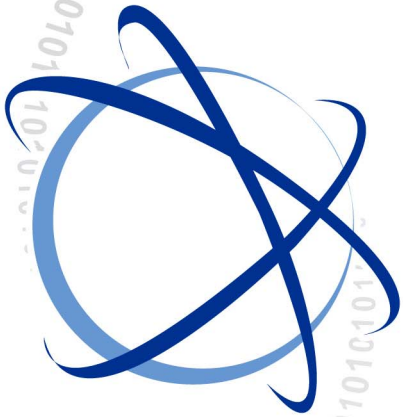
Ed. 00

OfficeServ 7200

General Description Guide

12. 2003.



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INTRODUCTION

Purpose

This document introduces the OfficeServ 7200 from Samsung and describes the hardware configuration, specifications, and functions of the OfficeServ 7200, which are needed to understand the OfficeServ 7200.

Audience

This document is intended for the users who want to understand information(major functions, hardware configuration, specifications, and functions) about the OfficeServ 7200 from Samsung.

Document Content and Organization

This document consists of four chapters as follows:

CHAPTER 1. Introduction to the OfficeServ 7200

Describes the features and major functions of the OfficeServ 7200 and introduces the system architecture, interfaces, and programming.

CHAPTER 2. Hardware of the OfficeServ 7200

Introduces the features of the OfficeServ 7200 hardware, cabinet configuration, and the functions and configurations of the functional boards. Also, describes a variety of terminals, wireless LAN equipment, and additional equipment that can be connected with the OfficeServ 7200.

CHAPTER 3. Specifications of the OfficeServ 7200

Describes the capacity, electric specifications, power specifications, rings and tones, and equipment specifications of the OfficeServ 7200 system.

CHAPTER 4. Functions of the OfficeServ 7200

Describes the functions related to the calls, VoIP, data, UMS, and web/system management provided by the OfficeServ 7200.

ABBREVIATION

Introduces the acronyms and their full terms.

Conventions

The following special paragraphs are used in this document to point out information that must be read. This information may be set-off from the surrounding text, but is always preceded by a bold title in capital letters.

WARNING

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

CAUTION

Provides information or instructions that the reader should follow in order to avoid a service failure or damage to the system.

CHECKPOINT

Provides the operator with checkpoints for stable system operation.

NOTE

Indicates additional information as a reference.

OPERATION PROCEDURES

Indicates the operational procedures that should be executed in sequence.

References

OfficeServ 7200 Installation Guide

This guide provides the information about the installation of the OfficeServ 7200.

Revision History

EDITION	DATE OF ISSUE	REMARKS
00	12. 2003.	Original

TABLE OF CONTENTS

CHAPTER 3. Specifications of the OfficeServ 7200

CHAPTER 4. Functions of the OfficeServ 7200

ABBREVIATION

LIST OF FIGURES

LIST OF TABLES

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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 Introduction to the System

The OfficeServ 7200 is a communication device, which is most suitable for small offices where less than 50 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 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 easily.

Next-generation Platform

The OfficeServ 7200 uses an IP-based feature server to provide an IP solution, which integrates the functions of mail servers, Session Initiation Protocol(SIP) servers, and Voice over IP Unified Messaging Service(VoIP UMS).
The IP-based feature server is a Linux platform and can continuously add feature server modules to be provided in the future. Examples of the feature servers include the mobile roaming server and Authentication, Authorization and Accounting(AAA) server.

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)

WAN/LAN Functions

The WAN and LAN interface modules are installed in the OfficeServ 7200; thus, data can be sent/received via the interface of the 10Base-T/100Base-Tx in both the external Internet and the internal Intranet without any data equipment.

Wireless LAN Services

The OfficeServ 7200 offers a wireless LAN solution for both wire and wireless services at offices. The OfficeServ 7200 uses a combined Access Point(AP), which offers services by separating the data from voice, and 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.

