent (UA) to UA
Interface between the call server and system manager	Physical Connection	100 BASE-T Ethernet
	Signal Processing	TCP/IP
	Access Protocol	TCP, UDP IPC
Interface between the SNMP Agent and SNMP Manager	Physical Connection	100 BASE-T Ethernet
	Signal Processing	TCP/IP
	Access Protocol	SNMP

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1.2.2 Interfaces between the VoIP Elements

The OfficeServ 7200 provides a variety of VoIP interfaces below:

- VoIP networking
- H.323 VoIP gateway
- SIP VoIP gateway
- SIP server
- System SIP User Agent (UA)
- IP phones
- Standard SIP phones
- Wireless LAN phones

The interface interworking standards between the VoIP elements based on the signal processing are as follows:

- Proprietary TCP IPC
- SIP UA-to-UA
- UA-to-Server

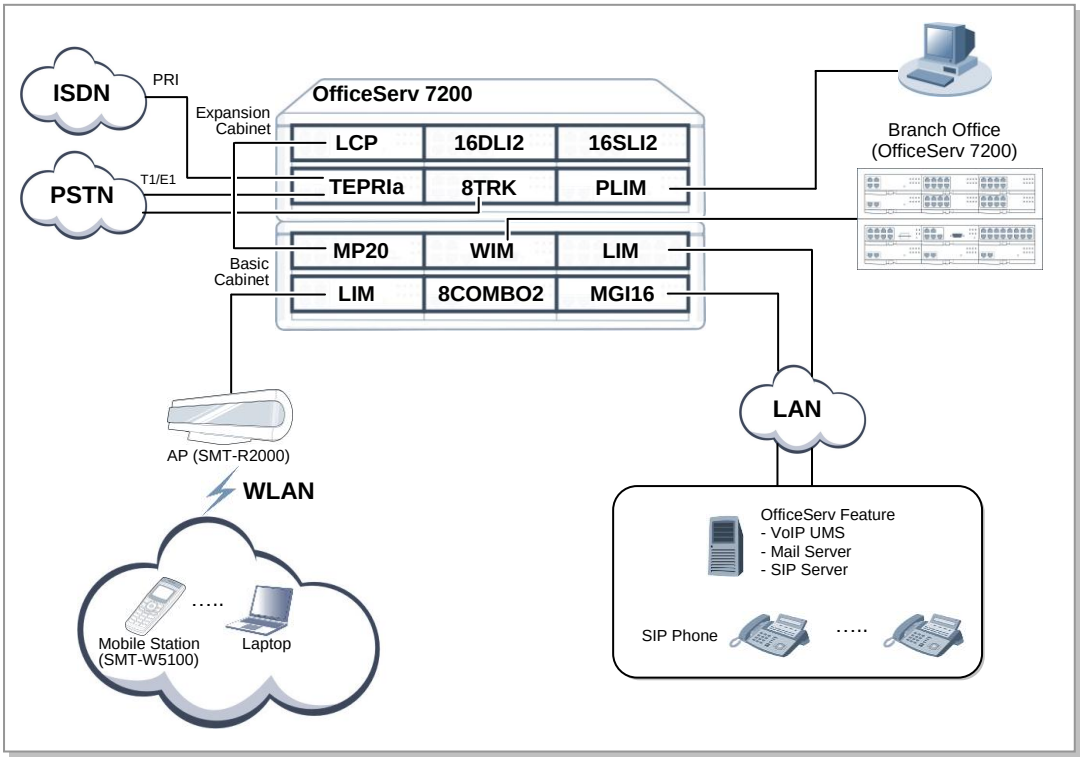

Figure 1.3 Interfaces Between the VoIP Components

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1.3 Programming

There are three methods for programming in OfficeServ 7200. One is using the Man Machine Communication (MMC) program, another is using the Installation Tool, and the other is using Web Management. Using Web Management is only available for OfficeServ 7200 with MP20S.
The MMC program can change the data value used for the system operation program. The MMC program is categorized into three levels, which are technician, operator, and subscriber. Depending on the levels, some MMCs can be programmed by the subscribers while some MMCs can not.
A password is required for the programming.

Technician-Level Programming

All programs can be programmed.
Programming can be made in any of the stations in the OfficeServ system, however in some cases, programming can be only made in a station.

Operator-Level Programming

A technician can only program the programs specified in the ‘Program 802 Range Specification of the Operator Program’.
Programming can be made in any stations in the tenant group, however in some cases, programming can be only made in a station.

Subscriber-Level Programming

Programming can be only made for the subscriber program.

Installation Tool

The Installation Tool is an application that provides various functions necessary for system maintenance. The system maintenance software is installed on a PC for programming. You can use the Installation Tool when you need to install a new system component or change a system component or modify the database.

Web Management

The Web Management is an application that provides various functions necessary for system maintenance. Because it has been embedded in system, you don’t need to install. You can use it when you need to install a new system component or change a system component or modify the database.

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CHAPTER 2. Hardware of the OfficeServ 7200

This chapter introduces the hardware features, cabinet configuration, and board functions and configuration of the OfficeServ 7200. Also, this chapter describes the terminals, wireless LAN equipment, and additional equipment available in the OfficeServ 7200.

2.1 Hardware Features

The features of the OfficeServ 7200 hardware are described below:

Reliability

The materials and parts used for the OfficeServ 7200 hardware are firm and stable. Also, they meet with the mechanical and electrical features needed for a communication system.

- The cabinet of the OfficeServ 7200 complies with the industry standards (19 inches) and is assembled with firm and stable metal welding.
- The OfficeServ 7200 hardware does not generate poisonous or corrosive gas, which might do harm to the human body or affect the system operation.
- The OfficeServ 7200 hardware is made of materials that meet Electro-Magnetic Compliance (EMC) Standard.
- The OfficeServ 7200 hardware has a fail-safe to prevent the system from being damaged due to an over-voltage.

Modularity

The functions of the OfficeServ 7200 hardware are modularized.

- Capacity can be expanded or functions can be changed in each module without stopping the services for the existing subscribers.
- Each module can be easily installed or removed in a plug-in way.

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Maintenance

The OfficeServ 7200 hardware is designed to be maintained with ease and safety.

- The specifications of the 19-inch rack are as follows. The rack is designed to maintain sufficient strength.
- The installers or maintainers can connect cables easily because all external ports exist on the front panel.
- The front of each module has an LED that indicates failures or the operation status so that the operator can easily identify system failures.
- The back of the rack has a grounding lug to which an anti-static wrist strap for preventing static electricity can be connected when working on the system.
- The OfficeServ 7200 hardware is designed to prevent electronic devices from being damaged due to an external environment while installation or maintenance operation is being made.

Fire Resistance and Heat Processing

The OfficeServ 7200 hardware is made of fire-resistant materials and parts to protect the hardware from fire.
The OfficeServ 7200 hardware is designed not to affect the system performance due to heat generated from inside of the system.

- Specific heat-generating parts of the hardware are blocked in order not to affect the temperature-sensitive components.
- Two 80mm fans for cooling are installed to extract internal air.
- The parts installed into the modules are located based on heat distribution.

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2.2 Cabinet Configuration

The OfficeServ 7200 consists of two cabinets (basic/expansion cabinet) mounted on the 19-inch rack and a feature server that operates externally.
The MP20, which is the main control part and is installed into the basic cabinet, manages the entire OfficeServ 7200, performs switching, processes signals, and manages the subscriber terminals. The LCP, which is the minor control part and is installed into the expansion cabinet, controls the line boards and sends/receives information to/from the MP20.In addition, line boards, power, and cooling fans are in the OfficeServ 7200 cabinets.

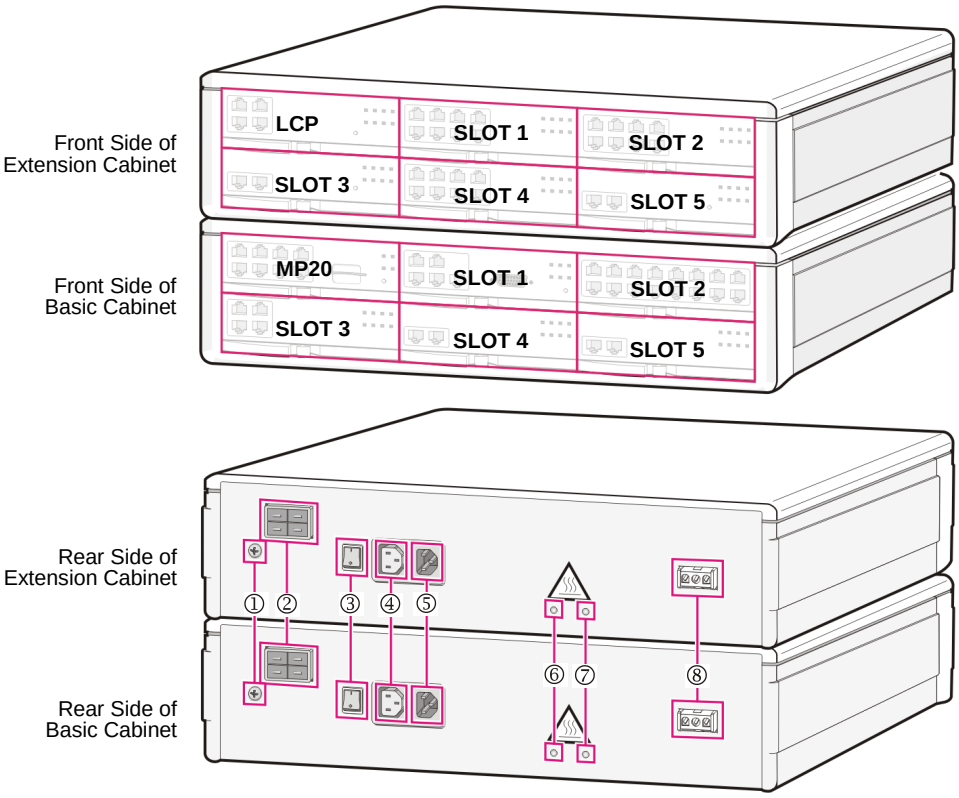

Figure 2.1 Cabinet Configuration of the OfficeServ 7200 with MP20

The OfficeServ 7200 with MP20S is configured with only a basic cabinet mounted on a 19-inch rack. The Main Control Processor (MP20S) is installed into the basic cabinet, manages the basic cabinet of OfficeServ 7200 and performs switching, processes signals, and manages the subscriber terminals.

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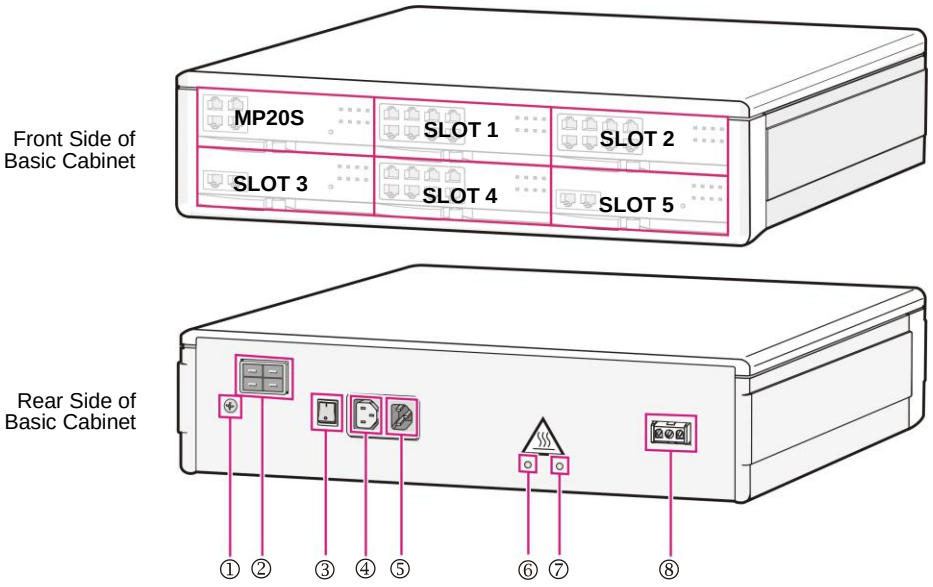

Figure 2.2 Cabinet Configuration of the OfficeServ 7200 with MP20S

Rear Side Configuration of Cabinet	Function
① Ground Lug	Lug for grounding system communication
② External Rectifier Socket	External DC power supply socket for PoE.
③ Power Switch	Turn on/off the OfficeServ 7200 power.
④ Power Connection Connector between Basic Cabinet and Extension Cabinet	The connector to supply the supplied power to the external cabinet.
⑤ Power Input/Output Connector	The connector to connect power cable.
⑥ AC LED	LED is turned on when AC power is entered.
⑦ DC LED	LED is turned on when DC power is properly output.
⑧ Battery Connection Socket	The socket to connect the external battery.

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2.2.1 Slot Configuration

There are 6 slots that are available for mounting boards in each of the basic cabinet and extension cabinet. The following table shows mountable boards for each slot of the cabinet.

Table 2.1 Boards that is available to mount in slots

Cabinet	Slot	Mountable Boards
Basic Cabinet (OfficeServ Access)	Slot 0	MP20 , MP20S
	Slot 1	All boards except for MP20, MP20S, LCP, TEPRIa, LIM, PLIM, PLIM2, GPLIMT, and GSIMT
	Slot 2	All boards except for MP20, MP20S, LCP, TEPRIa and WIM
	Slot 3, 4, 5	All boards except for MP20, MP20S, LCP, and WIM
Expansion Cabinet (OfficeServ Expansion)	Slot 0	LCP only
	Slot 1	All boards except for MP20, MP20S, LCP, TEPRIa LIM, PLIM, PLIM2, GPLIMT, and GSIMT
	Slot 2	All boards except for MP20, MP20S, LCP, TEPRIa and WIM
	Slot 3	All boards except for MP20, MP20S, LCP, and WIM
	Slot 4, 5	All boards except for MP20, MP20S, LCP, TEPRIa and WIM

- The WIM can be mounted only on slot 1 of the basic and expansion cabinets.
- The TEPRIa can be only mounted on slots 3, 4 and 5 of the basic cabinet and Slot 3 of the expansion cabinet.
- The LIM, PLIM, PLIM2, GPLIMT, and GSIMT cannot be mounted on slot 1 of the basic/expansion cabinet.
- One GPLIMT can be mounted to each cabinet. When using an external rectifier, up to 2 boards can be mounted. Mounting and using the board above the restricted capacity may overload and damage the PSU.
- The OAS can be mounted on slots 1, 2, 3, 4, and 5 of the basic and expansion cabinet. If the OAS is mounted on one of the slot 1 and 2, no board can be mounted on the other slot. If any board is mounted on the other slot, the board will not work.
  (If the slot 1 is occupied with the OAS, the slot 2 should be empty. And if the slot 2 is occupied with the OAS, the slot 1 should be empty.)

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NOTE

About the Managed LIM

The managed LIM is controlled by the WIM board and provides extended functions related to the layer2 QoS management such as 802.1p (Packet Preference), 802.1q (VLAN), IGMP Snooping in addition to the layer 2 switch function. If mounting LIM or PLIM to the slot 2 in the status that WIM is mounted in the slot 1, the Managed LIM function is operated.

NOTE

Blank Board Function

The blank board is a dummy board to protect the system from other objects when the board is not mounted in the universal slot like a screen board.

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2.3 Functional Boards

The following table shows categorized boards according to the functions and control boards.

Table 2.2 Functional Boards

Function	Control Board	Boards
Main Control Part	MP20	- Basic cabinet: MP20 (Option Board: RCM2, MIS, CRM, IRM, Modem) - Expansion cabinet: LCP
	MP20S	Basic cabinet: MP20S (Option Board: Modem)
Voice Trunk Line	MP20	TEPRIa, 8TRK, 8TRK2, 16TRK, 4HTRK (only China) 4BRI (except USA)
	MP20S	TEPRIa, 8TRK, 8TRK2, 16TRK, 4HTRK (only China) UNI (Option Board: 2BRM and 4TRM)
Voice Subscriber Line	MP20	8SLI2, 8DLI, 8COMBO2, 16SLI2, 16MWSLI, 16DLI2
	MP20S	8SLI2, 8DLI, 8COMBO2, 16SLI2, 16MWSLI, 16DLI2 and UNI (Option Board :4DLM , 4SL2 and 4SLM)
Data	MP20	WIM (option board: WIMD), LIM, PLIM, PLIM2, GPLIMT, GSIMT
	MP20S	LIM, PLIM, PLIM2
Voice Application	MP20	MGI16, OAS, CNF24
	MP20S	OAS, CNF24
VMS	MP20	SVMi-20E
Common Resource (MFR, CID, R2)	MP20	CRM, RCM2, IRM
	MP20S	Embedded
Power, Fan	MP20/MP20S	PSU, Fan, Ringer (Italy, Australia only)

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2.3.1 Control Boards

This section describes the configuration and functions of the MP20 and MP20S, which are the main control boards that control all the functions of the OfficeServ 7200, and those of the LCP, which is the minor control board.

2.3.1.1 MP20

The MP20 is the main control board that controls all the functions of the OfficeServ 7200 and is mounted on slot 0 of the basic cabinet. The MP20 performs voice switching, processes signals, and manages the subscriber terminals.

Major Functions

The MP20 performs the functions below:

- Operates applications through the LAN interface.
- Easy Installation using the SD card.
- Back ups the databases.
- Provides ports for the Universal Asynchronous Receiver and Transmitter (UART) test.
- Holds a meeting, detects caller IDs and multi-frequency and controls door phones.
- Functions as the internal/external MOH or loud/common bell.
- Sets the time and shows table time.
- Functions as the Analog Phase Locked Loop (APLL) for the synchronization of the digital subscribers.

Option Board

There are RCM2, MIS, CRM, IRM and Modem as option boards mounted in the MP20. The functions of these option boards are as follows:

- R2 CID Module 2 (RCM2): RCM2 detects an office line CID or transmits the CID information to the extension telephone as the ASIC chips, which detect the CID. In addition, RCM2 creates the R2 signal, the signaling signal between offices through the composed option board. The location that the RCM2 is mounted in the MP20 is provided and displayed on the MP20. If the RCM2 board is mounted, it is available to create the R2 signal through the 30 channels, and detect the R2 signal of 8 channels or office/extension CID of 14 channels. Selecting a detected signal (R2/CID) is decided by the switch location of the RCM2. The Simultaneous R2 CID Support function supports the 4 R2 channels and 6 office/extension CID channels at the same time (Over V2.45)
- Miscellaneous (MIS): MIS is the option board mounted in the MP20. The location is provided and displayed on the MP20. MIS provides 2 external holding voice source ports, an external paging port, a loud bell port, a common bell port, and also provides 2 dry contact ports that connect or disconnects the signal transmission or power supply with external equipments.

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- Common Resource Module (CRM): The CRM is to detect and generate DTMF signals and CID signals. The CRM is mounted on LOC1 or LOC2 in the MP 20 and the location is indicated on the MP20.
- Integrated Resource Module (IRM): The IRM is to detect and generate DTMF signals and R2/CID signals. The IRM is mounted on LOC2 in the MP20 and the location is indicated on the MP20.
- MP20 has a 2-Wire Full Duplex modem and can commonly use it with OfficeServ 500 system. Be careful with the direction of the MODEM when mounting/dismounting on the MP20. The MODEM operates in OfficeServ 7200 via V.23 interface and uses a modem chip for Central Office, which can perform Pulse Code Modulation (PCM) highway interface. In addition, the MODEM supports V.90 protocol. OfficeServ 7200 controls the MODEM via serial communication using standard AT commands.