Text-To Speech (TTS) Responses

The OfficeServ 7200 converts text messages such as e-mails to voice messages and allows the users to listen to the messages through phones. Also, it recognizes the voices and responds to them.

Mail Server and Instant Messaging

The OfficeServ 7200 integrates voice messages and e-mails to function as an e-mail server, which converts the integrated messages depending on the users' needs and resends them, and sends/receives instant messages.

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.

About Integrated and References

- 'Integrated' means that the OfficeServ 7200 system 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.

1.2 System Architecture

The OfficeServ 7200 is configured with a basic cabinet and expansion cabinet mounted on a 19-inch rack as well as the OfficeServ feature server mounted on an external Linux server.
The Main Control Processor(MCP) is installed into the basic cabinet and manages the entire OfficeServ 7200. It performs switching, processes signals, or manages the phones. The expansion Line Control Processor(LCP), which is the sub-control part, is installed into the expansion cabinet, controls boards, or sends/receives data to/from the MCP. The other components are various interface boards, power modules, and fans.

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

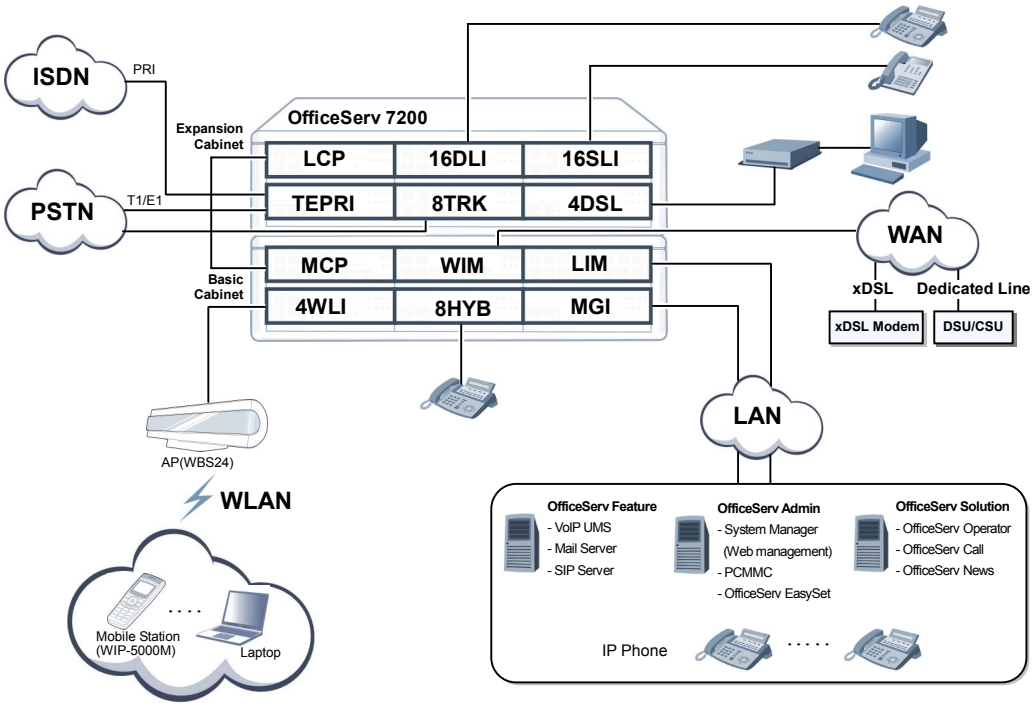

Figure 1.1 Service Structure of the OfficeServ 7200

Voice Trunk Line Part

The voice trunk line part is configured with digital trunk lines and analog 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. The 8TRK modules perform Polarity Reverse Detection(PRS), Metering Pulse Detection(MPD) and Caller ID(CID) Detection in a board and send/receive voice data via analog trunk lines. Also, it transmits the data of 64 Kbps per line.