Table 2.3 Option boards of the MP20

Option board	MP20			Max
	LOC1	LOC2	LOC3	
RCM2	-	○	-	1
MIS	-	-	○	1
CRM	○	○	-	2
IRM	-	○	-	1
MODEM	○	-	-	1

Specifications

The specifications of the MP20 are shown in the table below:

Table 2.4 Specifications of the MP20

Category	Item	Specifications
CPU	Processor	MPC8247T
	System clock	66 MHz
	Package	516P BGA
SDRAM (For saving programs and data)	Capacity	128 MB
	Data bus width	64 bit
Flash ROM (For booting)	Capacity	512 KB
	Data bus width	8 bit
Flash ROM (For Data saving)	Capacity	32 MB
	Data bus width	8 bit
Time Switch	Basic switch	256 (Tx) x 256 (Rx)
	Data bus width	16 bit
Others	Internal MOH port	1
	External MOH port	2

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Front View of MP20

The front view of the MP20 is shown in the figure below:

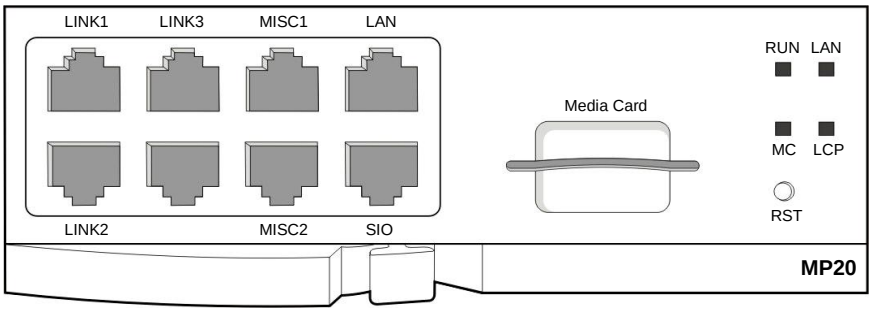

Figure 2.3 Front View of the MP20

The components on the front panel of the MP20 have the functions below:

Table 2.5 Ports and LEDs of the MP20

Ports, LEDs	Functions
LINK1~3	Ports that connect the MP20 with the LCP.
MISC1~2	Ports that connect external music sources, paging device, loud bell, common bell, or door bell.
LAN	Port for establishing the 10/100 BASE-T Ethernet connection.
SIO	UART port (for tests).
Media Card	Port for installing the NAND-type flash memory.
RUN LED	This LED indicates the status of the MP20. - Off: Power is not connected. - On (Green): Booting. - Blink (Green): The Program is operating properly. - Blink (Red): Fan module failed. - Blink (orange): Reset button is pushed. - ON (orange): Flash Memory (Data base) clear
LAN LED	This LED indicates the status of the connection to LAN. - Off: MP20 is not connected to LAN. - On: MP20 is connected LAN. - Blink: MP20 is transmitting or receiving Data through LAN port.
MC LED	This LED indicates the status of the Smart Media/Media Card access. - Off: The SD Card is not installed. - On: The SD Card is installed, however is not accessed. - Blink: The SD Card is installed and is being accessed.
LCP LED	This LED indicates the status of signaling message processing. - Off: There's no message exchange between MP20 and LCP. - On: Messages are being sent/received to/from the LCP.
RST	Button for resetting the MP20 board. Button for Data base clear when pushed more than 7second.

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2.3.1.2 MP20S

MP20S is a main control board that controls all functions of the basic cabinet and is mounted on slot 0 of the basic cabinet. It performs the voice switching function, signal processing function. MP20S carries out the system booting function and data management function.

MP20S strengthens the flexibility of system and by applying the VoIP function and IPC between cabinets raises the reliability by using the HDLC protocol.

Major Functions

MP20S offers the following functions:

- Various application operations via LAN interface
- Convenient installation via MMC card
- Database backup
- Port for Universal Asynchronous Receiver and Transmitter (UART) test
- External/Internal Music On Hold (MOH) and Loud/common bell functions
- Time setting and display function
- Phase Locked Loop (APLL) function for the synchronization with digital subscribers

Option Board

The MODEM can be mounted on option slot of MP20S.
The MODEM has the following functions:

- MP20S has a 2-Wire Full Duplex modem and can commonly use it with OfficeServ 500 system. Be careful with the direction of the MODEM when mounting/ dismounting the board on the MP20S.
- The MODEM operates in OfficeServ 7200 via V.24 interface and uses a modem chip for Central Office, which can perform Pulse Code Modulation (PCM) highway interface. In addition, the MODEM supports V.90 protocol. OfficeServ 7200 controls the MODEM via serial communication using standard AT commands.

Table 2.6 Option board of the MP20S

Option board	MP20S		Max
	LOC1	LOC2	
MODEM	-	○	1

Specification

The specification of MP20S is as follows:

Table 2.7 Specification of the MP20S

Category	Names	Standards
CPU	Processor	M82511G
	System Clock	375 MHz
	Package	484 BGA (BALL GRID ARRAY)
SDRAM (Memory for programs and data)	Capacity	128 MB
	Width of Data Bus	32 bit
NAND Flash	Capacity	128 MB
	Width of Data Bus	16 bit
Flash ROM (For Booting)	Capacity	512 KB
	Width of Data Bus	8 bit
Time Switch	Device	STC9604
	Basic Switch	256 x 256 Channel
	Data Bus Width	8 Bit
RTC	Device	RTC8564
	Time for Backup	48 Hr
Multi-Media (SD) (Memory for programs, data and VM/AA)	Capacity	1 GB
	Width of Data Bus	4 bit
EEPROM Data memory (example: MAC/IP Address)	Capacity	32 KB
	Interface	I2C

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Front View of MP20S

The front view of the MP20S main control part is as shown in the figure below.

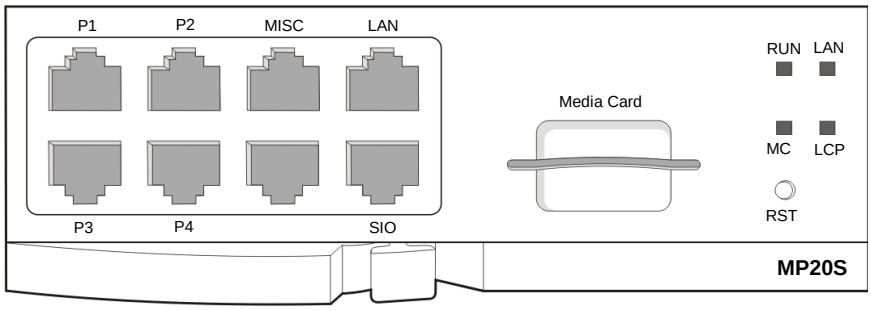

Figure 2.4 Front View of the MP20S

The components on the front panel of the MP20S have the functions below:

Table 2.8 Ports and LEDs of the MP20S

Ports, LEDs	Functions
P1~4	Subscriber connection port of 4DLMI
MISC	Port to connect Ext PAGING, DRY CONTACT and Ext MOH
LAN	Port to connect 100 BASE-T LAN
SIO	Port connect to serial I/O for development tool
Media Card	Port to insert an MMC+ card, which is a storage media
RUN LED	Status of Main CPU operation - Off: No-power - On (Green): On Booting - Blink (Green): Normal Operation of Program - Blink (Red): Fan module failed. - Blink (orange): Reset button is pushed. - ON (orange): Push the reset button over 7 sec, Flash Memory (Data base) clear
LAN LED	Status of LAN operation - Off: Link and no-connection of LAN port - On(Green): Link and LAN port connection - Blink (Green): Tx/Rx Data through LAN port.
MC LED	Status of MMC+ card operation - Off: Non-mounted MMC card - On (Green): Mounted MMC card - Blink (Green): In Tx/Rx of MMC card
RST	Button for resetting the MP20S board. Button for Data base clear when pushed more than 7 sec

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2.3.1.3 LCP

The Local Control Processor (LCP) is the minor control board that interworks the MP20, which is the main control part of the basic cabinet, with the expansion cabinet.
The LCP controls a variety of line boards and sends/receives information to/from the MP20.

Front View of LCP

The front view of the LCP is shown in the figure below:

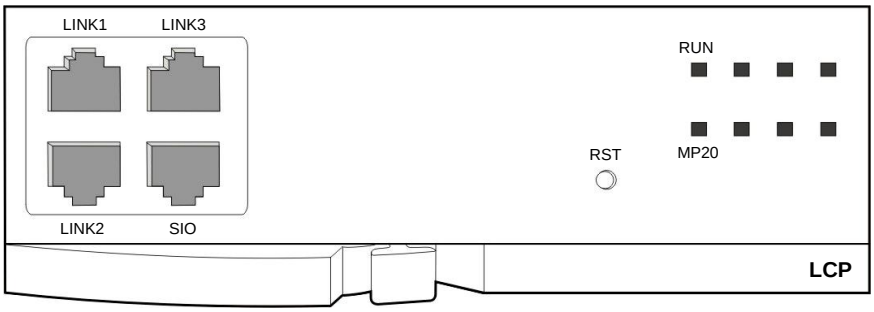

Figure 2.5 Front View of the LCP

The components on the front panel of the LCP have the functions below:

Table 2.9 Ports and LEDs of the LCP

Ports, LEDs	Functions
LINK1~3	Ports that connect the MP20 with the LCP.
SIO	UART port (for tests).
RST	Button for resetting the LCP board.
RUN LED	This LED indicates the status of the LCP. - Off: Power is not connected. - On: Booting. - Blinking: Program in operation.
MP20 LED	This LED indicates the status of signaling message processing. - Off: There's no message exchange between MP20 and LCP. - On: Messages are being sent/received to/from the MP20.

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2.3.2 Voice Trunk Line Board

This section describes the boards that offer the voice service of trunk lines.

2.3.2.1 TEPRIa

The T1/E1 Primary Rate Interface advanced (TEPRIa) uses a PCB identical to the OfficeServ 7400's TEPRI2 board.

Major Functions

The TEPRIa performs the functions below:

- Processes the T1/E1 signals by programming.
- Resistor Terminations for T1 line (100 Ω) and E1 line (120 Ω).
- Endures the ITU-recommended level of surge.
- Protects the output port by monitoring line signals.
- Crystal-less wander and jitter attenuation/compensation to TR62411.
- Attenuates/compensates jitter as recommended in ITU-T I.431 and G703.
- Provides the selectable line CODEC (HDB3, AMI).
- Performs local/remote loopback for test.
- Accommodates High level Data Link Control (HDLC) protocol in Common Channel Signaling (CCS) mode or Common Associated Signal (CAS) mode.

Specifications

The specifications of the TEPRIa are as follows:

- One trunk line port
- E1: 30 channels
- T1: 23 channels
- PRI: 30 channels or 23 channels

Front View of the TEPRIa

The front view of the TEPRIa is shown in the figure below.

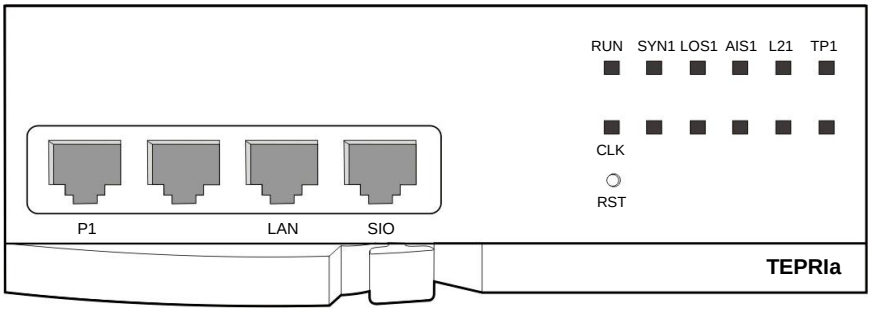

Figure 2.6 Front View of the TEPRIa

The components on the front panel of the TEPRIa have the functions below:

Table 2.10 Ports and LEDs of the TEPRIa

Ports, LEDs	Functions
P1	Port 1 that connects the T1/E1/PRI cable
LAN	Port that connects the 10/100 BASE-T LAN (for tests)
SIO	UART Port (for tests), CPLD JTAG Port (for managements)
RUN LED	Green Light: When operating in E1/T1/PRI mode (blinks at a rate of 200 ms) Orange Light: When operating in debug mode (blinks at a rate of 200 ms)
SYN1 LED	Indicates the status of the synchronization with the opposite switchboard. - On: The frame synchronization with the opposite switchboard is incorrect - Off: The frame synchronization with the opposite switchboard is correct
LOS1 LED	Indicates whether the opposite switchboard has a Loss of Signal (LOS). - On: The opposite switchboard signal is small or suffers from a loss of signal - Off: The opposite switchboard signal is received normally
AIS1 LED	Indicates whether the board received the alarm bit of the opposite switchboard. - On: The board received the alarm bit of the opposite switchboard - Off: The board did not receive the alarm bit of the opposite switchboard
L21 LED	Indicates the operation status of Layer 2. - On: The Layer 2 is operating properly - Off: The Layer 2 is operating abnormally
TP1 LED	Indicates the type of the program running on Port 1 - On: The Port 1 is operating in PRI mode - Off: The Port 1 is operating in T1/E1 mode
CLK LED	Turns on when the reference clock is used as the system clock.
RST	Button for resetting the TEPRIa.

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2.3.2.2 UNI

UNI can be used as a voice trunk line board or voice subscriber line board depending on the mounted option board. If 4TRM and 2BRM are mounted on UNI, it operates as a voice trunk line board. If 4SLM, 4SL2 and 4DLM are mounted, it operates as a voice subscriber line board.

Main Functions

The main functions of UNI are as follows:

- 3-pair of connector to mount an option module
- Option Module control logic
- -54 V power Control function

Specifications

- Use of 4TRM: four trunk ports
- Use of 2BRM: TW trunk ports
- Use of 4SLM: Four subscriber ports
- Use of 4SL2: Four subscriber ports
- Use of 4DLM: Four subscriber ports

Front View

The front view of UNI is shown in the figure below:

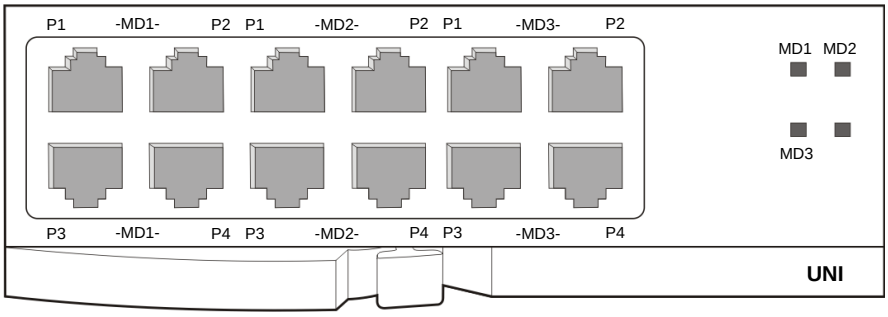

Figure 2.7 Front View of the UNI

The components on the front panel of UNI functions as follows:

Table 2.11 Ports and LEDs of the UNI

Ports, LEDs	Functions
MD1 P1~4 MD2 P1~4 MD3 P1~4	Port support in accordance with the option boards mounted on the position of MD1, MD2 and MD3
MD1 LED MD2 LED MD3 LED	Module mounting status at the each MD position and subscriber status - Off: No-module mounted - On (Red): 4DLM mounted - On (Green): 4TRM or 2BRM mounted - On (Orange = Green + Red): 4SLM or 4SL2 mounted

Mountable option boards for UNI are as follows.

Table 2.12 Option boards of the UNI

Option board	MP20			Max
	LOC1	LOC2	LOC3	
2BRM	O	O	O	3
4TRM	O	O	O	3
4DLM	O	O	O	3
4SLM	O	O	O	3
4SL2	O	O	O	3

If 2BRM and 4TRM is mounted, UNI operates as a voice trunk line board.

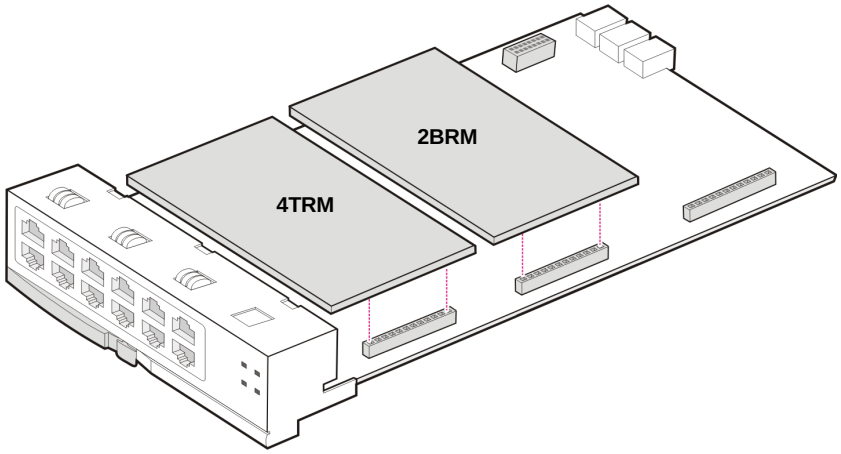

Figure 2.8 Option board of the UNI (Voice Trunk Line)

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If 4SLM and 4DLM are mounted, UNI operates as a voice subscriber board.

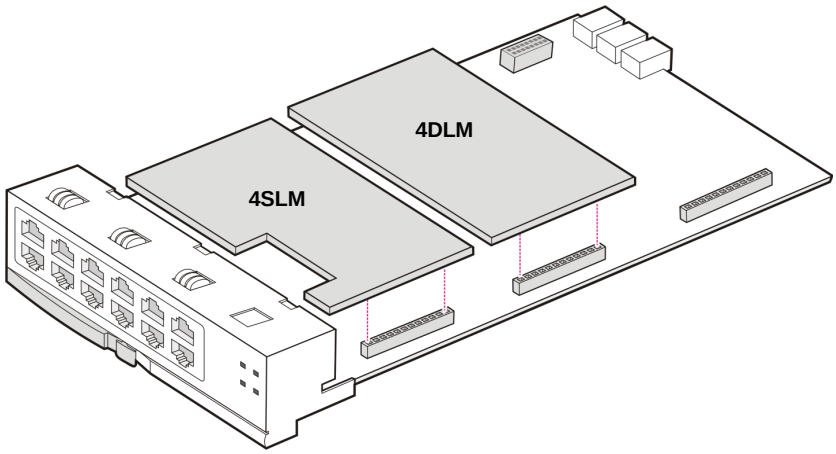

Figure 2.9 Option Boards of the UNI (Voice Subscriber)

NOTE

Description of 4TRM/8TRK

4TRM supports only DTMF dialing, but does not support for Dial Pulse dialing.
8TRK supports DTMF and Dial Pulse dialing.

2.3.2.3 8TRK

The 8TRK (Trunk) provides 8 ports for analog trunk lines. One board has the PRS, MPD, or CID path. Also, the board sends voice through the trunk lines and transmits voice data of 64 Kbps to one channel.

Major Functions

The 8TRK performs the functions below:

- Detects ring connection.
- Detects on/off-hook.
- Sends dial pulse.
- Performs Polarity Reverse Sensing (PRS) (Option)
- Performs Metering Pulse Detection (MPD), (Option)
- Performs the CID function.
- Periodically checks if the line is connected. If so, the voice data can be transmitted. This function is called line monitoring.
- A caller information relay function (a path to verify the caller information from the RCM2 can be created, if the caller information is provided through the 8TRK, by connecting the RCM2 to the MP20)

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Specifications

The 8TRK has eight trunk line ports.

Front View of 8TRK

The front view of the 8TRK is shown in the figure below:

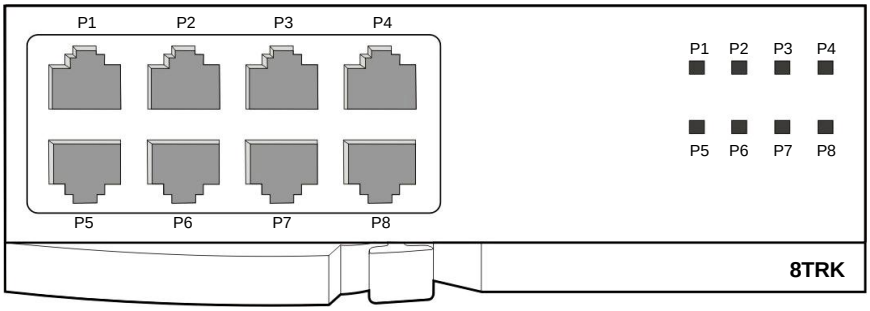

Figure 2.10 Front View of the 8TRK

The components on the front panel of the 8TRK have the functions below:

Table 2.13 Ports and LEDs of the 8TRK

Ports, LEDs	Functions
P1~8	Trunk ports.
P1~8 LED	These LEDs indicate the status of the ports. - Off: The trunk line is not being used. - On: The trunk line is being used. - Blink: The ring is being connected.

2.3.2.4 8TRK2

The 8TRK2 provides 8 ports of analog trunk line, and can support the PRS, CID paths within a single board. It provides the voice though the trunk line; each channel supports 64 Kbps voice data transmission.

Major Functions

The 8TRK2 performs the functions below:

- Ring incoming detection function
- On/Off-hook detection function
- PRS function
- A line monitoring function which periodically checks the line connection and provides services if connected
- A caller information relay function (a path to verify the caller information from the RCM2 can be created, if the caller information is provided through the 8TRK2, by connecting the RCM2 to the MP20)

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Specification

The 8TRK2 provides 8 trunk line ports.

Front View of the 8TRK2

The front view of the 8TRK2 is shown in the figure below

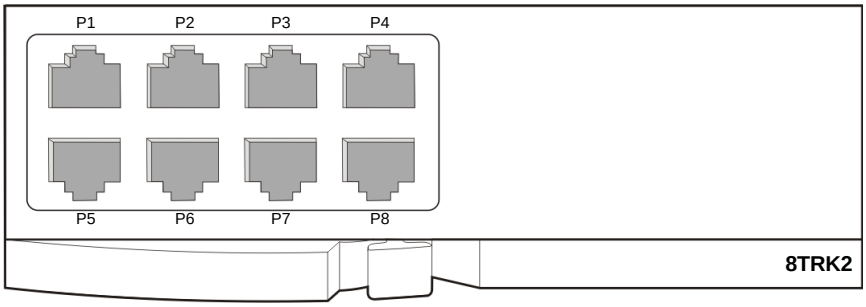

Figure 2.11 Front View of the 8TRK2

The components on the front panel of the 8TRK2 have the functions below:

Table 2.14 Ports of the 8TRK2

Ports	Functions
P1~8	Trunk Line Port

2.3.2.5 16TRK

The 16TRK provides 16 ports of analog trunk line, and can support the PRS, CID paths within a single board. It also provides the voice though the trunk line; each channel supports 64 Kbps voice data transmission.

Major Functions

The 16TRK performs the functions below:

- Ring incoming detection function
- On/Off-hook detection function
- PRS function
- CID function
- A line monitoring function which periodically checks the line connection and provides services if connected
- A caller information relay function (a path to verify the caller information from the RCM2 can be created, if the caller information is provided through the 16TRK, by connecting the RCM2 to the MP20)

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Specification

The 16TRK provides 16 trunk line ports.

Front View of the 16TRK

The front view of the 16TRK is shown in the figure below

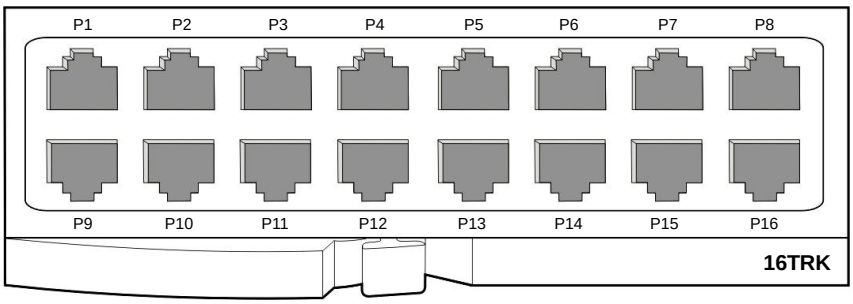

Figure 2.12 Front View of the 16TRK

The components on the front panel of the 16TRK have the functions below:

Table 2.15 Ports of the 16TRK

Port	Function
P1~16	Trunk Line Port

2.3.2.6 4HTRK

The 4HTRK (Hybrid Trunk) provides 4 ports of analog trunk line, and can support the DID, E & M and R/D paths within a single board. It provides the voice though the trunk line; each channel supports 64 Kbps voice data transmission.

Major Functions

The 4HTRK performs the functions below:

- DID Battery Feed Circuit (Relay Control)
- DID Battery Reverse Signal Control Circuit (Relay Control)
- DID Off-Hook Detection Circuit
- DID Voice Interface Longitudinal Circuit (Relay Control)
- R/D Ring Sending Signal Control circuit (Relay Control)
- R/D Ringer Circuit (80 Vrms 20 Hz)
- R/D Ring Incoming Detection Circuit
- E & M Off-Hook Detection Circuit
- E & M D/P Outgoing circuit

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Specification

The 4HTRK provides 4 trunk line ports.

Front View of the 4HTRK

The front view of the 4HTRK is shown in the figure below.

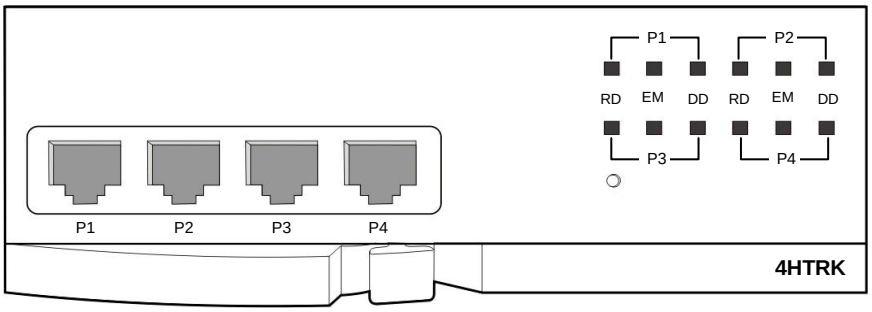

Figure 2.13 Front View of the 4HTRK

The components on the front panel of the 4HTRK have the functions below:

Table 2.16 Ports and LEDs of the 4HTRK

Ports, LEDs	Functions
P1~4	Trunk Line Port
P1~4 RD LED	R/D Port Operation Status - Off: Not being used - On: The trunk line is being used - Blink: The RD mode is being configured
P1~4 EM LED	E & M Port Operation Status - Off: Not being used - On: The trunk line is being used - Blink: The E & M mode is being configured
P1~4 DD LED	DID Port Operation Status - Off: Not being used - On: The trunk line is being used - Blink: The DID mode is being configured

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2.3.2.7 4BRI

The 4BRI (Basic Rate Interface) provides the digital trunk line. A 4BRI provides 2B + D ISDN BRI and functions as the Q-SIG. This board transmits voice via the trunk line and a channel transmits the voice data of 64 Kbps. The 4BRI is not available for MP20S.

Major Functions

The 4BRI performs the functions below:

- Processes the T/S0 mode signals by programming.
- Uses 4 port T mode or selectively uses 4 port S0
- Resistor Terminations for S0 line (100 Ω).
- Endures the ITU-recommended level of surge.
- Protects the output port by monitoring line signals.
- Crystal-less wander and jitter attenuation/compensation to TR62411.

Specifications

The specifications of the 4BRI are as follows:

- Four trunk line port
- T: 8 channels
- S: 8 channels

Front View of 4BRI

The front view of the 4BRI is shown in the figure below:

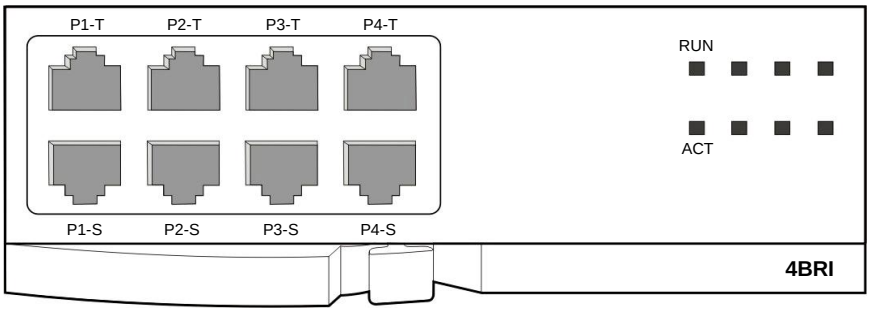

Figure 2.14 Front View of the 4BRI

The components on the front panel of the 4BRI have the functions below:

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Table 2.17 Ports and LEDs of the 4BRI

Ports, LEDs	Functions
P1-T~4-T	Office (trunk) Port
P1-S~4-S	Internal (station) Port
RUN LED	4BRI Board Operation Status - Off: 4BRI board is abnormal or power is disconnected - On: 4BRI board is properly operated.
ACT LED	4BRI Board LAYER1 SETUP Status - Off: LAYER1 SETUP Abnormal - On: LAYER1 SETUP Normal

2.3.2.8 2BRM

The 2BRM (BRI Module) is mounted on UNI and provides two 2B+1D digital trunk ports. This module is connected to 4 channel ISDN trunk in S and T mode. In S mode do not support DC power feeding.

Key Functions

The 2BRM provides the following functions:

- Full duplex 2B + 1D S/T interface transceiver based on Consultative Committee on International Telegraphy and Telephony (CCITT) I.430
- Frame conversion between S/T interface and ISDN Oriented Modular (IOM)
- Receive timing recovery according to a specific operation mode
- D-channel access
- Activation and deactivation procedures (automatic wake-up in power-down state)

Specification

The 2BRM provides four B channel and two D channel.
The maximum number of 2BRMs that can be installed onto an OfficeServ 7200 MP20S is four, and two UNIs are required for the maximum configuration.
And this UNI has to be inserted in universal slot number 1 or 2 (Slot 1, Slot 2 only).

Appearance

- The 2BRM can be mounted as a daughter board on the UNI.
- Maximum 4 boards can be mounted in a system.
- There is no separate line connection part within the 2BRM. It is connected to an external line through the RJ-45 connector on the line connection part, located at the right side of the system.
- Switch on of S1 provided a termination 100 ohm for S mode.

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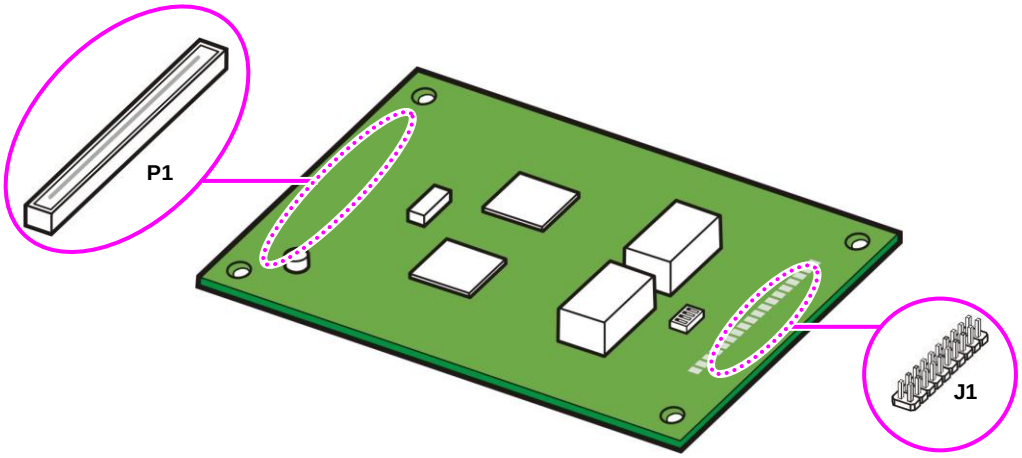

Figure 2.15 2BRM

Table 2.18 Ports of the 2BRM

Ports	Functions
P1	100-pin Connector Connector for connecting a signal line to the UNI board
J1	Connector for connecting lines to the two (2) ports

2.3.2.9 4TRM

The 4 Port Trunk Module (4TRM) is mounted on UNI and provides four (4) analog trunk ports. A 4TRM provides both of the PRS and CID paths.

Key Functions

The 4TRM provides the following functions:

- Incoming ring detection
- On/Off-hook detection
- Dial pulse transmission
- PRS function
- CID function
- Line monitoring function. This function checks whether or not a line is connected, and provides the service only if it is connected

Specification

The 4TRM provides four (4) trunk ports.

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Board View

- The 4TRM can be mounted as a daughter board on the UNI.
- There is no separate line connection part within the 4TRM. It is connected to an external line through the RJ-45 connector on the line connection part, located at the left side of the system.

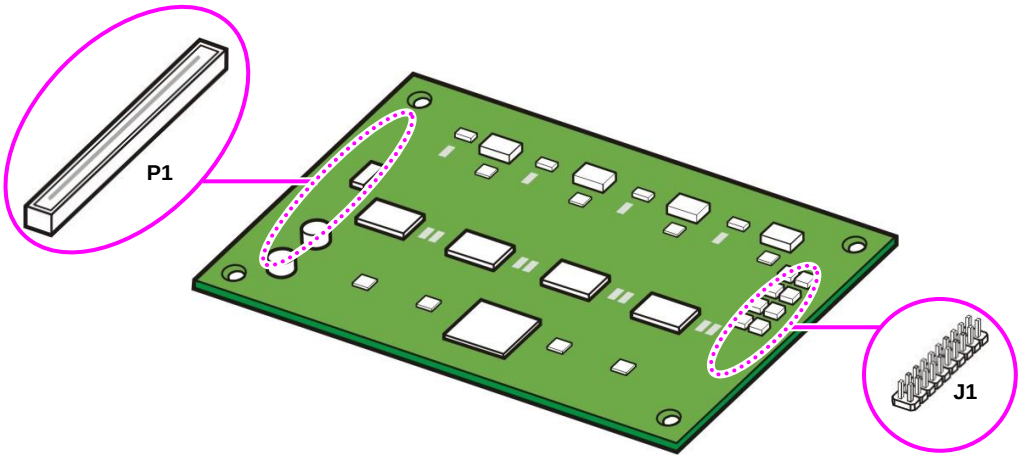

Figure 2.16 4TRM

Table 2.19 Ports of the 4TRM

Ports	Functions
P1	100-pin Connector Connector for connecting a signal line to the UNI board
J1	Connector for connecting lines to the four (4) ports

2.3.3 Voice Subscriber Line Board

This section describes the boards that offer voice paths for analog and digital subscribers.

2.3.3.1 8SLI2

The 8SLI2 has 8 ports for analog stations. It interworks with the analog phones via the trunk line to make a voice communication.

Major Functions

The major functions of the 8SLI2 are as follows:

- Generates a ring signal of 20/25 Hz.
- Detects DTMF/dial pulse.
- Detects on/off-hook.
- Generates various audible tones.

Specifications

The specifications of the 8SLI2 are as follows:

- 8SLI2: 8 station ports

Front View of the 8SLI2

The front view of the 8SLI2 is shown in the figure below.

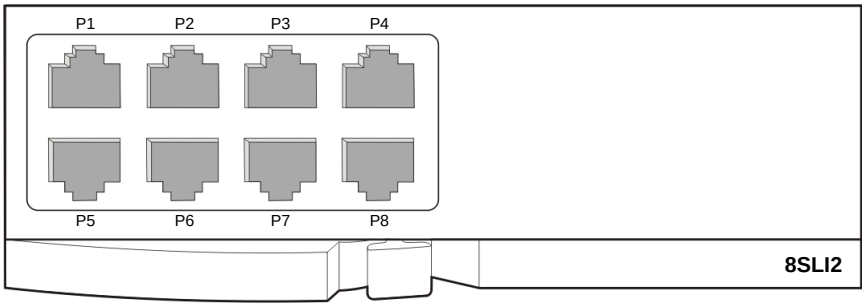

Figure 2.17 Front View of the 8SLI2

The components on the front panel of the 8SLI2 have the functions below:

Table 2.20 Ports of the 8SLI2

Ports	Functions
P1~8	Ordinary phone's local line port

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2.3.3.2 8DLI

The 8DLI has 8-ports for digital stations. It interworks with the Samsung digital phones via the station to make a voice communication.

Specifications

The specifications of the 8DLI are as follows:

- 8 station ports and 2B + D (two voice channels and one signal channel) provided
- Interworking Number is limited on the internal (Digital Phone)

Front View of the 8DLI

The front view of the 8DLI is shown in the figure below:

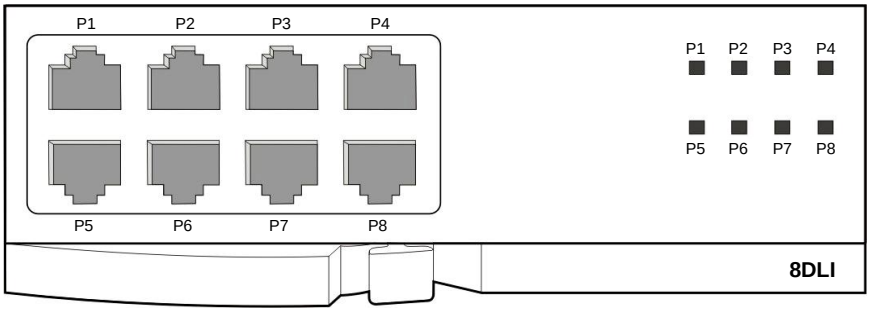

Figure 2.18 Front View of the 8DLI

The components on the front panel of the 8DLI have the functions below:

Table 2.21 Ports and LEDs of the 8DLI

Ports, LEDs	Functions
P1~8	Station ports of Samsung digital phones.
P1~8 LED	These LEDs indicate the status of the ports. - Off: The station is not being used. - On: The station is being used.

2.3.3.3 8COMBO2

The 8COMBO2 has 8 ports for analog stations and those of digital stations. It interworks with analog phones or digital phones to make a voice communication.

Major Functions

The major functions of the 8COMBO2 are as follows:

- Generates the ring of 20/25 Hz.
- Detects the DTMF/dial pulse.
- Detects on/off-hook.
- Generates a tone.

Specifications

The specifications of the 8COMBO2 are as follows:

- 8 analog station ports
- 8 digital station ports

Front View of the 8COMBO2

The front view of the 8COMBO2 is shown in the figure below.

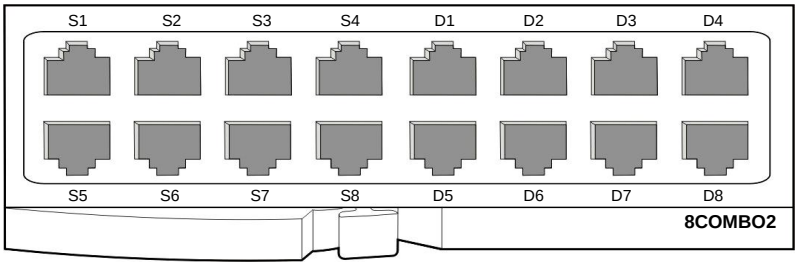

Figure 2.19 Front View of the 8COMBO2

The components on the front panel of the 8COMBO2 has the functions below:

Table 2.22 Ports of the 8COMBO2

Ports	Functions
S1~8	Analogue station ports
D1~8	Digital station ports

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2.3.3.4 16SLI2/16MWSLI

16SLI2 provides the voice communication function interworking with the general telephone through the extension line as the board that provides the analog extension 16 ports.
The 16MWSLI is the board that the message waiting function on the function of the 16SLI2.

Main Function

The main function of 16SLI2/16MWSLI is as follows:

- Creating 20/25 Hz Ring
- Sensing Dial Tone Multi Frequency (DTMF)/Dial Purse
- Sensing On/Off Hook
- Creating Tone
- Power Fail Transfer (PFT)
- Message Waiting Function
- Transmitting PRS
- Message waiting (16MWSLI only)

Specification

16SLI2/16MWSLI supports 16 extension ports.

Front View of 16SLI2/16MWSLI

The front view of the 16SLI2/16MWSLI is shown in the figure below:

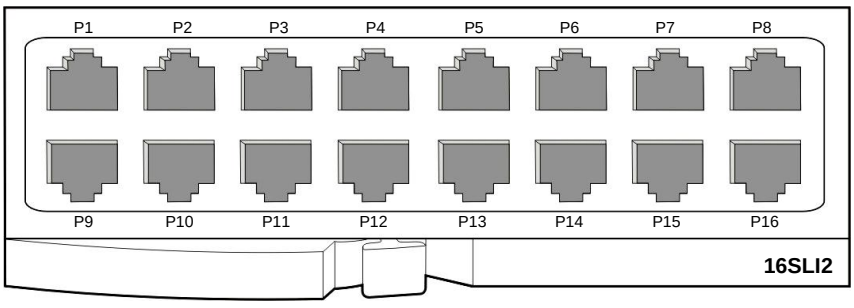
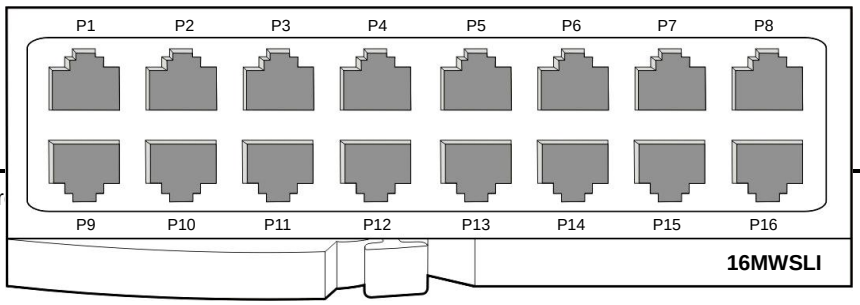


Figure 2.20 Front Views of the 16SLI2 and 16MWSLI



The components on the front panel of the 16SLI2 and 16MWSLI have the functions below:

Table 2.23 Ports of the 16SLI2 and 16MWSLI

Ports	Functions
P1~16	General Telephone Extension Port

2.3.3.5 16DLI2

16DLI2 provides the voice communication function interworking with Samsung Digital Telephone through the extension line as the board to provide the digital extension 16 ports.

Specification

The specification of 16DLI2 is as follows:

- Providing 16 extension ports.
- Providing 1B + D (One voice channel and one signal channel)
- Interworking Number is limited on the internal (Digital Phone)
- Large LCD Digital Phone (DGP) is available up to 8 equipments.
  If 9 equipments are interworked, the DGP power supply through 16DLI2 is disconnected.