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 analog voice stations. Multiple DLI and SLI boards can be mounted on any slots of the main or expansion cabinet depending on the numbers of analog/digital voice stations. 16DLI and 8DLI are Digital Line interface boards. 16SLI and 8SLI are analog Subscriber Line interface boards. In addition, the hybrid-type 8HYB, which contains interface circuits for analog and digital stations, exists.

Data Transmitting Part

The data module is configured with the WIM, which is a WAN interface board, and the LIM, which is a LAN interface board. The WIM board sends or receives data to or from the external Internet and provides ports for connecting the internal network with a variety of external interfaces.
The LIM board sends or receives data to or from the internal Intranet and provides an interface of 10Base-T/100Base-Tx. Also, the LIM functions as a switching hub.
The 4DSL board offers services to the data subscribers up to 1.2 km away from the internal Intranet. The subscribers can use the Ethernet service within a transmission distance of 1.2 km.

Voice Application Service Part

The voice application module consists of the VoIP that transmits the voice to the data network and the WLAN that transmits the voice wirelessly. The MGI board offers the VoIP function by converting voice into data. The 4WLI board uses a Digital Adaptor for Subscriber Loop(DASL) to connect to the wireless BTS and sends/receives voice to/from the phone system and wireless BTS. The 4WLI accommodates up to four BTSs and 48 subscribers.

Configuration of the Application

The OfficeServ 7200 has a commercial server on a Linux platform outside of the OfficeServ 7200 cabinet and provides the application software below:
The OfficeServ Solution and OfficeServ Admin have separate servers.

- Mail server
- SIP server
- VoIP-UMS
- OfficeServ Solution(CTI, OfficeServ Operator)
- OfficeServ Admin(Web Management, PCMMC, OfficeServ EasySet, System Manager)

2 Interfaces

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

2.1 Interfaces Between the Sub-Modules

Table 1.1 Interfaces Between the Sub-Modules

Type	Classification	Interface
LIM Interface	Physical Connection	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-Tx
	Connector Type	RJ-45 16 port
WIM Interface	Physical Connection	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-Tx, V.35
	Connector Type	RJ-45, serial 26-pin connector(non-standard cable)
	Access Protocol	PPPoE, PPP, DHCP, HDLC, Frame Relay
PSTN Interface	Physical Connection	T1, E1, Foreign Exchange Office(FXO)
	Connector Type	RJ-45
	Access Protocol	T1, E1, Loop Start
ISDN Interface	Physical Connection	ISDN PRI
	Connector Type	RJ-45
	Access Protocol	ISDN PRI
xDSL/Cable Modem Interface	Physical Connection	IEEE 802.3u 100Base-Tx 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, WBS24(wireless LAN AP of Samsung)
Interface between the call server and data server	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	UDP IPC
Interface between the call server and SIP server	Physical Connection	100Base-Tx Ethernet
	Signal Processing	SIP
	Access Protocol	User Agent(UA) to UA
Interface between the call server and system manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	TCP, UDP IPC

Type	Classification	Interface
Interface between the data server and feature manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	DHCP
Interface between the data server and system manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	TCP, UDP IPC
Interface between the feature server and system manager	Physical Connection	100Base-Tx Ethernet
	Signal Processing	TCP/IP
	Access Protocol	TCP, UDP IPC

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

The interface inter-working standards between the VoIP elements based on the signal processing are as follows:

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

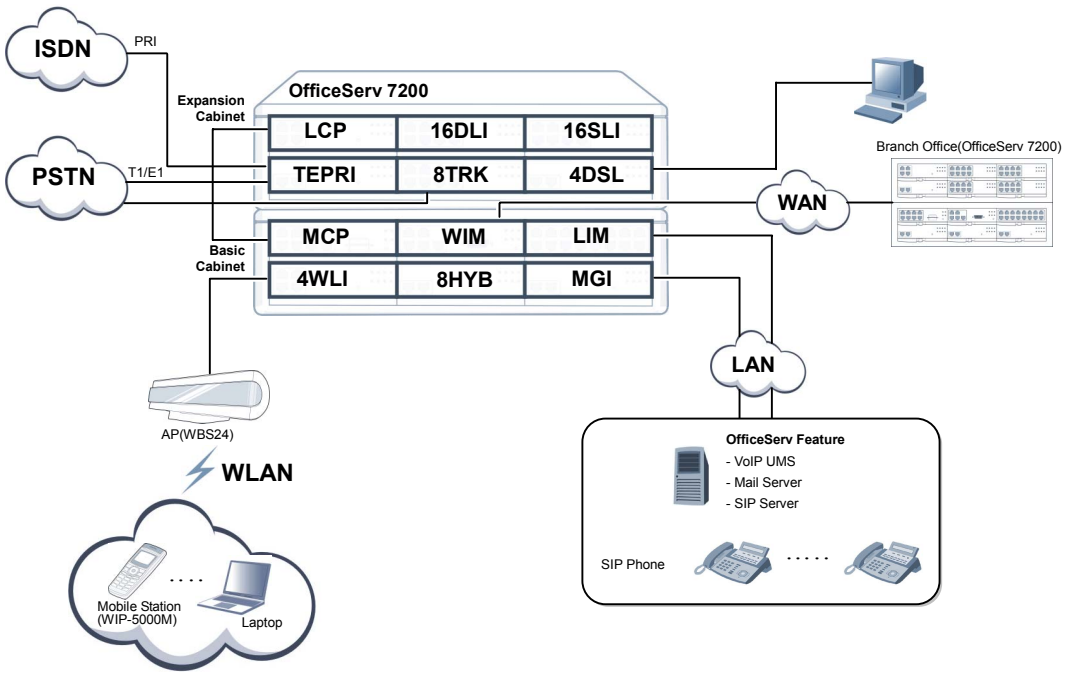

Figure 1.2 Interfaces Between the SIP Components

3 Programming

The Man Machine Communication(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 cannot. A password is required for the technician programming or operator programming; however, a password is not required for the subscriber 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.

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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 system. Also, this chapter describes the terminals, wireless LAN equipment, and additional equipment available in the OfficeServ 7200 system.

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.

Maintenance

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

- The specifications of the 19-inch rack are followed. The rack is designed to maintain sufficient strength.
- The installers or maintainers can connect cables easily because 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 ground hole to which a wrist strap for preventing static electricity can be connected.
- 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.

- A specific heat-generated part of the hardware is blocked in order not to affect the temperature-sensitive components.
- Two 80 mm fans for cooling are installed to exhale internal air to the outside.
- The parts installed into the modules are located based on heat distribution.

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 MCP, 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 MCP. In addition, line boards, power, and cooling fans are in the OfficeServ 7200 cabinets.

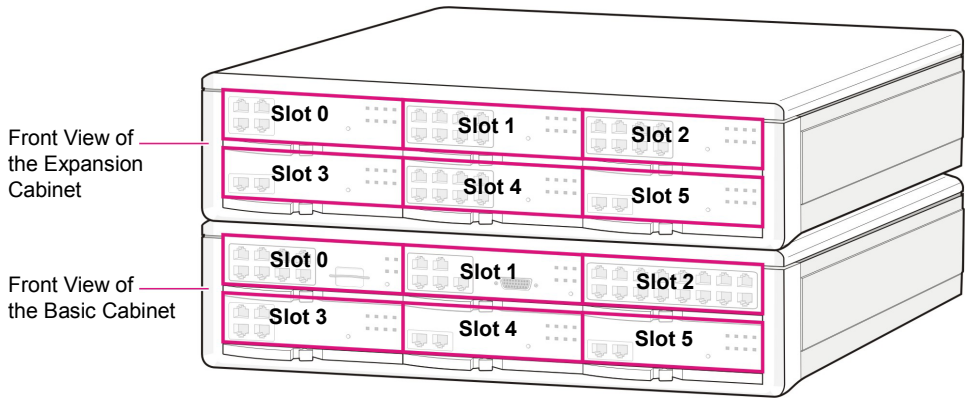

Figure 2.1 Cabinet Configuration of the OfficeServ 7200

Table 2.1 Boards that can be Mounted on the Slots

Cabinet	Slot	Mountable Boards
Basic Cabinet (OfficeServ Access)	Slot 0	MCP only
	Slot 1	All boards except for MCP, LCP, TEPRI, and LIM
	Slot 2	All boards except for MCP, LCP, TEPRI, and WIM
	Slot 3	All boards except for MCP, LCP, and WIM
	Slot 4	
	Slot 5	
Expansion Cabinet (OfficeServ Expansion)	Slot 0	LCP only
	Slot 1	All boards except for MCP, LCP, TEPRI, and LIM.
	Slot 2	
	Slot 3	All boards except for MCP, LCP, and WIM
	Slot 4	All boards except for MCP, LCP, TEPRI, and WIM
	Slot 5	

- The WIM board can be mounted only on Slot 1 of the basic and expansion cabinets.
- The TEPRI board can be only mounted on Slots 3,4, and 5 of the basic cabinet and Slot 3 of the expansion cabinet.
- The LIM board cannot be mounted on Slot 1 of the basic/expansion cabinet.

NOTE

About the Managed LIM

The Managed LIM is controlled by the WIM. It provides expanded functions about the management of Layer2 QoS(e.g. 802.1p(packet priority), 802.1q(VLAN), and IGMP snooping) as well as Layer 2 switching.

2.1 Rear Panel of the OfficeServ 7200

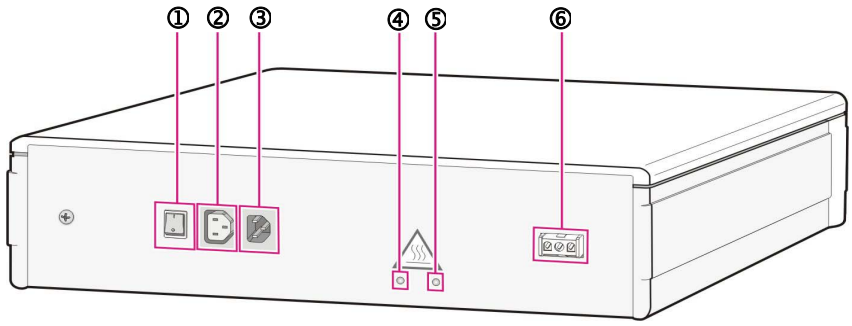

Figure 2.2 Rear Panel of the OfficeServ 7200

① Power switch
Turn on/off the power of the OfficeServ 7200.

② Power connector between the basic cabinet and expansion cabinet
This connector connects the power supplied to the basic cabinet with the expansion cabinet.

③ Power I/O connector
This connector connects the power cables that are configured with three inlets/outlets.

④ AC LED
This LED turns on when the AC power is supplied.

⑤ DC LED
This LED turns on when the DC power is properly supplied.

⑥ A Socket for backup battery cable
This socket connects the external batteries.

3 Functional Boards

Both the basic cabinet and expansion cabinet of the OfficeServ 7200 have six slots on which boards can be mounted. The boards below can be mounted on the slots depending on the configuration type of the OfficeServ 7200:

Table 2.2 Functional Boards

Function	Boards
Main Control Part	Basic cabinet : MCP(optional board : RCM, MFM, or MIS) Expansion cabinet : LCP
Voice Trunk Line	TEPRI, 8TRK
Voice Station	16DLI, 8DLI, 16SLI, 8SLI, 8HYB
Data	WIM(optional board : WIMD), Managed/Unmanaged LIM, 4DSL
Voice Application	4WLI, MGI(optional board : MGI1D/2D)
Power, Fan	PSU, fan

3.1 Control Boards

This section describes the configuration and functions of the MCP, which is the main control board that controls all the functions of the OfficeServ 7200, and those of the LCP, which is the minor control board.