Front View of 16DLI2

The front view of the 16DLI2 is shown in the figure below:

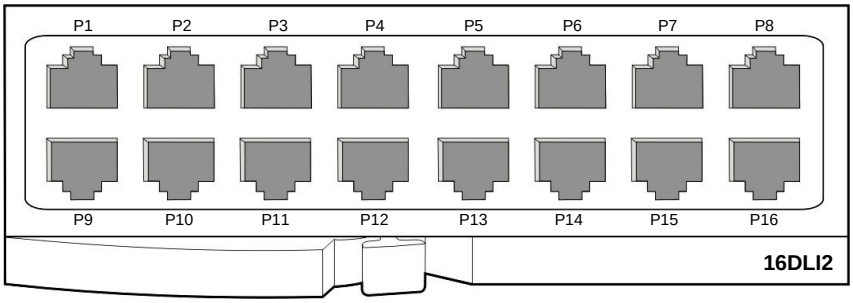


Figure 2.21 Front View of the 16DLI2

The components on the front panel of the 16DLI2 have the functions below:

Table 2.24 Ports of the 16DLI2

Ports	Functions
P1~16	Samsung Digital Telephone Extension Port

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2.3.3.6 4DLM

The 4 Port DLI Module (4DLM) provides four (4) digital station ports.
It interoperates with a Samsung digital phone through a station to provide the voice communication function.

Specification

The specification of the 4DLM is as follows:

- 4DLM: Provides four (4) station ports and 1B + D (a voice channel and a signal channel)

Board View

The 4DLM is a daughter board which can be mounted on the UNI.

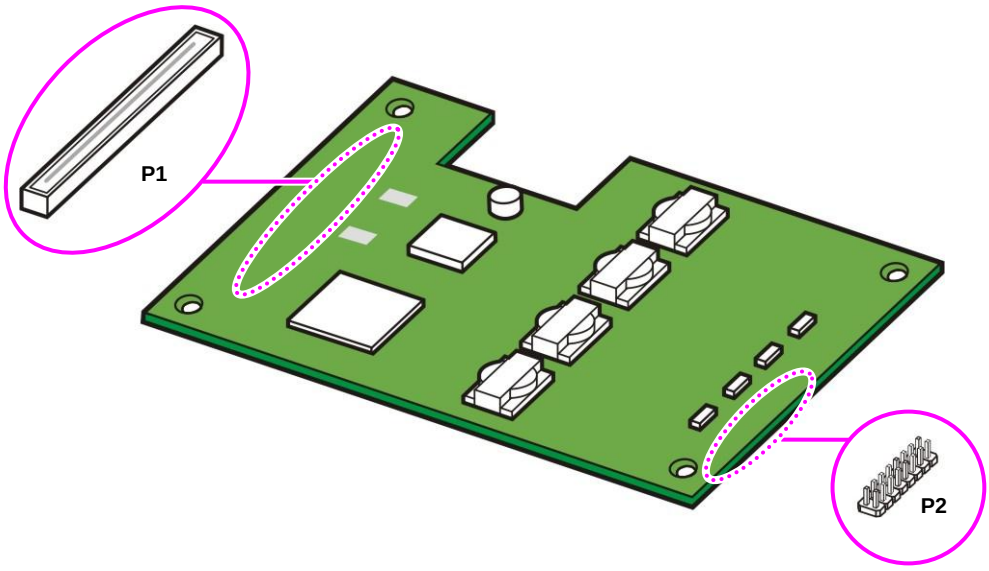

Figure 2.22 4DLM

Table 2.25 Ports of the 4DLM

Ports	Functions
P1	100-pin Connector Connector for connecting a signal line to the UNI board
P2	Connector for connecting lines to the four (4) ports

2.3.3.7 4SL2

The 4 Port SLI Module 2 (4SL2) is mounted on UNI and is used to process regular phone connections.

Key Functions

The key functions of the 4SL2 are as follows:

- 20 Hz ring generation
- Dial Tone Multi Frequency (DTMF)/Dial pulse detection
- On/Off-hook detection
- Tone generation

Specification

The specification of the 4SL2 is as follows:

- 4SL2: Four (4) station ports

Board View

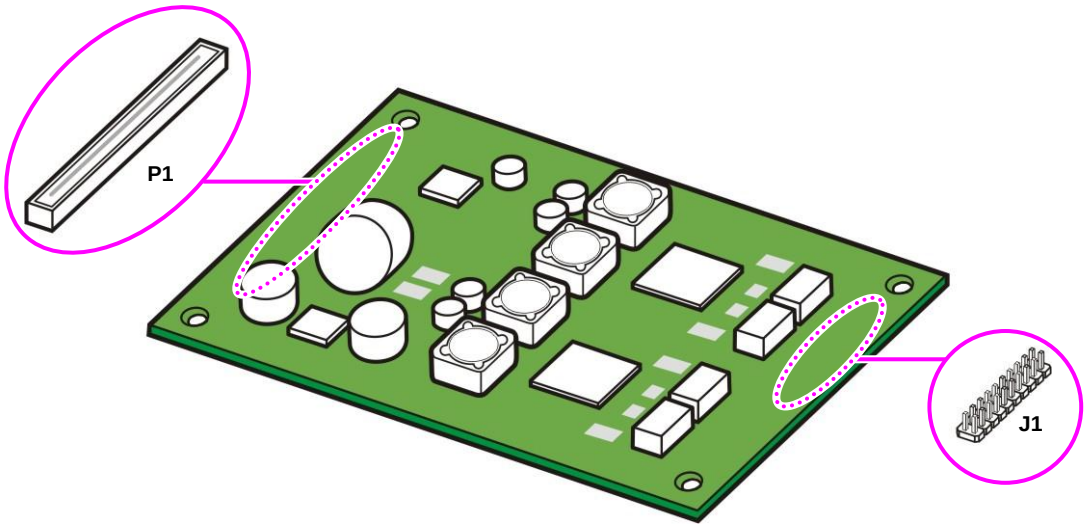

Figure 2.23 4SL2

Table 2.26 Ports of the 4SL2

Ports	Functions
P1	100-pin Connector Connector for connecting a signal line to the UNI board
J1	Connector for connecting lines to the four (4) ports

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2.3.3.8 4SLM

The 4 Port SLI Module (4SLM) is mounted on UNI and is used to process regular phone connections.

Key Functions

The key functions of the 4SLM are as follows:

- 20 Hz ring generation
- Dial Tone Multi Frequency (DTMF)/Dial pulse detection
- On/Off-hook detection
- Tone generation

Specification

The specification of the 4SLM is as follows:

- 4SLM: Four (4) station ports

Board View

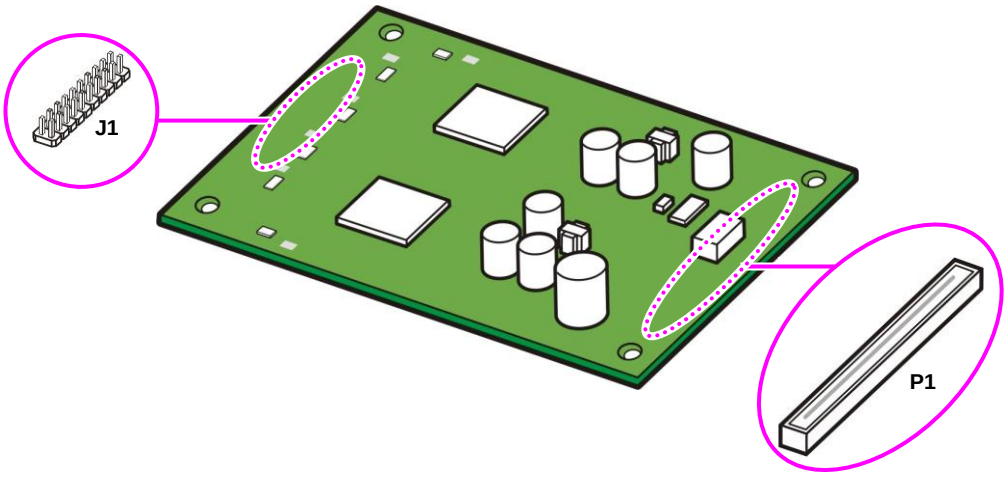

Figure 2.24 4SLM

Table 2.27 Ports of the 4SLM

Ports	Functions
J1	Connector for connecting lines to the four (4) ports
P1	100-pin Connector Connector for connecting a signal line to the UNI board

2.3.4 Data Board

This section describes the data board for transmitting/receiving data to/from the Internet or Intranet.

2.3.4.1 WIM

The WAN Interface Module (WIM) allows the OfficeServ 7200 to transmit/receive data to/from the external Internet. It offers a variety of external interfaces and ports for connecting with the internal network. One WIM board provides applications and a variety of external interfaces.

Major Functions

The major functions of the WIM are as follows:

- Interworks with dedicated lines using V.35.
- Provides the Ethernet port of 10/100 BASE-T that interworks with the xDSL or cable modem. (WAN1)
- Provides the Ethernet port of 10 BASE-T for backup. (WAN2)
- Offers the DeMilitarized Zone (DMZ) service.
- Provides the Ethernet port of 10/100 BASE-T for the LAN interface.
- Provides the UART port for configuration setting.
- Provides applications such as a firewall and VPN.

Option Board

Among the boards which can be mounted to the WIM, there is the WIMD.
The WIMD performs tunneling operations via data encryption, decryption, authentication etc. to implement the WIM's Virtual Private Network (VPN) functionality.
All operations are performed in hardware-level, from the option board's Network Security Processor and thus increase the system's performance.

Specifications

The specifications of the WIM are as follows:

- One V.35 serial port
- Two ports for connecting with the external Ethernet network
- Three Ethernet port of 10/100 BASE-T (P1~3)
- One Ethernet port of 10/100 BASE-T (P4)

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Front View of WIM

The front view of the WIM is shown in the figure below:

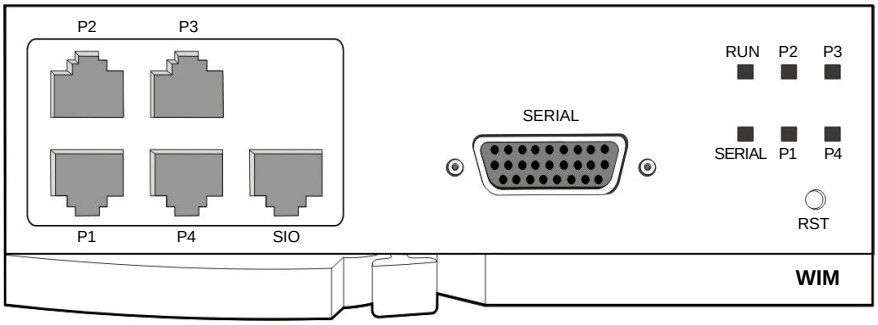

Figure 2.25 Front View of the WIM

The components on the front panel of the WIM have the functions below:

Table 2.28 Ports and LEDs of the WIM

Ports, LEDs	Functions
P1, P2, P3	The WAN/LAN interface port interconnected to the 10/100 BASE-T Ethernet
P4	The WAN/LAN interface port interconnected to the 10 BASE-T Ethernet
SIO	UART port (for tests)
SERIAL	Port that connects the serial dedicated line that interworks with the V.35
RUN LED	This LED indicates the operation status of the WIM. - Off: The WIM board is in an abnormal status or the power is not being supplied. - On: The WIM board is operating properly.
SERIAL LED	This LED indicates the operation status of the LAN. - Off: The link is not connected. - On: The link is operating. - Blinking: The Serial link is connected, and the data is being transmitted
P1, P2, P3, P4 LED	This LED indicates the operation status of the DMZ. - Off: The Ethernet is not connected. - On: The Ethernet is operating. - Blinking: The Ethernet link is connected, and the data is being transmitted
RST	Button for resetting the WIM module

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2.3.4.2 LIM

The LIM sends/receives data in the Intranet, and provides an interface of 10/100 BASE-T. It functions as a hub for switching. The LIM interworks with the WIM through the internal back panel to provide the VLAN function for supporting QoS.
In this case, because there is separate Ethernet from the back panel, it is available to all 16 ports LAN of the front view.

Major Functions

The major functions of the LIM are as follows:

- Detects 10/100 BASE-T, or full/half duplex automatically.
- Offers the VLAN for supporting QoS.
- Functions as a switching hub.

Specifications

The LIM provides 16 ports of 10/100 BASE-T.

Front View of LIM

The front view of the LIM is shown in the figure below:

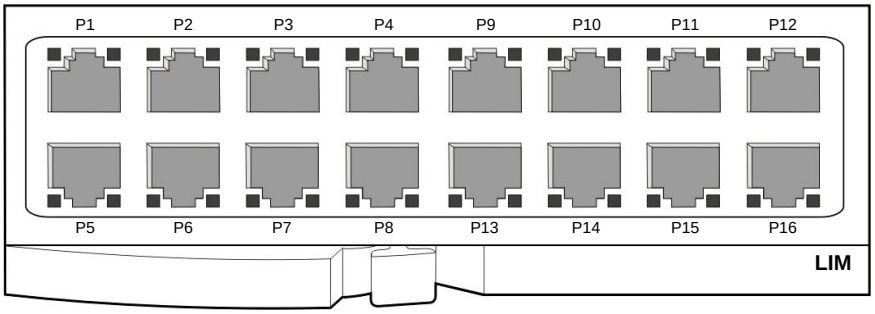

Figure 2.26 Front View of the LIM

The components on the front panel of the LIM have the functions below:

Table 2.29 Ports and LEDs of the LIM

Ports, LEDs	Functions
P1~16	Ports for connecting the Ethernet.
Left LED of each port	The LED indicates if the link is operating. - Blink: The link is operating.
Right LED of each port	The LED indicates if the port of 10/100 BASE-T is operating. - Off: The port of 10 BASE-T is operating. - On: The port of 100 BASE-Tx is operating.

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2.3.4.3 PLIM

PoE LAN Interface Module (PLIM) provides the 10/100 BASE-T interface as the board to transmit/receive the data from intranet, and also provides the Power over Ethernet (PoE) function to supply the 48 V power to externals and also provides a simple switching function. In addition, PLIM provides the VLAN function for the QoS support interworking with WIM through the internal back panel in one board.
In this case, because there are separate Ethernet ports from the back panel, it is available to use all 16 ports LAN.

Main Function

The main function of the LIM is as follows:

- 10/100 BASE-T, Full/Half duplex automatic sensing function
- The VLAN function for the QoS support
- The switching function
- PoE function

NOTE

Setting PLIM

PLIM is available to select the internal PSU (connecting the shunt pin 1-2) and the external rectifier (connecting the shunt pin 2-3) by using the shunt pin (J1, J2, J3). For the detailed description for the shunt pin connection, refer to 'OfficeServ 7200 Installation Manual'

Specification

The PLIM provides 16 10/100 BASE-T ports.

Front View of PLIM

The front view of the PLIM is shown in the figure below:

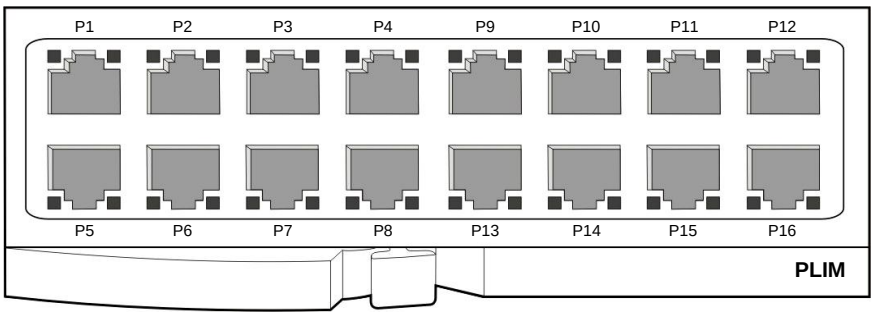

Figure 2.27 Front View of the PLIM

The components on the front panel of the PLIM have the functions below:

Table 2.30 Ports and LEDs of the PLIM

Ports, LEDs	Functions
P1~16	Ethernet Connection Port
Left LED of Each Port	Link Operation - Blinking: Link is in operation
Right LED of Each Port	10/100 BASE-T Operation - Off: In operation as 10 BASE-T - On: In operation as 100 BASE-Tx

NOTE

Selecting PLIM Power Supply

The PLIM is available to use the internal rectifier (PSU: Power Supply Unit) or external rectifier, and select the power supply source through using the shunt pin. The detail is described in OfficeServ 7200 Installation Manual.

2.3.4.4 PLIM2

The PLIM2 transmits the data through the intranet, and provides a 10/100 BASE-T interface. It provides the Power over Ethernet (PoE) function to supply the 48 V power to externals and also provides a simple switching function.

Major Functions

The major functions of the PLIM2 are as follows.

- 10/100 BASE-T, Full/Half duplex automatic detection function
- Switching function
- PoE function

NOTE

Setting PLIM2

Using the shunt pin (J1, J2, J3), the PLIM2 can select from the internal PSU (connect shunt pin no. 1-2) and the external rectifier (connect shunt pin no. 2-3). Refer to the ‘OfficeServ 7200 Installation Manual’ for more details concerning the connection of the shunt pin.

Specification

The PLIM2 provides 16 10/100 BASE-T ports.

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Front View of the PLIM2

The front view of the PLIM2 is shown in the figure below.

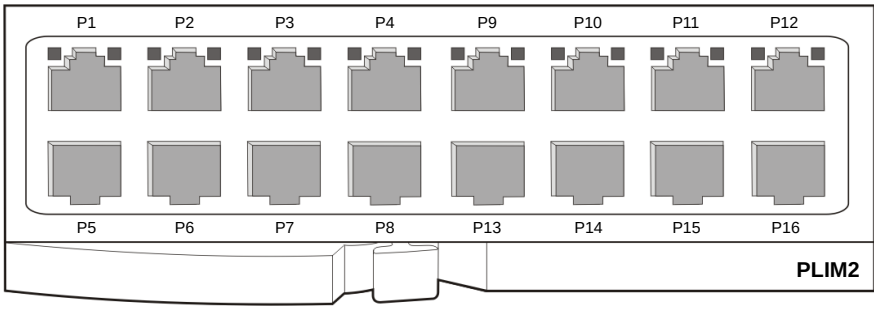

Figure 2.28 Front View of the PLIM2

The components on the front panel of the PLIM2 have the functions below:

Table 2.31 Ports and LEDs of the PLIM2

Ports, LEDs	Functions
P1~16	Port that connects to the Ethernet
Left LED of P1~4, P9~12	First LED: Indicates if the P1~4, P9~12's link is operating - On: When the link is operating, LED is turned on into green color - Blink: When each port is active, the LED is blinking Second LED: Indicates whether the P1~4, P9~12 are operating in 10/100 BASE-T mode - Off: In operation as 10 BASE-T - On: In operation as 100 BASE-TX
Right LED of P1~4, P9~12	First LED: Indicates if the P5~8, P13~16's link is operating - On: When the link is operating, LED is turned on into green color - Blink: When each port is active, the LED is blinking Second LED: Indicates whether the P5~8, P13~16 are operating in 10/100 BASE-T mode - Off: In operation as 10 BASE-T - On: In operation as 100 BASE-TX

2.3.4.5 GPLIMT

The Gigabit PoE LAN Interface Module TX (GPLIMT) provides data transmission through the intranet. Compared to the PLIM, the GPLIMT comes with an additional GbE interface and can provide 12 10/100 BASE-T interface ports and 2 1000 BASE-TX ports.
The GPLIMT provides a simple switching hub function.

Major Functions

The major functions of the GPLIMT are as follows.

- L2 Ethernet Switching
- 10/100 BASE Full/Half duplex auto-sensing
- VLAN Networking (802.1q)
- Packet Priority Control (802.1p)
- Flow Control (802.3x)
- Multi-casting (IGMP Snooping)
- IEEE 802.3af PoE (Power over Ethernet)

Specification

The specification of the GPLIMT is as follows.

- 12 10/100 BASE-T interface port
- 2 10/100/1000 BASE-TX interface port
- 1 Serial console port (also used as P12)

Front View of the 4HTRK

The front view of the GPLIMT is shown in the figure below.

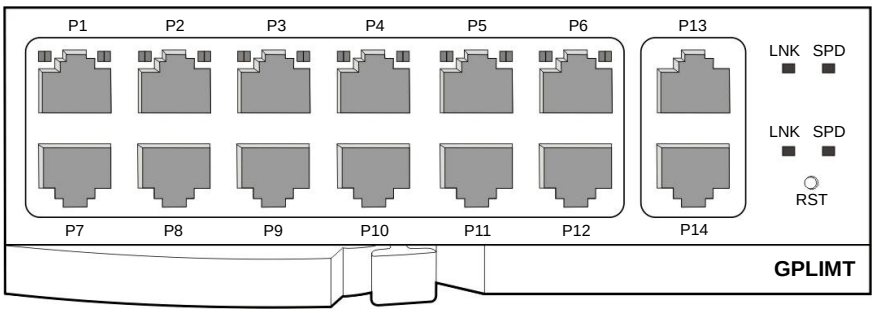

Figure 2.29 Front View of the GPLIMT

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The components on the front panel of the GPLIMT have the functions below:

Table 2.32 Ports and LEDs of the GPLIMT

Ports, LEDs	Functions
P1~12	Ports that connect to the 10/100BASE-T Ethernet
P13, P14	Ports that connect to the 10/100/1000 BASE-TX GbE (Gigabit Ethernet)
Left LED of P1~6	First LED: Indicates if the P1~6's link is operating - On: When the link is operating, LED is turned on into green color - Blink: When each port is active, the LED is blinking Second LED: Indicates whether the P1~6 are operating in 10/100 BASE-T mode - Off: In operation as 10 BASE-T - On: In operation as 100 BASE-TX
Right LED of P1~6	First LED: Indicates if the P7~12's link is operating - On: When the link is operating, LED is turned on into green color - Blink: When each port is active, the LED is blinking Second LED: Indicates whether the P7~12 are operating in 10/100 BASE-T mode - Off: In operation as 10 BASE-T - On: In operation as 100 BASE-TX
LNK LED	- Turns on if the Giga port P13~14's link is connected. - Blinks if the corresponding ports are active.
SPD LED	Indicates whether the Giga ports P13~14 are operating in 10/100/1000 BASE-T mode - Off: In operation as 10 BASE-T - On: In operation as 100 BASE-TX - Blink: The ports are operating in 1000 BASE-TX mode
RST	Button for resetting the GPLIMT

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2.3.4.6 GSIMT

The Gigabit Switch Interface Module TX (GSIMT) provides Layer 2 and Layer 3 Gigabit LAN interfaces to support the data network.

Major Functions

The major functions of the GSIMT are as follows.

- L3 Unicasting Protocol
- L3 Multicasting Protocol
- Ethernet Switch (802.3 compatible)
- 10/100/1000 BASE-TX port
- Packet Priority Control (802.1p)
- VLAN Networking (802.1q)
- Spanning Tree Protocol (RSTP, PVST+)
- Diffserv
- Flow Control (802.3x)
- Multi-casting (IGMPv1/v2, DVMRP, PIM-SM)

Specification

The specification of the GSIMT is as follows.
12 10/100/1000 BASE- TX interface ports

Front View of the GSIMT

The front view of the GSIMT is shown in the figure below.

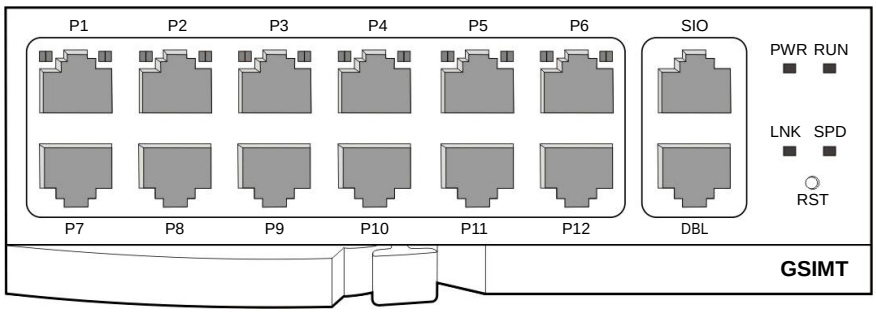

Figure 2.30 Front View of the GSIMT

The components on the front panel of the GSIMT have the functions below:

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Table 2.33 Ports and LEDs of the GSIMT

Ports, LEDs	Functions
P1~12	Ports that connect to the 10/100/1000 BASE-TX GbE (Gigabit Ethernet)
SIO	Port that connects to the RS-232
DBL	Port that connects to the LAN for debugging purpose
Left LED of P1~6	Indicates whether the P1~6 are operating in 10/100/1000 BASE-TX mode - Alternates between green and orange: In operation as 10 BASE-T - Green Light: In operation as 100 BASE-TX (blinks if active) - Orange Light: In operation as 1000 BASE-TX (blinks if active)
Right LED of P1~6	Indicates whether the P7~12 are operating in 10/100/1000 BASE-TX mode - Alternates between green and orange: In operation as 10 BASE-T - Green Light: In operation as 100 BASE-TX (blinks if active) - Orange Light: In operation as 1000 BASE-TX (blinks if active)
PWR LED	Power Supply Status - On: The power is being supplied normally
RUN LED	GSIMT Operation Status - Blinking: The RAM programming is running
LNK LED	Turns on if the DBL port link is connected
SPD LED	Indicates whether the DBL port is operating in 10/100BASE-T Ethernet mode - Off: In operation as 10 BASE-T - On: In operation as 100 BASE-TX (blinks if active)
RST	Button for resetting the GSIMT

2.3.5 Voice Application Board

This section describes the interface board that uses the DASL to send/receive voice to/from the phone system and wireless base station as well as the board that converts voice to data and then sends/receives the data.

2.3.5.1 MGI16

The MGI16 converts the voice into data and transmits the data through the data network. It supports a maximum of 16 channels and provides the G.729, G.723, G.711 voice compression/decompression function. It also provides a T.38 specification compliant Fax function. The MGI16 is not available for MP20S.

Major Functions

The major functions of the MGI16 are as follows:

- Voice decompression (Codec): G.729, G.723, and G.711
- Fax Relay Function: Providing 1 FAX channel according to Voice 1 channel
- Echo cancellation: Dual Filter EC (Enhanced EC)
- Volume adjustment (-14~+6 dBm)
- Silence suppression

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Front View of MGI16 Board

The front view of the MGI16 is shown in the figure below:

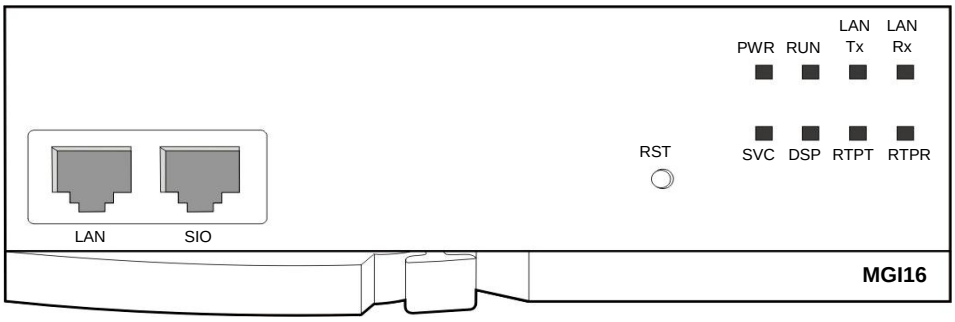

Figure 2.31 Front View of the MGI16

The components on the front panel of the MGI16 have the functions below:

Table 2.34 Ports and LEDs of the MGI16

Ports, LEDs	Functions
LAN	Port that connects the Ethernet.
SIO	UART port (for tests).
RST	Button for resetting the MGI16.
PWR LED	This LED indicates the power supply status. - Off: Power is not being supplied. - On: Power is being supplied properly.
RUN LED	This LED indicates MGI16 board status. - Off: Power is not being supplied. - On: Booting. - Blink: The RAM program is operating.
LAN Tx LED	This LED indicates the status of the Ethernet data transmission. - Off: Data does not exist. - On or blink: Data is being transmitted.
LAN Rx LED	This LED indicates the reception status of the link and Ethernet data. - Off: Data does not exist or the link is not connected. - On or blink: Data is being received.
SVC LED	This LED indicates if the service is being offered. This LED blinks when the software task can be serviced.
DSP LED	This LED indicates if the VoIP DSP is operating. This LED blinks when the VoIP DSP operates.
RTPT LED	This LED indicates if the voice packets are being forwarded. This LED turns on when the voice packets are forwarded.
RTPR LED	This LED indicates if the voice packets are being received. This LED turns on when the voice packets are received

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2.3.5.2 OAS (OfficeServ Application Server)

The OAS converts the voice into data and transmits the data through the data network. It supports a maximum of 32 channels and provides the G.729, G.723, G.711 voice compression/decompression function. It also provides a T.38 specification compliant Fax function. OAS can be mounted on slots 1, 2, 3, 4, and 5 of the basic and expansion cabinet. If the OAS board is mounted on one of the slot 1 and 2, no board can be mounted on the other slot. If any board is mounted on the other slot, the board will not work.

Major Functions

The major functions of the OAS are as follows:

- Voice decompression (Codec): G.729, G.723, and G.711
- Fax Relay Function: Providing 1 FAX channel according to Voice 1 channel
- Echo cancellation: Dual Filter EC (Enhanced EC)
- Volume adjustment (-14~+6 dBm)
- Silence suppression
- DTMF receiver functions with channel numbers such as 32, 28, 24 or 16 for MOBEX Executive user.
- MPS (Media Proxy Service) redirects the RTP data for the call between IP Phone of Private IP Network and that of Public IP Network.

Front View of OAS

The front view of the OAS is shown in the figure below:

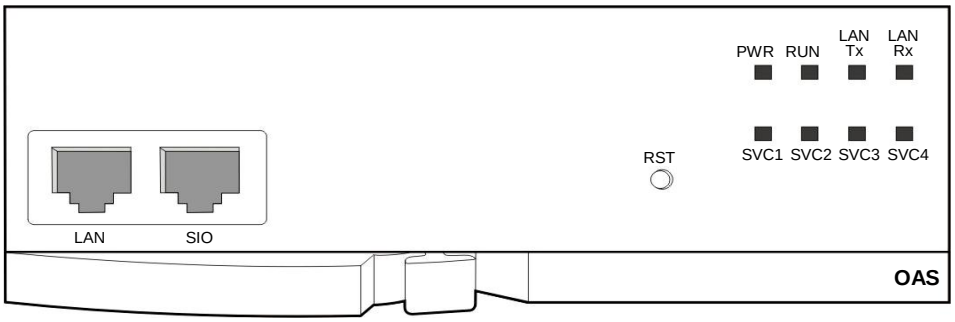

Figure 2.32 Front View of the OAS

The components on the front panel of the OAS have the functions below:

Table 2.35 Ports and LEDs of the OAS

Ports, LEDs	Functions
LAN	Port that connects the Ethernet.
SIO	UART port (for tests).
RST	Button for resetting the OAS.
PWR LED	This LED indicates the power supply status. - Off: Power is not being supplied. - On: Power is being supplied properly.
RUN LED	This LED indicates OAS status. - Off: Power is not being supplied. - On: Booting. - Blink: The RAM program is operating.
LAN Tx LED	This LED indicates the status of the Ethernet data transmission. - Off: Data does not exist. - On or blink: Data is being transmitted.
LAN Rx LED	This LED indicates the reception status of the link and Ethernet data. - Off: Data does not exist or the link is not connected. - On or blink: Data is being received.
SVC1 LED	This LED indicates if the MGI service is being offered. This LED turns on when the MGI software task can be serviced.
SVC2 LED	This LED indicates if the MFR service is being offered. This LED turns on when the MFR software task can be serviced.
SVC3 LED	This LED indicates if the MPS service is being offered. This LED turns on when the MPS software task can be serviced.
SVC4 LED	This LED indicates if the LINK is connected to MP. This LED turns on when the LINK is connected to MP.

NOTE

Mounting the OAS in 16 channels slot

If the OAS is mounted on one of 16 channels slot, no board can be mounted on the other slot. If any board is mounted on the other slot, the board will not work. (If the slot 1 is occupied with the OAS, the slot 2 should be empty. And if the slot 2 is occupied with the OAS, the slot 1 should be empty.)

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2.3.5.3 CNF24 (24 channel Conference bridge card)

CNF24 provides transceiver function of packet data converted from voice data through the packet network. The extension participant who is connected in the system and the external participant who is connected in the PSTN or SPnet can participate to the voice conference. CNF24 provides maximally 24 lines for voice conference, and the group participant in the conference can be varied from 2 lines to 24 lines flexibly.
The maximum recording capacity per CNF24 is 50 hours, and concurrent recording channel is restricted to 6 channels.

Major Functions

Functions of CNF24 are as follows.

- Supports Meet-Me conference which the participant makes a phone call to the system to attend the conference
- Supports Pre-defined conference which the chairperson makes phone calls for a specific group at once to invite members to the conference
- Supports Ad-hoc conference which the chairperson makes a phone call for each member to invite the member to the conference
- Permits a participant to enter the conference after notifying members in the conference
- Provides the chairperson with additional functions for the conference using personal web page function
- Register and setup function for guidance and greetings for the conference

System Capacity

OfficeServ 7200 provides voice conference with maximally 16 members when the CNF24 is mounted on 16 channel slot.
The number of the CNF24 is restricted as follows.

System	Maximum number of CNF24	Maximum number of members
OS7200 (MP20)	2	24 members, 2 groups (without using recording function)
OS7200 (MP20S)	1	24 members, 1 group (without using recording function)

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Front View of CNF24

The front view of the CNF24 is shown in the figure below:

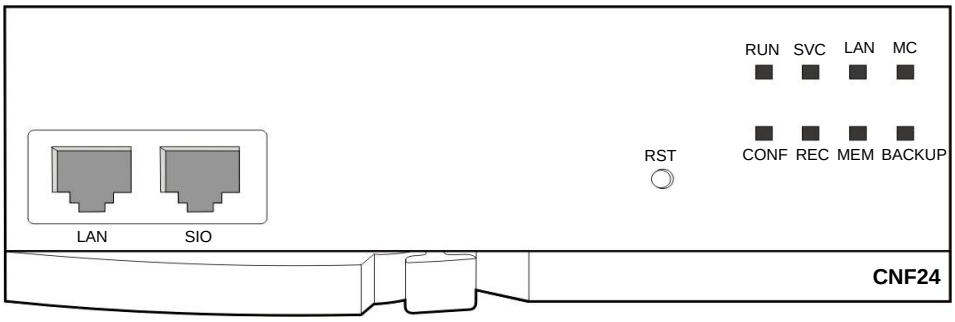

Figure 2.33 Front View of the CNF24

The components on the front panel of the CNF24 have the functions below:

Table 2.36 Ports and LEDs of the CNF24

Ports, LEDs	Functions
LAN	Port that connects the Ethernet. Connector: RJ45 Cable: CAT 5 cable, UTP
SIO	UART port (for tests).
RST	Button for resetting the CNF24.
RUN LED	This LED indicates CNF24 status. - Off: Power is not being supplied. - On: Booting. - Blink: The RAM program is operating.
SVC LED	This LED indicates if the CNF24 service is being offered. This LED turns on when the CNF24 software task can be serviced.
LAN LED	This LED indicates the status of the Ethernet link - Red: Linked as 10 BASE-T Ethernet mode - Red blink: Transmitting/receiving data as 10 BASE-T - Green: Linked as 100 BASE-TX Ethernet mode - Green blink: Transmitting/receiving data as 100 BASE-T - Orange: Linked as 1000 BASE-TX Ethernet mode - Orange blink: Transmitting/receiving data as 1000 BASE-TX - Off: Link off
MC LED	- Green blink: Auxiliary memory (NAND) is accessed. - Off: No access
CONF LED	This LED indicates the number of the conference channel - Green: 1~8 channels conferencing - Orange: 9~16 channels conferencing - Red: 17~24 channels conferencing - Off: No conference

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Table 2.36 Ports and LEDs of the CNF24 (Continued)

Ports, LEDs	Functions
REC LED	This LED indicates the number of the recording channel - Green: Recording 1~2 channels - Orange: Recording 3~4 channels - Red: Recording 5~6 channels - Off: No recording
MEM LED	This LED indicates the capacity status of the recording storage. - Green: Uses 0~49% of the recording storage - Orange: Uses 50~69% of the recording storage. - Red: Uses 70~79% of the recording storage - Red blink: Uses over 80% of the recording storage.
BACKUP LED	This LED indicates the status of backup operation. - Green blink: Makes backup of the recorded data to the web page. - Off: No operation

2.3.6 VMS Board (SVMi-20E)

SVMi-20E is Voice Mailing System (VMS) that its own voice mail box and automatic repeater functions are mounted. SVMi-20E provides all necessary voice mailbox function. This SVMi-20E is the product that is easy to use and install. The SVMi-20E is not available for MP20S.

Main Function

Main Function and Feature of the SVMi-20E are as follows:

- It is available to use the automatic repeater and voice mailbox functions separately, or simultaneously.
- Basically, it is available to process 4 calls at the same time, and if upgraded, 12 calls are available.
- Because SVMi-20E is designed as the type of modular, it is easy to add voice ports if necessary.
- Only one SVMi-20E is available to be installed in the OfficeServ 7200, and it is available to use by connecting other voice mail system to SVMi-20E.

Specification

The specification of SVMi-20E is as follows:

- Maximum Port: 4~12 (Default: 4)
- Maximum Recoding Time: 150hours (HDD model option)
- Maximum Subscriber Number: 0~30000 (Default: 30000)
- Message Holding Period: 0~9999 day (Default: 9999)
- Total Message Number per Mailbox: 0~9999 (Default: 9999)
- Maximum Message Length: 0~9999 sec. (Default: 600)

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Front View of SVMi-20E

The front view configuration of the SBC board, which is the main board of SVMi-20E is as follows:

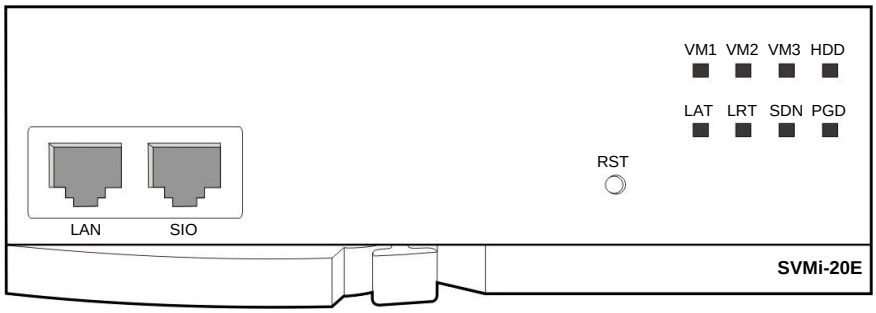

Figure 2.34 Front View of the SVMi-20E

The components on the front panel of SVMi-20E are as follows:

Table 2.37 Ports and LEDs of the SVMi-20E

Ports, LEDs	Functions
LAN	The LAN interface connector is used for data transmission and database backup. It is also called as 'LAN connector' and mainly used for system file transmission (backup and restore) SVMi-20E backs up or restores data by using LAN provided by customer or by connecting to laptop computer or PC connected the relevant LAN connector.
SIO	Used to connect to PC.
RST	If pushing this button, SVMi-20E system starts and the call in progress is disconnected.
VM1 LED	When one or more ports are hooked on/off in the first 4 ports (1~4), it blinks.
VM2 LED	When one or more ports are hooked on/off in the second 4 ports (5~8), it blinks.
VM3 LED	When one or more ports are hooked on/off in the final 4 ports (9~12), it blinks.
HDD LED	If accessing to the hard disk driver, LCD blinks.
LAT LED	When the LAN port is run, LED is turned on into green color.
LRT LED	When transmitting data to LAN, LED is turned on into orange color.
SDN LED	This LED displays the system status. When the system driver is loaded, LED is turned on into red color, and if the loading is terminated, LED is turned into green color.
PGD LED	If the system power is normal, LED is turned on into green color.

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2.4 Station Phones

This section describes the types and features of analogue/digital station phones that can be connected to the OfficeServ 7200.

2.4.1 Regular Phones

The regular phones used for voice calls are connected to the ports of the 8SLI2/16SLI2/ 8COMBO2/16MWSLI mounted on the Universal slot of the OfficeServ 7200.

2.4.2 Digital Phones

Digital phone are used for voice calls or data transmission and connected to the ports of the 8DLI/16DLI2/8COMBO2 mounted on the Universal slot of the OfficeServ 7200.
The digital phones can be used by connecting with devices such as Add On Module (AOM), Keyset Daughter Board (KDB)-D, and KDB-S.

The 5000 Series Digital Keysets are as follows:

14-Button 2-Line LCD Keyset (DS-5014D)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- 14 programmable keys
- Navigation keys for easy use of keyset functions
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

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21-Button 2-Line LCD Keyset (DS-5021D)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- 21 programmable keys
- Navigation keys for easy use of keyset functions
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk-or wall-mounted

7-Button 2-Line LCD Keyset (DS-5007S)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- 7 programmable keys
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

14-Button 2-Line LCD Keyset (DS-5014S)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- 14 programmable keys
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk or wall-mounted

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38-Button 2-Line LCD Keyset (DS-5038S)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- 38 programmable keys
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

12-Button Large LCD Keyset (DS-5012L)

- Large LCD with 12 keys for feature selection
- Supports data transfer, handset calls and full-duplex speakerphone
- USB interface
- Navigation keys for easy use of keyset functions
- 5 fixed-function keys
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes

NOTE

Up to 8 DS-5012L phones can be connected with the DLI module (8DLI).
24 DS-5012L phones can be connected to both the basic chassis and expansion chassis (48 totals).

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2.4.3 IP Phones

Internet (IP) phones use IP addresses to send/receive voice and data. They use existing data network lines, so do not need normal phone lines, and can be connected to devices such as a switching hub. They are connected to other digital phones through the MGI16.