3.1.1 MCP

The MCP 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 MCP performs voice switching, processes signals, and manages the subscriber terminals.

Major Functions

The MCP performs the functions below:

- Operates applications through the LAN interface.
- Installation using the SmartMedia board.
- Back ups the databases.
- Provides ports for the Universal Asynchronous Receiver and Transmitter(UART) test.
- Holds a meeting, detects caller IDs and multi-frequency, or controls door phones.
- Functions as the internal/external MO 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.

Specifications

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

Table 2.3 Specifications of the MCP

Category	Name	Specifications
CPU	Processor	MPC855T
	System clock	50 MHz
	Package	357P BGA
SDRAM	Capacity	64 MB
	Data bus width	32 bit
	Saves programs and data	
SRAM	Capacity	4 MB
	Data bus width	32 bit
	Saves data	
Flash ROM	Capacity	512 KB
	Data bus width	8 bit
	For booting	
Time Switch	Basic switch	256(Tx)x256(Rx)
	Data bus width	16 bit
Others	Internal MOH port	1
	External MOH port	2

Front View

The front view of the MCP board is shown in the figure below:

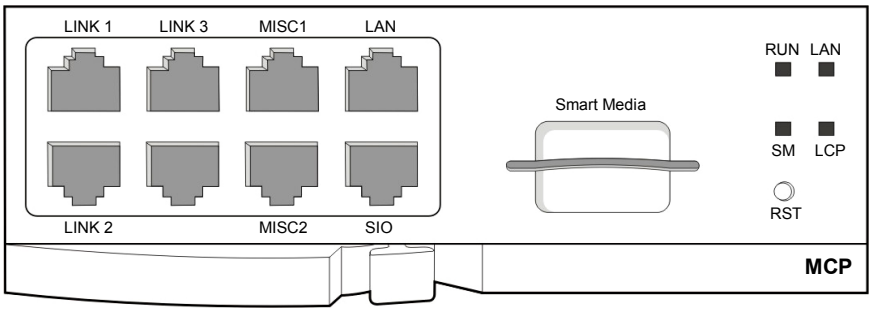

Figure 2.3 Front View of the MCP

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

Table 2.4 Ports and LEDs of the MCP Board

Ports & LEDs	Function Description
LINK1~LINK3	Ports that connect the MCP with the LCP.
MISC1~MISC2	Ports that connect external music sources, paging device, loud bell, common bell, or door bell.
SmartMedia	Port for installing the NAND-type flash memory.
LAN	Port for establishing the 10Base-T/100Base-Tx Ethernet connection.
SIO	UART port(for tests).
RST	Button for resetting the MCP board.
RUN LED	This LED indicates the status of the MCP. - Off : Power is not connected. - On : Booting. - Blink : The program is operating properly.
LAN LED	This LED indicates the status of the connection to LAN. - Off : MCP is not connected to LAN. - On : MCP is connected LAN. - Blink : MCP is transmitting or receiving Data through LAN port.
SM LED	This LED indicates the status of the SmartMedia access. - Off : The Smartmedia is not installed. - On : The SmartMedia is installed, however is not accessed. - Blink : The SmartMedia is installed and is being accessed.
LCP LED	This LED indicates the status of signaling message processing. - Off : There's no message exchange between MCP and LCP. - On : Messages are being sent/received to/from the LCP.

3.1.2 LCP

The LCP is the minor control board that inter-works the MCP, 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 MCP.