The 5000/5100 Series IP Keysets are as follows:

12-Button Large LCD IP Keyset (ITP-5012L/5112L)

- Large LCD with 12 keys for feature selection
- Supports data and voice transfer using Internet Protocol
- Navigation keys for easy use of Keyset functions
- 5 fixed-function keys
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes

14-Button 2-Line LCD IP Keyset (ITP-5014D)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- Supports data and voice transfer using Internet Protocol
- 14 programmable keys
- Navigation keys for easy use of keyset functions
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk-or wall-mounted

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21-Button 2-Line LCD IP Keyset (ITP-5021D)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- Supports data and voice transfer using Internet Protocol
- 21 programmable keys
- Navigation keys for easy use of keyset functions
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

The 5100 Series IP Keysets are as follows:

12-Button Large LCD IP Keyset (ITP-5112L)

- Large TFT Color LCD with 12 keys for feature selection
- Supports data and voice transfer using Internet Protocol
- Navigation keys for easy use of Keyset functions
- 5 fixed-function keys
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes

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14-Button 2-Line LCD IP Keyset (ITP-5114D)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- Supports data and voice transfer using Internet Protocol
- 14 programmable keys
- Navigation keys for easy use of keyset functions
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk-or wall-mounted

21-Button 2-Line LCD IP Keyset (ITP-5121D)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- Supports data and voice transfer using Internet Protocol
- 21 programmable keys
- Navigation keys for easy use of keyset functions
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk- or wall-mounted

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7-Button 2-Line LCD Keyset (DS-5107S)

- 48-character display (2 × 24) LCD with 3 associated soft keys and scroll key
- Supports data and voice transfer using Internet Protocol
- 7 programmable keys
- 5 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 8 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk-or wall-mounted

5-Button 2-Line LCD Keyset (SMT-i3100)

- 128-character display (8 × 16) LCD with 3 associated soft keys
- Supports data and voice transfer using Internet Protocol
- 5 programmable keys
- 10 fixed-function keys
- Built-in speakerphone
- Keyset Status Indicator
- 5 selectable ring tones
- Volume Up/Down keys for digital control of speaker, handset and ringer volumes
- Desk-or wall-mounted

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2.4.4 Add-On Module (AOM)

DS-5064B 64-Button AOM

- 64 programmable keys with red LEDs
- Up to 4 can be assigned to a keyset to provide additional programmable keys

2.4.5 Keyset Daughter Board (KDB)

5000 Series Keyset Daughter Board

DS-5014D, DS-5021D and DS-5038S keysets support one of 3 different types of daughter board installed on them to enhance operation or to provide an additional local port, depending on the type of daughter board.

KDB-Digital Line Interface (KDB-D)

If your keyset is connected to a Digital Line Interface (DLI) port that supports 2B + D operation, you may install a daughter board that provides a Digital Line Interface (DLI) port for connection of a digital station device such as a keyset or 64 button add-on modules.

KDB-Subscriber Line Interface (KDB-S)

If your keyset is connected to a Digital Line Interface (DLI) port that supports 2B + D operation, you may install a daughter board that provides a Subscriber Line Interface (SLI) port for connection of a standard telephone device such as a cordless phone.

KDB-Full Duplex (KDB-F)

The standard speakerphone mode of operation for 2-line LCD keysets is ‘half duplex’. This means that you cannot transmit and receive speech at the same time. Adding a KDB-F to your keyset will convert the speakerphone into full duplex mode, enhancing its operation. In addition, the KDB-F may have up to 3 external microphones attached to it for conference room type applications. These microphones require an ‘EXTMIC’ key programmed on the keyset to activate or deactivate them.

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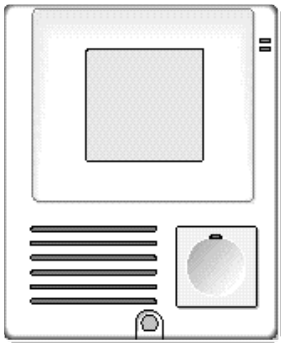
2.4.6 Door Phone and Door Phone Interface Module (DPIM)

The DPIM adapts any DLI circuit for use with the door phone unit. The unit is commonly used to request entry through locked doors (interior or exterior) or as a room monitoring box. It provides contact control to be used with a customer-provided electric door lock. The door phone is wall-mounted. An external weather-resistant unit is also available.

DPIM



Door Phone

Figure 2.35 DPLIM and Door Phone

2.5 Wireless LAN Equipment

This section describes the wireless LAN BTS and mobile stations that can be connected with the OfficeServ 7200.

2.5.1 Wireless LAN Access Point (SMT-R2000)

The Wireless Access Point (SMT-R2000) of 2.4 GHz consists of both wire and wireless processing parts. The wireless processing part has an IEEE 802.11a/b/g standard and wireless LAN RF interface with the wireless frequency band of 2.4 GHz and IEEE 802.11a standard and wireless LAN RF interface with the wireless frequency band of 5 GHz.

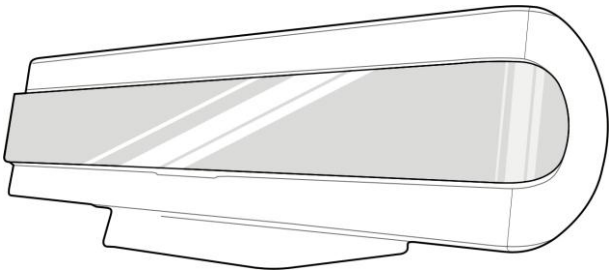


Figure 2.36 SMT- R2000

The wire Ethernet interface is connected with the LAN based on 10/100 BASE-T and transmits/receives data (e.g., Internet access) other than voice. The wireless processing part transmits/receives voice data for wireless voice calls and accesses the wireless Internet.

2.5.2 Mobile Station

The SMT-W5100, which is a local wireless mobile station, uses the wireless LAN of IEEE802.11a/b/g to allow the users to make voice calls. The SMT-W5100 supports hand-over when moving between the APs (SMT-R2000) and can use data terminals such as laptops that enable the wireless LAN in the same place. The SMT-W5100 performs the message service functions supported by the OfficeServ 7200 as well.

Figure 2.37 SMT-W5100

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2.6 Additional Devices

This section describes the types and features of devices that can be connected optionally when the OfficeServ 7200 is installed.

2.6.1 On Hold/Background Sound Source

The OfficeServ 7200 is connected with cassettes or radios in addition to the basic tone provided by the system or internal sound source to allow the subscribers to listen to melodies other than ones specified to the subscribers. The devices such as the cassettes or radios are called on a hold/background sound source.
The on hold/background sound source is mainly used for an on hold tone, background music, or announcement and can be used by being connected with the external sound source devices below:

- FM radio
- CD player
- Cassette tape recorder

NOTE

Output Resistance

The output resistance of FM radios, CD players, or cassette recorders are 8 Ω to 16 Ω.

2.6.2 External Units

The OfficeServ 7200 is connected with external units such as amplifiers or speakers for consumers instead of internal speakers. The external units are connected via the MISC1 port of the MP20 card to the MIS option board. The MIS option board is installed in the MP20.

2.6.3 Loud Bell

The loud bell allows the users to listen to ring signals from outside and amplifiers or external speakers are used for the loud bell.
The loud bell is also connected via the MISC1 port of the MP20 board to the MIS option board. Once the secondary call device is connected, a call signal rings from only a specific phone set to MMC 205 Assign Pair Station of loud bell.

2.6.4 Common Bell

The common bell is a ring that can be specified when a station group is set. Once a station in a group rings, other stations in the same group ring. The common bell is connected via the MISC2 port of the MP20 board to the MIS option board.

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CHAPTER 3. Specifications of the OfficeServ 7200

This chapter describes the capacity of the OfficeServ 7200, various signal specifications, power specifications, rings and tones, compatible boards and terminals, and equipment specifications.

3.1 System Capacity

Up to 180 lines can be installed and operated in the OfficeServ 7200, and the line ratio of the station and trunk line can be adjusted within the capacity limit depending on the user's needs. Table 3.1 below shows the maximum line capacity of the OfficeServ 7200:

Below are the system configuration and the capacities of the system.

Table 3.1 System Configuration

Category	OfficeServ 7200 with MP20	OfficeServ 7200 with MP20S
Cabinet	Basic Cabinet & Expansion Cabinet	Basic Cabinet Only
Media Card	MMC/SD	SD
Slot	10 (5 per one cabinet)	5
Highway Channel	1st cabinet: two 16 ch., three 32 ch. 2nd cabinet: four 16 ch., one 32 ch.	Two 16 ch. slot, three 32 ch. slot
Control Board	MP20, LCP	MP20S
Control board Connector	Link1~3 (HDLC with 2nd), MISC1, MISC2 LAN, SIO	P1~4: Unmanaged Layer2 Switch Port, MISC, LAN, SIO
Web Management	No	Yes
Installation Tool	Yes	Yes
SNMP	No	Yes

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Table 3.2 System Resources

Category	OfficeServ 7200 with MP20	OfficeServ 7200 with MP20S	
Option Board	RCM2/CRM/MISC/IRM	None	
MFR Ch.	16 (CRM 1) 16 (IRM 1)	8 (Embedded)	14
Mobex Ch.	96 (OAS 3)	8 (Embedded)	
CID Ch.	14 (RCM2/CRM 1) 16 (IRM 1)	6 (Embedded)	
R2MFC Ch.	8 (RCM2 1) 14 (CRM 1) 16 (IRM 1)	None	

In OfficeServ 7200 with MP20S, the total number of MFR & Mobex is fixed at 14.
The minimum of each channels are 6, and can be expanded to 8. If the user wants to use 8 MFR channels, the Mobex channels will be 6 channels, and vice versa.

Table 3.3 System VM/MGI/MPS Capacity

Category	OfficeServ 7200 with MP20	OfficeServ 7200 with MP20S
Voice Mail	20 (SVMi-20E)	6 (Embedded)
MGI	96 (6 MGI16)*/64 (6 OAS)**	54 (Embedded 6 & 3 OAS 48)
MPS	192 (6 OAS)	104 (Embedded 8 & 3 OAS 96)

NOTE

- ***** The MGI16 can be used any slot include expansion cabinet, and the OfficeServ 7200 have 10 universal slot. (Max. 5 cards)
- ****** OAS can be used only 32 channels slot, it means this card can be used only 3 slots(slot 3, 4, 5) in main cabinet and 1 slot in expansion cabinet (slot 3). (Max. 4 cards)

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Table 3.4 System Maximum Capacity

Category		OS7200 with MP20		OS7200 with MP20S	
STN	PCM STN	128		64	
	ITP Phone	128		64	64
	Wi-Fi Phone				
	SIP Phone				
	IP-UMS/IVR			**	
	STN Total	128		64	
TRK	PCM TRK	64		60 (48*)	
	SIP TRK	64	64	32	32
	H.323 TRK	32		24	
	SPnet TRK	64		32	
	TRK Total	64		60	
Total	STN+TRK	192		124	
Etc.	Virtual Cabinet	6		5	
	MOBEX standard	120		60	
	MOBEX executive	64		60	
BHCA (0.45 erl, 90 sec)		3,200		2100	
Condition		In case of the unconditional group ring, ring group or paging, each member has one call.			

NOTE

- ***** The capacity for the PCM trunk is considered that two TEPRIa are used. So, in case of U.S.A. the PCM trunk number is 48, and the others are 60.
- ****** In OfficeServ 7200 with MP20S, the IP-UMS, IVR and ACD features are not supported.

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Table 3.5 MP20 maximum resource capabilities with Optional Boards

Option Card		BASE	# of resources of Loc #1			# of resources of Loc #2			TOTAL RESOURCE			Remark Loc #1
Loc #1	Loc #2	MFR	MFR	R2	CID	MFR	R2	CID	MFR	R2	CID	
NONE	NONE	4	-	-	-	-	-	-	4	-	-	-
	RCM2 (R2)	4	-	-	-	-	8	-	4	8	-	-
	RCM2 (CID)	4	-	-	-	-	-	14	4	-	14	-
	RCM2 (R2/CID)	4	-	-	-	-	4	6	4	4	6	-
	IRM (MFR/R2 /CID)	4				4 + 16			8 + 16			IRM provides additional 4 ch.
	CRM (MFR)	4	-	-	-	4+12	-	-	20	-	-	CRM-provides-additional-4-DTMF-Receivers-because-Engine-has-4MFR
	CRM (R2)	4	-	-	-	4	14	-	8	14	-	
	CRM (CID)	4	-	-	-	4	-	14	8	-	14	
	CRM (R2/CID)	4	-	-	-	4	8	6	8	8	6	
MODEM	NONE	4	-	-	-	-	-	-	4	-	-	-
	RCM2 (R2)	4	-	-	-	-	8	-	4	8	-	Modem does not work
	RCM2 (CID)	4	-	-	-	-	-	14	4	-	14	
	RCM2 (R2/CID)	4	-	-	-	-	4	6	4	4	6	
	CRM (MFR)	4	-	-	-	4+12	-	-	20	-	-	CRM provides additional 4 DTMF Receivers because Engine has 4MFR
	CRM (R2)	4	-	-	-	4	14	-	8	14	-	
	CRM (CID)	4	-	-	-	4	-	14	8	-	14	
	CRM (R2/CID)	4	-	-	-	4	8	6	8	8	6	
	IRM (MFR)	4	-	-	-	20	-	-	24	-	-	
	IRM (R2)	4	-	-	-	4	16	-	8	16	-	
	IRM (CID)	4	-	-	-	4	-	16	8	-	16	

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Table 3.5 MP20 maximum resource capabilities with Optional Boards (Continued)

Option Card		BASE	# of resources of Loc #1			# of resources of Loc #2			TOTAL RESOURCE			Remark Loc #1
Loc #1	Loc #2	MFR	MFR	R2	CID	MFR	R2	CID	MFR	R2	CID	
CRM (MFR)	NONE	4	12	-	-	-	-	-	16	-	-	-
	RCM2 (R2)	4	12	-	-	-	8	-	16	8	-	-
	RCM2 (CID)	4	12	-	-	-	-	14	16	-	14	-
	RCM2 (R2/CID)	4	12	-	-	-	4	6	16	8	6	-
	CRM (MFR)	4	12	-	-	12	-	-	28	-	-	-
	CRM (R2)	4	12	-	-	-	14	-	16	14	-	-
	CRM (CID)	4	12	-	-	-	-	14	16	-	14	-
	CRM (R2/CID)	4	12	-	-	-	8	6	16	8	6	-

In case of MP20, the maximum line capacity is basic cabinet + expansion cabinet column but in case of MP20S, the maximum line capacity is basic cabinet column

3.1.1 Trunk Line Capacity

The maximum trunk line capacity of the OfficeServ 7200 is based on its configuration and is shown in the table below:

Table 3.6 Trunk Line Capacity

Control Board	System Configuration	Analog	Digital				IP	
		LOOP TRK	BRI	T1 TRK	E1 TRK	PRI TRK	SPNET	SIP
MP20, MP20S	Basic cabinet	40	40	60	60	T1: 60 E1: 60	60	32
MP20 only	Basic cabinet + expansion cabinet	80	80	60	60	T1: 60 E1: 60	60	32

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3.1.2 Station (Subscriber) Line Capacity

The maximum station line capacity for analog phones and digital phones and IP phones in the OfficeServ 7200 is based on its configuration and is shown in the table below:

Table 3.7 Station Line Capacity

Control Board	System Configuration	Analog phones	Digital Phones	ITP
MP20, MP20S	Basic cabinet	80	80 (24: DS-5012L: 8/board)	16 (PoE, Internal PSU) 120 (use without PoE)
MP20 only	Basic cabinet + expansion cabinet	120	120 (48: DS-5012L: 8/board)	32 (PoE, Internal PSU) 120 (use without PoE)

Table 3.8 Station (IP) Line Capacity

Control Board	System Configuration	IP Station			
		IP Phone	SMT-R2000	SMT-W5100	SIP Phone
MP20, MP20S	Basic cabinet	16 (PoE, Internal PSU) 120 (use without PoE)	32	32	32
MP20 only	Basic cabinet + expansion cabinet	32 (PoE, Internal PSU) 120 (use without PoE)	32	32	32

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3.2 Electrical Specifications

3.2.1 Signal Specifications

The signal processing protocol is used for interfacing messages between the trunk lines/stations and system. Also, the signal processing protocol refers to the method for providing status information.

3.2.1.1 Signaling Type of the Trunk Line

Loop Start

When processing the loop start signals, the on-hook and off-hook status is controlled by the flow of the electric current. The loop is a closed loop trunk circuit or standard 2500-type set loop.

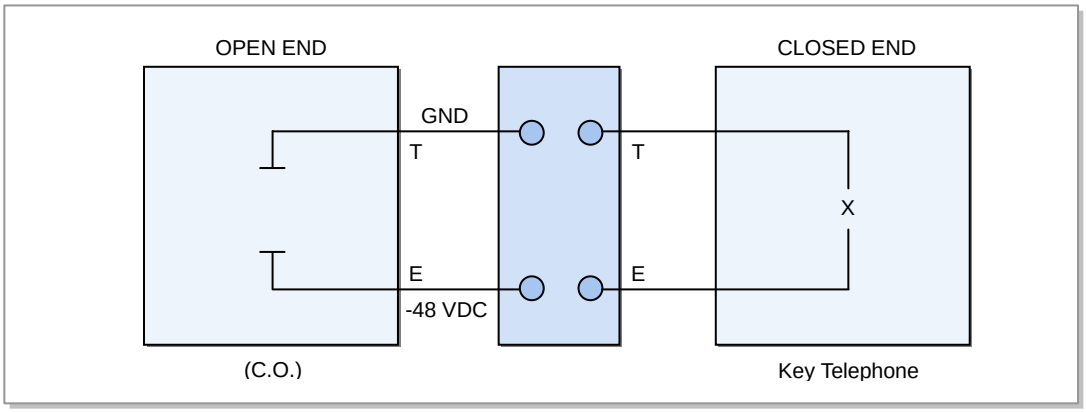

Figure 3.1 Trunk Line Loop Start Signaling

T1 Trunk Line

The electrical characteristics of the T1 trunk line comply with the ITU G.703 and G.704 standards.

Table 3.9 Electrical Characteristics of the T1 Trunk Line

Category		Specification
Transfer speed		1544 Kbits/s ±50 ppm
Code		AMI or B8ZS
Pulse type		Regular square wave: When indicating all valid signals, comply with the mask (G.703) regardless of the codes.
Transmission media		A pair of twisted lines
Load resistance		100 Ω
Indicated (pulse) nominal peak voltage		3.00 V
Signal Level	Power at the frequency of 772 kHz	±12~19 dBm
	Power at the frequency of 1544 kHz	25 dB or higher when the power is less than the power at the frequency of 772 kHz

The signaling specifications and signaling method of the T1 trunk line should comply with the ITU G.703 and G.704 standards.

E1 Trunk Line

The electrical characteristics of the E1 trunk line comply with the ITU G.703 and the G.704 standards.

Table 3.10 Electrical Characteristics of the E1 Trunk Line

Category	Specification
Transmission speed	2048 Kbits/s ±50 ppm
Code	High Density Bipolar of Order 3 (HDB3)
Pulse type	Regular square wave: When indicating all valid signals, comply with the mask (G.703) regardless of the codes.
Nominal and pulse	244 ns
Jitter of the I/O terminal	Refer to the G.823.
Transmission media	A pair of twisted lines
Load resistance	120 Ω
Indicated (pulse) nominal peak voltage	3.00 V
Blank (non-pulse) peak voltage	0 ±0.300 V

The signaling specification and signaling method of the E1 trunk line comply with the ITU G.703 and G.704 standards.

Characteristics of the ISDN Interface Transmission

The electrical characteristics of the ISDN (BRI) interface comply with the ITU I.430 and ETS 300 012 standards.

Table 3.11 Electrical Characteristics of the BRI Trunk Line

Category	Specification
Transmission speed	192 Kbits/s ±100 ppm
Code	AMI
Pulse type	Regular square wave: When indicating all valid signals, comply with the mask (I.403) regardless of the codes.
Transmission media	A pair of twisted lines
Load resistance	120 Ω
Indicated (pulse) nominal peak voltage	2.75 V

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The electrical characteristics of the ISDN (PRI) interface comply with the ITU I.431 and ETS 300 011 standards.

Table 3.12 Electrical Characteristics of the PRI Trunk Line

Category	Specification
Transmission speed	2048 Kbits/s ±50 ppm
Code	High Density Bipolar of Order 3 (HDB3)
Pulse type	Regular square wave: When indicating all valid signals, comply with the mask (I.403) regardless of the codes.
Nominal and pulse	244 ns
Transmission media	A pair of twisted lines
Load resistance	120 Ω
Indicated (pulse) nominal peak voltage	3.00 V
Blank (non-pulse) peak voltage	0 ±0.300 V

The electrical characteristics of the Digital Line Interface (DLI) are shown in the table below:

Table 3.13 Electrical Characteristics of the DLI Line

Category	Specification
Transmission speed	384 Kbits/s
Code	AMI
Pulse type	Typical AMI waveform

3.2.1.2 Signaling Type of the Dedicated Line

Electrical Characteristics of the WIM Interface

The electrical characteristics of the V.35 interface are shown in the table below:

Table 3.14 Electrical Characteristics of the WIM Interface (V.35 Interface)

Category	Specification
Maximum transmission speed	10 Mbits/s
Transmission code	V.35 driver
Number of transmission lines	18
Characteristic resistance	100 Ω
Indicated (pulse) nominal peak voltage	±2 V
Input differential threshold	±80 mV

The electrical characteristics of the RS-232C (V.28) interface are shown in the table below:

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Table 3.15 Electrical Characteristics of the WIM Interface (RS-232C Interface)

Category	Specification
Maximum transmission speed	230 Kbits/s
Transmission code	V.28 driver
Number of transmission lines	14
Characteristic resistance	3 KΩ-7 KΩ
Indicated (pulse) nominal peak voltage	±15 V
Input threshold	+1.2-1.7 V

The electrical characteristics of the RS-449 (V.11) interface are shown in the table below:

Table 3.16 Electrical Characteristics of the WIM Interface (RS-499 Interface)

Category	Specification
Maximum transmission speed	10 Mbits/s
Transmission code	V.11 driver
Number of transmission lines	24
Characteristic resistance	100 Ω
Indicated (pulse) nominal peak voltage	±10 V
Input threshold	±0.3 V

3.2.1.3 Signaling Type of the LAN

The electrical characteristics of the 10 BASE-T, which complies with the IEEE802.3 standard, are shown in the table below:

Table 3.17 Electrical Characteristics of the LAN Interface (10 BASE-T)

Category	Specification
Transmission speed	10 Mbits/s ±50 ppm
Transmission code	Manchester coding - When the transmission data bit is ‘0’, the higher level of the middle bit is inversed into the lower level. When the transmission data bit is ‘1’, the lower level of the middle bit is inversed into the higher level.
Access control method	Carrier Sense Multiple Access/Collision Detect (CSMA/CD)
Transmission media	UTP (Unshielded Twisted Pair) CAT3, CAT4, CAT5, STP (Shielded Twisted Pair)
Number of the UTP pairs	2 pairs
Characteristic resistance	100 Ω
Cable thickness	Diameter: 0.51 mm (24 AWG), External diameter: 5 mm

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The electrical characteristics of the 100 BASE-Tx, which complies with the IEEE802.3u standard, are shown in the table below:

Table 3.18 Electrical Characteristics of the LAN Interface (100 BASE-T)

Category	Specification
Transmission speed	100 Mbits/s ±50 ppm
Transmission code	4B/5B + MLT-3 (4 bit/5 bit) converts the data of 4 bits to the data of 5 bits and encodes the data on the physical layer. Multi Level Transmission-3 (MLT-3) encodes transmission data into 3 levels (high, middle, and low)
Access control type	CSMA/CD
Transmission media	UTP CAT5, STP
Number of UTP pairs	Two pairs
Characteristic resistance	100 Ω
Cable thickness	Diameter: 0.51 mm (24 AWG), External diameter: 6 mm

NOTE

UTP Cable Type

The UTP cable is divided into Straight-through UTP cable and Crossover UTP cable. The Straight-through UTP cable is used to connect the OfficeServ 7200's LIM/PLIM module with other modules (MP20, MGI16, WIM).
The Crossover UTP cable is used to connect between the LIM/PLIM modules only.

The electrical characteristics of the 1000 BASE-TX, which complies with the IEEE802.3ab standard, are shown in the table below

Table 3.19 Electrical Characteristics of the LAN Interface (1000 BASE-TX)

Category	Specification
Transmission speed	1000 Mbits/s
Transmission code	8B1Q4 (the 8 bit transmission data is processed using additional scramble/error detection bits, converted into 9 bit transmission code, mapped into 5 levels/4 amplitude modulated transmission signals using the mapping table, randomized into each pair of actual transmission signals, then transmitted)
Access control type	CSMA/CD
Transmission media	UTP CAT5 (Up to 100 m)
Number of UTP pairs	4 pairs
Characteristic resistance	100 Ω
Cable thickness	Diameter: 0.51 mm (24 AWG), External diameter: 6 mm
Transmission speed	1000 Mbits/s

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Table 3.19 Electrical Characteristics of the LAN Interface (1000 BASE-TX) (Continued)

Category	Specification
Transmission code	8B/10B Data Encoding Processes the 8 bit data received through the upper-layer MAC sub-layer as one nibble, converts each nibble into 10 bit code through the physical layer, and transmits the code. The transmission speed is 1250 Mbps after changing from 8-bit to 10-bit code.
Access control type	CSMA/CD
Transmission media	- SX: Multi-Mode Optical Fiber (MMF) - LX: Multi-Mode Optical Fiber/Single-Mode Optical Fiber (SMF)
Number of Optical Fiber	2 Pairs
Max Transmission Length	- SX: Up to 550 m - LX: Up to 5 km
Cable thickness	Diameter: 0.51 mm (24 AWG), External diameter: 6 mm

Table 3.20 Electrical Characteristics of 1000 BASE-Sx/LX Fiber Optic

Fiber Type	Mode Band (Short Wave/Long Wave MHz.Km)	Transmission Distance (m)	
		1000BASE-SX	1000BASE-LX
62.5uM MMF	160/500	220	550
	200/500	275	550
50uM MMF	400/400	500	550
	500/500	550	550

NOTE

Mode Band

The mode band in the previous table represents the quality of the multi-mode optical fiber relative to the transmission speed. The unit is generally represented in MHz.Km, the optical signal's bit rate (the flickering rate of the optical signal) multiplied by the maximum transmission distance. The higher value means farther transmission of higher optical signal with higher bit rate. When using the short-wave laser and the long-wave laser, a mode band is also specified for each type.

NOTE

Categories of UTP Cable

UTP Cables are classified into Straight-through UTP cable and Crossover UTP cable. The Straight-through UTP cable is used for connecting the LIM or PLIM module of OfficeServ 7200 to other modules (MP20, MGI16, WIM).
The Crossover UTP cable is used for connecting only LIM (PLIM) module to LIM (PLIM) module.

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3.2.1.4 Signaling Type of the Station

Dial Pulse Signaling Type

- Ratio-10 Pulse Per Second (PPS)
- Make/Break Ratio (M/B ratio)-33%: 66% (It can be adjusted by the software.)
- The minimum signaling time between digits-20 ms (It can be adjusted by the software.)

DTMF Push Button Dialing

The DTMF signal processing complies with the ITU standard, which enables the user to send/receive the signals of digital phones through the trunk line and to process the signals of analog phones.

3.2.2 Transmission Characteristics

- Attenuation
  - Attenuation between subscribers: Less than 6 dB
  - Attenuation between the subscriber and local trunk line: Less than 0.5 dB
- Characteristic resistance of the line: 600 Ω
- Weighted noise: Less than-65 dBm
- Crosstalk attenuation: Less than-68 dBm
- Frequency band: 300~3400 Hz
- Insulation resistance: More than 1 MΩ

3.2.3 Line Conditions

- Length for installation:
  - Analog phones: Up to 1 km (When the AWG #24 cable is used)
  - Digital phones: Up to 400 m (When the AWG #24 cable is used)
  - Door phones: Up to 400 m (When the AWG #24 cable is used)
  - AOMs: Up to 400 m (When the AWG #24 cable is used)
- Leakage resistance between lines: More than 20 kΩ
- Leakage resistance between grounds: More than 20 kΩ

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3.3 Power Specifications

3.3.1 Power Supply Unit

The Power Supply Unit (PSU) is installed in the cabinet of the OfficeServ 7200. The PSU supplies the power of -48 V DC received from the external power supply unit to each board. The rating is as follows.

- RATING: AC 220~240 V, 6 A; 50/60 Hz or DC48 V 3 A
- RATING: AC 100~120 V, 6 A; 50/60 Hz or DC48 V 3 A (for U.S.A)

Table 3.21 Power Specifications

Power Supply Unit (PSU)		Specification
PSU	Input power	AC 220~240 V (Other country) AC 100~120 V (USA)
	Output power	- DC -48 V, 2.2 A - DC -5 V, 1.0 A - DC +3.3 V, 10 A - DC +5 V, 8.0 A - DC +12 V, 0.4 A - DC -54 V, 0.4 A (for backup)
External rectifier (OfficeServ 7150)	Input power	AC 110~220 V (Free Volt)
	Output power	DC -54 V, 15 A (Installed 2 Power unit, USA) DC -54 V, 20 A (Installed 2 Power unit, Other country)

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3.3.2 External Rectifier

External Rectifier is an external power resource to supply the power to IP telephone and SMT-R2000 connected the OfficeServ 7200 when using the PLIM.
Because the internal power capacity is not enough, 48 V power source is supplied to the external equipment by connecting the supplementary power source.

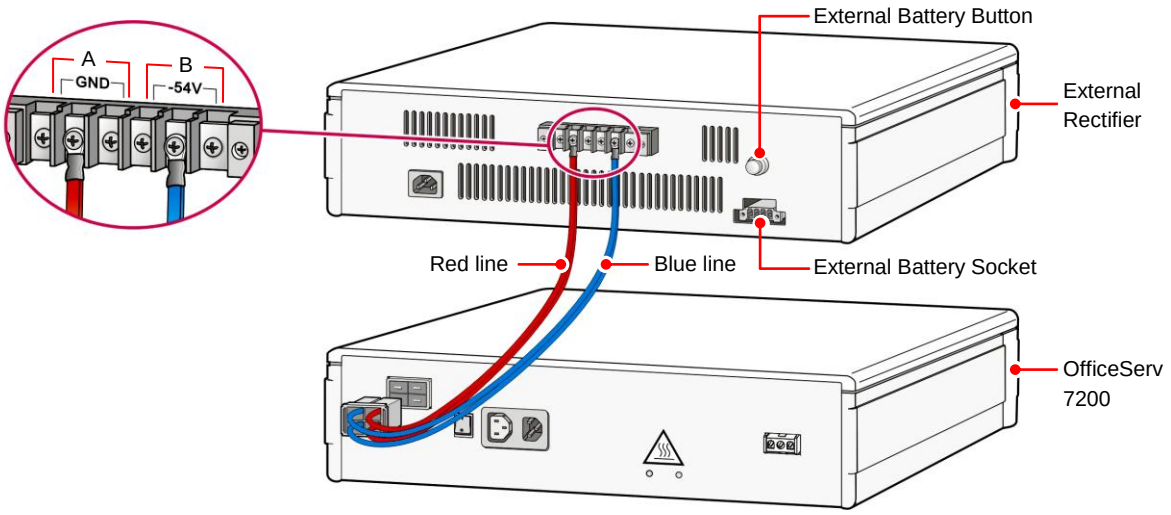

Figure 3.2 External Rectifier

NOTE

Installing an External Rectifier
For details concerning the installation of the external rectifier, refer to the 'OfficeServ 7200 Installation Manual'.

3.4 Rings and Tones

3.4.1 Ring Cycles

The OfficeServ 7200 provides the trunk line rings, station rings, door rings, and alarm rings. The ON/OFF cycle of each ring is shown in the table below:
(It is different according to a country and available to be modified by the software)

Table 3.22 System Ring Cycles

Ring	ON/OFF Cycle
Trunk line ring	1000/2000 ms
Station ring	400/200/400/3000 ms
Door ring	400/200/400/200/400/2000 ms
Alarm ring	400/200/400/200/400/200/400/1000 ms

Ring ON/OFF Cycle

The ON/OFF cycle can be adjusted by changing the values of the system database.

3.4.2 Ring

The output voltage and frequency of the ring signals in the OfficeServ 7200 are as follows:

- Output voltage: 75 Vrms Square Wave (Built in SLI)
  75 Vrms External Sinewave (Italy, Australia)
- Frequency: 20 or 25 Hz

The OfficeServ 7200 provides the users with various tones to notify the users of the status of functional operations and give feedback to the users. The ON/OFF cycles of currently specified tones are shown in the table next page:

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3.4.3 Tones

Table 3.23 Cycles of the System Tones

Tone	ON/OFF Cycle
Dial tone	1000/250 ms
Busy Tone	500/500 ms
Do Not Disturb tone	250/250 ms
Ring Back tone	1000/2000 ms
Call Park tone	Continuous
Confirmation/Caution/Barge-In tone	50/50 ms
Call Back/Hold tone	500/3500 ms
Ring Back tone	1000/2000 ms
Error/Number Unobtainable tone	250/250 ms
Message Camp On tone	Continuous

NOTE

Tone ON/OFF Cycle

The ON/OFF cycle can be adjusted by changing the values of the system database.

3.5 Available Terminals

The terminals available to the OfficeServ 7200 are shown in the table below:

Table 3.24 OfficeServ 7200 Compatible Terminals

Type	Terminal
Digital phone	DS-5014D, DS-5021D, DS-5038D, DS-5012L, DS-4000 series, DS-24SE, DS-24D, DS-2024E, DS-2021E, DS-3020S
IP phone	ITP-5121D/5114D/5107S, ITP-5112L, SMT-i3100
Wireless LAN device (WLAN)	SMT-W5100 (MS), SMT-R2000 (Access Point device)
DSS	DS-64B
AOM	- DS-5064BAOM, DS-4014AOM, DS-4064AOM, DS-24SE AOM, DS-2024EAOM, DS-3020SAOM - The AOM can be interconnected with the OfficeServ 7200's 8 8DLIs, and 8 8COMBO2s.
Others	KDB-S, KDB-D, DPIM, door phone

Compatible Terminals

All the compatible terminals of the iDCS 500 Premium system are available to the OfficeServ 7200 since the compatible terminals can be changed depending on system settings, contact the system administrator.

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3.6 Equipment Specifications

The OfficeServ 7200 consists of the two cabinets shown in the figure below:

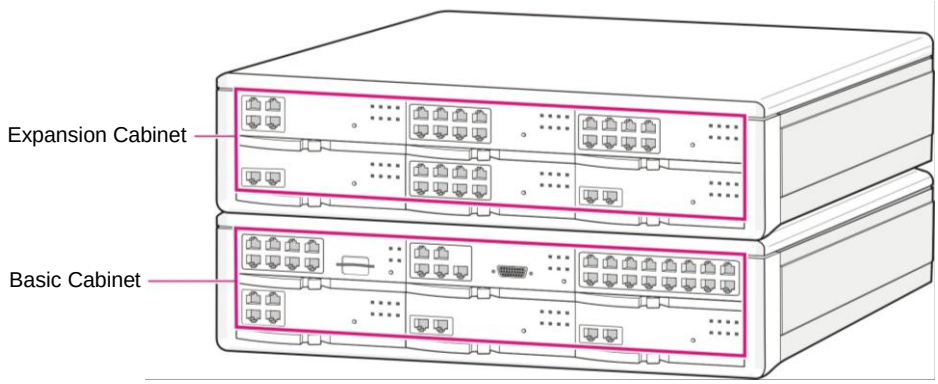

Figure 3.3 Cabinet Configuration of the OfficeServ 7200

- When the OfficeServ 7200 consists of one cabinet (basic cabinet)
  440 (W) × 123.8 (H) × 410 (D) mm
- When the OfficeServ 7200 consists of two cabinets (basic cabinet + expansion cabinet)
  440 (W) × 247.6 (H) × 410 (D) mm

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3.7 Port Number Usage Detail

3.7.1 OfficeServ 7000 Series Port Number

The port numbers used by the OfficeServ 7000 series are represented in the next table.

Table 3.25 OfficeServ 7000 Series Port Number

Category	Service Type	Protocol	Port Number	Remarks
System	SPnet	TCP	6100	For connection setup
			1024~4999	For maintaining TCP Connection
	IP Phone interface	TCP, UDP	6000	For connection setup
		UDP	1024~4999	For signaling to IP phone
	H.323 Gateway	UDP	1719	For connection with Gatekeeper
		TCP	1720	For connection setup
			1024~4999	For maintaining TCP Connection
	SIP Gateway	UDP	5060	For connection setup
	OSM interface	TCP	5000, 5200	OSM connection
	CTI interface	TCP	5002	CTI Connection
	Program Upload		5003	Program upload to Media card
	OfficeServ News		5012	OfficeServ News Server connection
	Installation Tool		5090, 5091	OfficeServ Installation Tool connection
	Web Management		5092, 5094, 6001	Web Server-MP/VM connection
	7200 Web (internal)		5092, 5093	Web Server-MP/VM/ Router connection
	reserved		5000~5099	Reserved for new service
	SMDR Report		5100	SMDR printout to IP connection
	UCD Report		5101	UCD printout to IP connection
	Traffic Report		5102	Traffic Report to IP connection
	Alarm Report		5103	System Alarm Report to IP connection

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Table 3.25 OfficeServ 7000 Series Port Number (Continued)

Category	Service Type	Protocol	Port Number	Remarks
System	Periodic UCD	TCP	5105	Periodic UCD printout to IP connection
	Hotel/Motel Report		5106	Hotel Report to IP connection
	BD-PMS		5107, 5109	Bi-direction PMS connection
	Centralized M & A		5110, 5210	Centralized M & A connection
	GPS Clock		5111	GPS Clock Server connection
	PIN Server		5112	PIN Code Server connection
	SMDR/ANI		5113	SMDR/ANI Server connection
	SMDR Server		5150, 5151	SMDR Server connection
	reserved		5100~5199	Reserved for new service
	QoS Monitor		8500	QoS Monitor Server connection
NMS	NMS	UDP	161	Well-known port. Can set 1024~65535
MGI/OAS	MGI 16, OAS	RTP, RTCP	10000~60000	For stream data. Flexible assigned for channel numbers
		UDP	6000	For Link test with MP20
	MPS	UDP	10000~60000	For stream data. Flexible assigned for channel numbers
	OS7200 MGI	RTP, RTCP	10000~60000	For stream data. Flexible assigned for channel numbers
IP Phone	System Interface	UDP	6000	Signaling for MP20
		RTP, RTCP	9000, 9001	Voice data for MGI or ITP
Wi-Fi Phone	System interface	UDP	8000, 8001	For signaling interface
			10000, 10001	For Link Indication interface
	proprietary DHCP		7000, 7001	For proprietary DHCP (Samsung)
	EasySync		6320	For PC link connection
	SIP		5060, 5080	For SIP interface
	RTP	RTP	8004, 8005	For RTP, RTCP

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3.7.2 OfficeServ Solutions Port Number

The Port numbers used by the OfficeServ Solution are represented in the next table.

Table 3.26 OfficeServ Solution Port Number

Solution	Protocol	Port Number	Remarks
IP-UMS	UDP	5025, 5026	MP20link CS-US
		5061, 5070	SIP CS-US
		14000~14511	RTP, RTCP (= RTP + 1)
	TCP	8080	Web Admin
		20001	File Server
		3681, 50000~55999	Outlook Sync Protocol
		25	Mail Alarm (SMTP)
		110, 995	Pop3, Pop3/SSL
		8624	Port Activity Monitor Program
IP-IVR	UDP	5060	SIP Port
ACD	TCP	18828	SRVPORT
		18818	CNTPORT
		18848	AGTMONISRVPORT
		54301	CTCCMDPORT
		54302	CTCEVTPORT
		17770	IODSMONIPORT
		18000	IODSALARMPORT
		17771	IODSSNDPORT
		17772	IODSRCVPORT
		17773	LOGRCVPORT
		17774	DBNETPORT
		17777	ARSLOGPORT
		17776	IODLOGRCVPORT
		17779	IODUPDATERCVPORT
		2600	ARSSNDPORT
		2601	ARSRCVPORT
		2605	VMSSNDPORT
		2700	ACSSNDPORT
		2701	ACSRECVPORT
		19000	MONIPORT
		19010	PROCMONIPORT
		8500	DBRECVPORT

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Table 3.26 OfficeServ Solution Port Number (Continued)

Solution	Protocol	Port Number	Remarks
ACD	TCP	8501	DBSENDPORT
		10018	CNTMONIPORT
		8600	HOSTPORT
		2555	ACDMANRECPORT
		30000	WallBoardPort1
		30001	WallboardPort2
		30002	WallBoardPort3
VCS	UDP	11000	For EasySync
		9000	Multicast Audio
		9230	Multicast Video
		35000	Live Push Control
		35001	GIPS listen Port
		35100	Live Push Audio
		35102	Live Push Video
		5000~6000	Internal Station
		20000~20100	External Station
		6000~7000	Internal Recording
		20100~20120	External Recording
MCS	UDP	Dynamic	SIP (System: Default 5060~n channels)
	RTP	Dynamic	Voice/Video
Easyset	TCP	5004	Easyset Web Server Listening Port (Can be changed)
OfficeServ Link (All ports can be changed by the option configuration.)	TCP	6000	Licensed Client Connection Port
		6001	CTI Message Monitoring Port (Self Monitoring)
		6002	SMDR & UCD Message Monitoring Port for Samsung Solution like Easyset
		6003	SMDR & UCD ports for 3rd party application
		6500	Server Solution Connection Port

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CHAPTER 4. Functions of the OfficeServ 7200

This chapter describes the functions of the OfficeServ 7200 related to calls, VoIP, data, UMS, and web/system management.