Front View

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

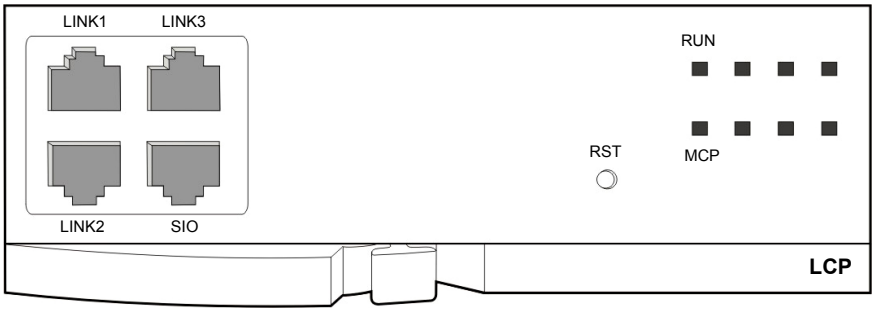

Figure 2.4 Front View of the LCP

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

Table 2.5 Ports and LEDs of the LCP

Ports & LEDs	Function
LINK1~LINK3	Ports that connect the MCP 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. - Blink : The RAM program is operating.
MCP LED	This LED indicates the status of signaling message processing. - Off : There's no message exchange between MCP and LCP. - On : Messages are being sent/received to/from the MCP.

3.2 Voice Trunk Line Board

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

3.2.1 TEPRI

The TEPRI board provides the digital trunk line. A TEPRI board provides E1, T1, or ISDN PRI and functions as the Q-SIG. This board transmits voice via the trunk line and a channel transmits the voice data of 64 Kbps.

Major Functions

The TEPRI voice trunk line board 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.
- Accomodates High level Data Link Control(HDLC) protocol in Common Channel Signaling(CCS) mode or Common Associated Signal(CAS) mode.

Specifications

The specifications of the TEPRI voice trunk line board are as follows:

- One trunk line port
- E1 : 30 channels
- T1 : 24 channels
- PRI : 30 channels

Front View

The front view of the TEPRI board is shown in the figure below:

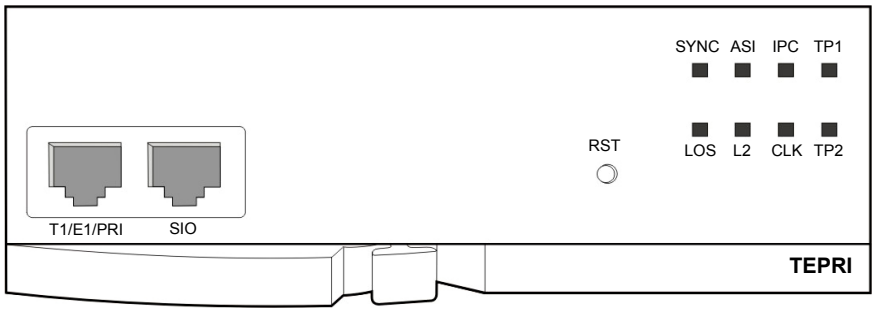

Figure 2.5 Front View of the TEPRI

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

Table 2.6 Ports and LEDs of the TEPRI

Ports & LEDs	Function Description
T1/E1/PRI	Ports that connect the T1/E1/PRI cable.
SIO	UART port(for tests).
RST	Button for resetting the TEPRI board.
SYNC LED	Clock synchronization. - On : Clocks are not synchronized when they inter-work with the counterpart station. - Off : Clocks are synchronized when they inter-work with the counterpart station.
LOS LED	This LED indicates whether signals have been lost. - On : Signals have been lost. - Off : Signals have not been lost.
AIS LED	This LED indicates whether the T1/E1 remote alarm has been generated. - On : The remote alarm has been generated. - Off : The remote alarm has not been generated.
L2 LED	This LED indicates the operation status of Layer 2 - On : The PRI Layer2 is operating properly. - Off : The PRI Layer2 is operating abnormally.
IPC LED	This LED indicates that this board is inter-working with the higher-level module. - On : The board is inter-working with the MCP/LCP. - Off : The board is not inter-working with the MCP/LCP.