4.1 Call Functions

The OfficeServ 7200 processes the station calls, trunk line calls, application calls, or various signals through the PSTN and VoIP networking.

4.1.1 Dynamic IP Address Allocation

MGI16 Configuration

The MGI16 mounted in the OfficeServ 7200 can be alternatively operated by automatically receiving the dynamically allocated IP address from the data server then manually setting the IP address.

IP Phone Configuration

The IP phones or Session Initiation Protocol (SIP) phones registered to the OfficeServ 7200 also can be alternatively operated by receiving the dynamically allocated IP address from the data server then manually setting the IP address. It can also be operated by fixed IP address.

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4.1.2 Router ALG Interface

NAT Application Level Gateway (ALG)

When various functions such as the VoIP signal process function and gateway function executed through the IP network in the OfficeServ 7200 are executed in the Network Address Translation (NAT) network, the conversion between the private IP address and public IP address should be performed. In this case, the call server and the data server interface with each other and share the information on the conversion between the private IP and public IP, which enables the OfficeServ 7200 to provide services smoothly. Each IP address is translated automatically. This function operates only between the call server and data server of the OfficeServ 7200.

Time Synchronization

In the OfficeServ 7200, the call server and the data server interconnect to each other and synchronize their time. This function is only available between the OfficeServ 7200's call server and data server.

SIP-ALG

When the OfficeServ 7200 functions operating through the IP network such as VoIP signal processing, gateway etc. are operating on the Network Address Translation (NAT) network, it may be necessary to convert between the Private IP address and the Public IP address. For this purpose, an ALG is processed from the Data server's SIP-ALG in response to the Call Server's SIP call.

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4.2 VoIP Functions

The VoIP functions represents the voice communication service offered through the IP network. The voice communication service is based on the standard protocol; the OfficeServ 7200 supports the SIP and H.323 standard protocol.
Its interconnection with the server enables the VoIP service to more users.

4.2.1 VoIP Network

To communicate with another system through the VoIP networking, the MGI16 board must be installed in the OfficeServ 7200.

4.2.2 VoIP Trunk Line Interface

The OfficeServ 7200 provides the VoIP trunk line interface (H.323/SIP).
The OfficeServ 7200 controls calls and the private MGI16 board connects the speech path.

4.2.3 User Registration

The OfficeServ 7200 provides a server-based user registration function. To interconnect and use the device with the server, a user must complete its registration in order to access the service. The SIP interface users are identified by the SIP address in the e-mail format. This function saves and manages the current user's IP address after giving a priority to the IP address. Then, this function provides the user information according to the valid user's demands.

4.2.4 SIP Phone Interface

The OfficeServ 7200 provides a functionality to use the standard SIP phone in a local line. Once the external standard SIP phone is registered as an OfficeServ 7200 phone, it can use the allocated OfficeServ 7200's phone number to provide call processing services between the SIP phones, between the SIP phone and the digital phone, and between the SIP phone and the PSTN trunk line.

Standard SIP Phone Registration

Register a SIP phone operating as a SIP interface to the OfficeServ 7200, and perform the call processing service following the system's numbering plan.

Standard SIP Phone Basic Call Processing

Provides local, trunk line call services through the standard SIP phones registered to the OfficeServ 7200. Diverse features offered from the key phone system are generally not provided on the standard SIP phone; therefore, only the basic local, trunk line call services are provided.

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Standard SIP Phone Additional Call Processing

The following additional local line services are available from the standard SIP phone registered to the OfficeServ 7200.

- Call Hold/Resume
- Consultation
- Call Transfer
- Call Waiting
- Call Pickup
- Call Forwarding
- Conference
- Call Park
- DND
- Call Back
- Message Waiting Indication

4.2.5 Call Log

This records the related information to the call process performed in the SIP telephone which is saved into a file, transmitted and managed into an external system management package.

4.2.6 Forward Busy

The call server always monitors the SIP telephone status through the SIP server.
If the ‘Forward Busy’ function is set, the incoming call is forwarded to the specified telephone number when a call is forwarded to a busy SIP telephone.

4.2.7 Forward No Answer

If the ‘Forward No Answer’ function is set, the incoming call is forwarded to the specified telephone number when a call is not answered for a specific time.

4.2.8 Parallel Forking

If multiple SIP telephones are set to be used by one user in the SIP server and the priority of the call connection is the same, all assigned telephones will ring at the same time when the call is forwarded. When the call is answered on one of assigned telephones, the call will be connected and other ringing telephones will be disconnected.

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4.3 Data Functions

The OfficeServ 7200 functions as a router, switch, performs security functions, or serves as a data network application or data access interface.

4.3.1 Switches

Managed/Unmanaged Switch

- The switch is operated as a managed switch if the WIM is mounted on the Slot1 and the LIM/PLIM is mounted on the Slot 2.
- The PLIM2 is always operated as an unmanaged switch, regardless of the WIM.
- The GPLIMT is always self-operated as a managed switch, regardless of the WIM.
- The switch performs the function of the layer 2 Ethernet switch as well as the Learning Bridge function based on the MAC address filtering and forwarding algorithm.
- The switch supports the full duplex mode by the 10/100 BASE-T auto detection and provides 16 switch ports per switch card.

802.1d Spanning Tree

The switch configures and processes the forwarding tree based on the spanning tree algorithm to prevent a packet forwarding loop in the switch.

802.1p Packet Priority

The switch extracts the priority field from the Ethernet frame configured according to the 802.1p specification standard, and discriminatively processes the frame according to the priority of the specified operation standard.
The packets are categorized into emergent packets and non-emergent packets and are then processed.

VLAN

The Virtual Local Area Network (VLAN) groups the related equipment by the work group according to the LAN operational policy regardless of the location of the user equipment. The VLAN also processes switching for the work groups. The VLAN removes the effects of unnecessary broadcasting packets and configures a stable switching subnet only for the corresponding group by separating and processing the group in the virtual LAN. Accordingly, the switch can provide the differentiated QoS services and the VLAN can be configured based on the switch port and MAC address.
The system automatically configures the VLAN for the IP telephone, signal process gateway, media gateway, and UMS required for services of the OfficeServ 7200, and performs the QoS process. The OfficeServ 7200 provides 32 VLAN groups.

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IGMP Snooping

L2 switch (located in the lower layer of the IP router) without the Internet Group Management Protocol (IGMP) function is located between the IP router and multicast group member (host), intercepts the IGMP messages. Then the L2 switch operates in the IP router like the group member and operates in the group member like the IP router, which is referred to as IGMP Snooping.
The IP layer multicast group information included in the IGMP message is reflected in the MAC filtering database, its own switching database. The group information is processed in the MAC multicast address format mapped with the IP multicast address.

4.3.2 Routers

Various Network Interfaces

The OfficeServ 7200 provides the P1~4 network interfaces, which are connected to the WAN or LAN through an Ethernet interface, provides the serial network connected through the V.35 serial interface.

Static Routing

The OfficeServ 7200 configures a fixed routing table between each network interface to process the static routing. In this case, the routing table cannot be dynamically changed by the routing protocol, and specific routing services will be provided according to the pre-set routing policy.

WAN Interface (Ethernet, PPPoE, DHCP Client)

The OfficeServ 7200 accesses the Internet through the P1~P4 interface by using the PPPoE and DHCP client protocols.

V.35 Interface (PPP, HDLC, Frame Relay)

The OfficeServ 7200 accesses the Internet through the V.35 serial interface in a transfer speed of up to 2Mbps. In this case, the OfficeServ 7200 supports various environments using the functions such as the PPP, HDLC, and Frame Relay Encapsulation.

Subnet Routing

The network interfaces of the P1~4 are configured with different sub-network interfaces, which enable them to perform the routing process with each other.

GRE Tunneling (Generic Routing Encapsulation)

The GRE Tunneling creates a virtual tunnel to provide a logical, non-physical path. A GRE tunnel over IPSec method, interconnected with the VPN, is used for general purposes.
In this case, the original IP header and the payload are encapsulated/encrypted to ensure confidentiality.

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VRRP (Virtual Router Redundancy Protocol)

The VRRP is a Hot Standby function securing the end-host's communication path via the identical Ethernet's backup router in case the main router stops functioning properly.

Routing Protocol

The OfficeServ 7200 supports the routing information-exchanging protocol to react on the network environmental change and to effectively process the routing.

- RIPv1, RIPv2
  These protocols are widely used for managing the routing information in a middle-sized independent network such as a group of LANs
- OSPFv2
  This routing protocol is used prior to the RIP in a large-sized independent network. A router detects and reports any change in the routing table or the network to other routers. In this way, all routers share the same routing information.

IGMPv2 Interface

- This is an Internet protocol that enables an IP terminal or an Internet computer to report multicast groups to nearby routers. The multicasting allows a host computer to send the contents to pre-specified other IP terminals or Internet computers.
- The multicasting is used for modifying the address book of the mobile computer users at the site, sending the company's document according to the distribution list, setting the multicast membership group and broadcasting the broadband width-program of the streaming media to the audience tuning the received wavelength.

Routing Between the VLAN Groups

The communication between the VLAN groups is done through the routing between the VLAN groups.

CBQ/BoD (Bandwidth on Demand)

The queuing process is differentially performed according to the level table where the routing process priority for a data server is defined.

RTP Priority

The Real-Time Transport Protocol (RTP) packet is a VoIP media packet.
The queuing process for the RTP packet is prior to that of other data packets, which helps to maintain the tone quality. This function is useful when using the VoIP function in the network where the VoIP packet that should be processed in real time and other packets for general office work are mixed processed.

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IP-ToS Process

This function checks the Type of Service (ToS) field of the IP header and processes it according to priority of the corresponding routing in the data server. This function reproduces the ToS field flowing into the data server, performs the routing process first of all, and heightens the process priority in the next HOP.

4.3.3 Security

NAT/PT (In/Out/Exclusive/Redirect)

The security function supports the conversion function between the private IP address and public IP address in the network where security is required.
The Inbound, Outbound, Exclusive, and Redirect functions are supported.

- In bound: This function performs the forwarding process for the packet flowing from the WAN to the IP and port of the LAN specified in the NAT/PT conversion table.
- Outbound: This function converts the IP address of the transmitter into the global IP address according to the NAT/PT conversion table for transmitting the packet from the LAN to the WAN.
  - Exclusive: This function is used for the IP address that is not applied by the NAT/PT conversion.
  - Redirect: When the DNS server IP in the data server management sector is changed, each IP terminal uses the pre-DNS IP and this function changes the DNS IP by registering the post-DNS IP into the Redirect table.

Firewall

- Access filtering
  This function prevents the access to disallowed IP addresses to control the access for the resource non-disclosed to the outside and to control the external resource for which the membership in the LAN may access.
- DMZ function
  This function is used for connecting the web server and mail server, which are firewall-protected LAN networks but need to be freely accessed from the outside, to the subnet separated from the LAN network where the firewall blocking is not applied. In this way, the access from the outside can be smoother with the access control service through the firewall.
- Port Forwarding
  This function is almost the same as the DMZ function but is used for connecting to a specific network without a separately divided DMZ port.
  This function is used for the Extra network services as well as the DMZ function.
  The Extra network is configured for a party out of the office to access the Intranet in the office via the Internet. In this network, the user should take care of the security on the Intranet.

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Intrusion Protection System (IPS)

This function monitors the packets on the network and detects and blocks the packets, which can damage the network operation, making the network more stably operated.
The IPS is divided into various types from a detection type where a specific-type attack is detected to the abnormal traffic detecting type, which are based on the Snort Rule (www.snort.org) defining the intrusion pattern and types. The detected packets are sorted and processed into close connection/port or service disable/Alarm/log based on the intrusion pattern and the level and processed. In the case of an alarm, the system will immediately notify the system administrator and protect the packets.

Virtual Private Network (VPN)

- VPN function
  The system provides the private network function by using the Internet that is an open network. The OfficeServ 7200 provides the VPN gateway function based on the IPSec (IP Security), which is useful to build the enterprise network with reduced cost and enforced security by using a public network such as the Internet rather than the dedicated network.
- VPN Transparent Mode
  The data server operates as a VPN client and establishes a VPN channel to a remote VPN equipment to enable data transmission. This mode provides the interface function between each OfficeServ 7200 based on the IPSec and the 3DES and RSA coding function.
- VPN Tunnel Mode
  By establishing a tunnel through the VPN gateways between the OfficeServ 7200 data servers the VPN functions are processed. Up to 100 VPN channels are available for one VPN.

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4.3.4 Data Applications

DHCP

The OfficeServ 7200 can assign the IP address as a DHCP server. When using the DHCP server in another subnet, the OfficeServ 7200 operates as a DHCP relay.
The IP addresses of the IP equipments connected to the OfficeServ 7200 can be easily managed.

SIP Aware ALG (SIP Application Gateway)

This function is used for re-creating packets for smooth communication by checking the SIP signal process packets according to the NAT/PT table in the data server.
When using the data server of the OfficeServ 7200, the SIP equipment can operate regardless of the packet blocking cased by the firewall or the MAT/PT conversion.

System Management Interface

This function allows the administrator to report and manage the alarms, events, traffic, and logging information including the IDS/IPS information of the data server into the system administrator package via the TCP/UDP. Whether to report can be optionally specified based on the management data type.

Management Function

This function is used for configuring the data server function with Command Line Interface (CLI) on the Telnet. The user can configure and view the operation of the data server functional block by using a web browser.

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4.4 System Management

The OfficeServ 7200 provides a user interface that manages various functional blocks of the system. The OfficeServ 7200 also monitors and collects the operational status of the functional blocks in the system.

4.4.1 Web Management

User can manage Telephone and VM/AA server configuration via the embedded web service through web browser.

Database Backup

The admin user can backup (export) and restore (import) the system database file to a media card.

Software Package Upload

The admin user can explore the current package in media card and upgrade it.

User Account Management

The admin user can add and delete User ID and can change User Password. User IDs has each level.

Telephone Management

User can program features of the call server.

VM/AA Management

User can program features of the voice mail server.

4.4.2 Installation Tool

Database Download/Upload

The user can download the database of telephone from system
The user can upload the database of telephone to system

Offline Mode

The user can view and modify the database file of telephone in client PC

File Control

The user can control the files in system
The user can upgrade the system

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Import and Export

The user import the database of telephone from excel file
The user export the database of telephone to excel file

Database Comparison

The user can compare the database file with the other

Telephone Configuration

The user can view and modify the database of telephone

KMMC Search

The user can search the KMMC number and title

4.5 NMS Management Function

The OfficeServ 7200 (only MP20) provides a user interface that works with the OfficeServ NMS through SNMP Agent. The OfficeServ NMS is a Network Management System (NMS) providing the OfficeServ system's operation and maintenance function.

Additionally, the OfficeServ NMS has the following advantages.

Real-Time System Status Monitoring

The OfficeServ NMS uses the SNMP to collect the system errors in real-time.

User Friendly GUI Design

The OfficeServ NMS is developed using standard graphic interfaces. All commands are organized in graphic menus, so the operator can easily understand and use the OfficeServ NMS functions.

Various Statistics Reports

The OfficeServ NMS provides a textual, graph format and statistics of the data such as errors, performances, traffics etc. to the operator. The operator can view the data from a file format or print to the printer.

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ANNEX A. Open Source Announcement

Some software components of this product incorporate source code covered under the GNU General Public License (GPL), the GNU Lesser General Public License (LGPL) and BSD License.

Acknowledgement

To obtain the source code covered under those Licenses, please visit http://www.samsungnetwork.com/Home/opensource
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S/W	License	S/W	License
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mtd	GPL 2.0	ethtool	GPL 2.0
linux kernel	GPL 2.0	dhcpcd	GPL 2.0
busybox	GPL 2.0	xinetd	GPL 2.0
vsftpd	GPL 2.0	glibc	LGPL 2.1
iptables	GPL 2.0	libosip	LGPL 2.1
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ABBREVIATION

A

AA	Auto Attendant
ACD	Automatic Call Distribution
ALG	Application Level Gateway
AME	Answering Machine Emulation
AMI	Alternate Mark Inversion
AOM	Add On Module
AP	Access Point
APLL	Analog Phase Locked Loop
ASIC	Application Specific Integrated Circuit
AWG	American Wire Gauge

B

BRI	Basic Rate Interface
BRM	Basic Rate interface Module
BoD	Bandwidth on Demand

C

CAS	Common Associated Signal
CBQ	Class Based Queuing
CCS	Common Channel Signaling
CDR	Call Detail Record
CID	Caller Identification
CLI	Command Line Interface
CNF	Conference
CODEC	Coder/Decoder
CRC	Cyclic Redundancy Code
CSMA/CD	Carrier Sense Multiple Access/Collision Detect
CTI	Computer Telephony Integration

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D

DASL	Digital Adaptor for Subscriber Loop
DPIM	Door Phone Interface Module
DHCP	Dynamic Host Configuration Protocol
DID	Direct Inward Dialing
DLI	Digital Line Interface
DLM	Digital Line interface Module
DMZ	DeMilitarized Zone
DNS	Domain Name Server
DPIM	Door Phone Interface Module
DSL	Digital Subscriber Line
DSP	Digital Signal Processor
DTMF	Dial Tone Multi Frequency

E

EMC	Electro-Magnetic Compliance
EMI	Electro-Magnetic Interference

F

FXS	Foreign eXchange Station
FXO	Foreign eXchange Office

G

GK	GateKeeper
GPLIMT	Gigabit PoE LAN Interface Module TX
GSIMT	Gigabit Switch Interface Module TX

H

HDB3	High Density Bipolar of order 3
HDLC	High-level Data Link Control
HTRK	Hybrid Trunk

I

IDS	Intrusion Detection System
IGMP	Internet Group Management Protocol
IMAP4	Internet Message Access Protocol version 4
IP	Internet Protocol
IPC	Inter Processor Communication
IRM	Integrated Resource Module
ISDN	Integrated Services Digital Network
IPSec	Internet Protocol Security
ITU	International Telecommunication Union

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K

KDB	Keyset Daughter Board

L

LAN	Local Area Network
LCD	Liquid Crystal Display
LCP	Local Control Processor
LCR	Least Cost Routing
LED	Light Emitting Diode
LIM	LAN Interface Module

M

MP20	Main control Processor 20
MP20S	Main control Processor 20 for Single cabinet
MGI	Media Gate Interface
MIS	Miscellaneous
MMC	Man Machine Communication
MPD	Metering Pulse Detection

N

NAT	Network Address Translation

O

OAS	OfficeServ Application Server
OSPF	Open Shortest Path First

P

PCM	Pulse Code Modulation
PFT	Power Fail Transfer
PoE	Power over Ethernet
POP3	Post Office Protocol 3
PPP	Point to Point Protocol
PPPoE	PPP over Ethernet
PPS	Pulse Per Second
PRI	Primary Rate Interface
PRS	Polarity Reverse Signal
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit
PLIM	PoE LAN Interface Module
PLIM2	PoE LAN Interface Module version 2

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Q

QAM	Quadrature Amplitude Modulation
QoS	Quality of Service

R

RCM	R2 Caller identification Module
RTP	Real-time Transmission Protocol
RTPT	Real-time Transmission Protocol Transfer
RTPR	Real-time Transmission Protocol Receiver

S

SIP	Session Initiation Protocol
SL2	Subscriber Line interface module 2
SLI	Subscriber Line Interface
SLM	Subscriber Line interface Module
SMDR	Station Message Detail Recording
SME	Small Medium Enterprise
STP	Signaling Transfer Point
SMTP	Simple Mail Transfer Protocol
SWM	Switch Module

T

TAPI	Telephony Application Programming Interface
TEPRIa	T1 E1 Primary Rate Interface advanced
ToS	Type of Service
TRK	Trunk
TRM	Trunk Module
TTS	Text-To Speech

U

UA	User Agent
UART	Universal Asynchronous Receiver and Transmitter
UDP	User Datagram Protocol
UMS	Unified Messaging Service
UNI	Universal

V

VDSL	Very high bit rate Digital Subscriber Line
VLAN	Virtual Local Area Network
VMS	Voice Mailing System
VoIP	Voice over Internet Protocol
VPM	Voice Processing Module
VPN	Virtual Private Network

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W

WAN	Wide Area Network
WIM	WAN Interface Module
WLAN	Wireless Local Area Network

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WEEE SYMBOL INFORMATION

Correct Disposal of This Product (Waste Electrical & Electronic Equipment)

(Applicable in the European Union and other European countries with separate collection systems)

This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g., charger, headset, USB cable) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

EEE Yönetmeliğine Uygundur (This EEE is compliant with RoHS)

BATTERY SYMBOL INFORMATION

Correct disposal of batteries in this product

(Applicable in the European Union and other European countries with separate battery return systems.)

This marking on the battery, manual or packaging indicates that the batteries in this product should not be disposed of with other household waste at the end of their working life. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66. If batteries are not properly disposed of, these substances can cause harm to human health or the environment.

To protect natural resources and to promote material reuse, please separate batteries from other types of waste and recycle them through your local, free battery return system.

OfficeServ 7200

System Description

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