Ports & LEDs	Function Description
CLK LED	This LED indicates whether this board is a master or slave. - On : The board has received the synchronization clock from the counterpart station. - Off : The board has sent the synchronization clock to the counterpart station.
TP1 LED	This LED indicates whether the T1 is established. - This LED turns on once the T1 is established.
TP2 LED	This LED indicates whether the PRI is connected. - This LED turns on once the PRI is connected.

3.2.2 8TRK

The 8TRK board 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 voice trunk line board performs the functions below:

- Detects ring connection.
- Detects on/off-hook.
- Sends dial pulse.
- Performs Polarity Reverse Detection(PRD).
- Performs Metering Pulse Detection(MPD).
- Performs the Caller ID(CID) function.
- Periodically checks if the line is connected. If so, the voice data can be transmitted. This function is called line monitoring.
- Functions as the relay path of caller information(When caller information is entered as 8TRK, connect the RCM, which is an optional board, with the MCP so that the caller information can be checked in the RCM board.).

Specifications

The 8TRK voice trunk line board has eight trunk line ports.

Front View

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

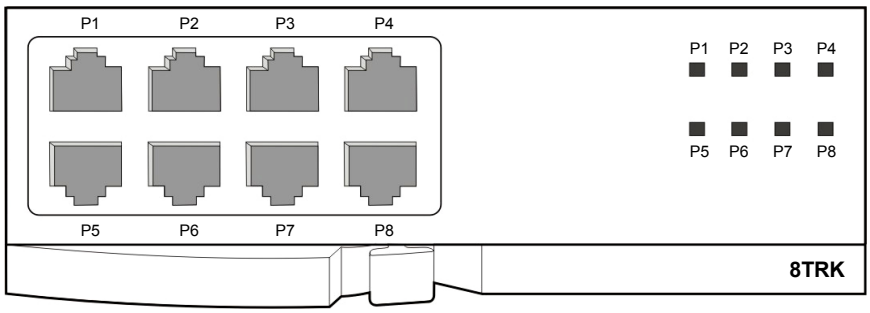

Figure 2.6 Front View of the 8TRK

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

Table 2.7 Ports and LEDs of the 8TRK

Ports & LEDs	Function Description
P1~P8	Trunk ports.
P1~P8 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.

3.3 Voice Subscriber Line Board

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

3.3.1 8SLI/16SLI

The 8SLI/16SLI board has 8/16 ports for analog stations. It inter-works with the analog phones via the trunk line to make a voice communication.

Major Functions

The major functions of the 8SLI/16SLI board 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 8SLI/16SLI board are as follows:

- 8SLI board : 8 station ports
- 16SLI board : 16 station ports

Front View of the 8SLI

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

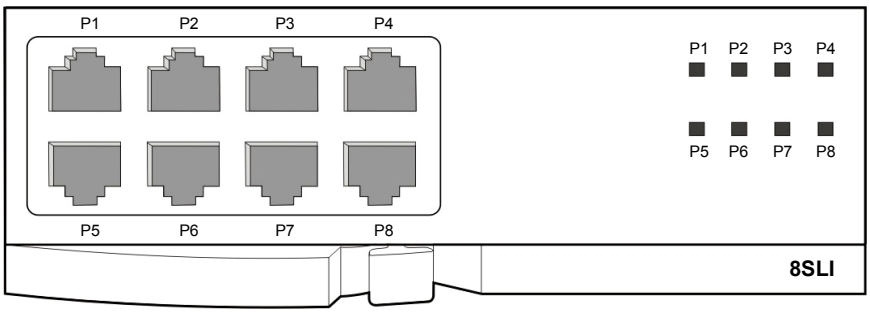

Figure 2.7 Front View of the 8SLI

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

Table 2.8 Ports and LEDs of the 8SLI

Ports & LEDs	Function Description
P1~P8	Station ports for analog phones.
P1~P8 LED	These LEDs indicate the operation status of the ports. - Off : The station is not being serviced. - On : The station is being serviced.

Front View of the 16SLI

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

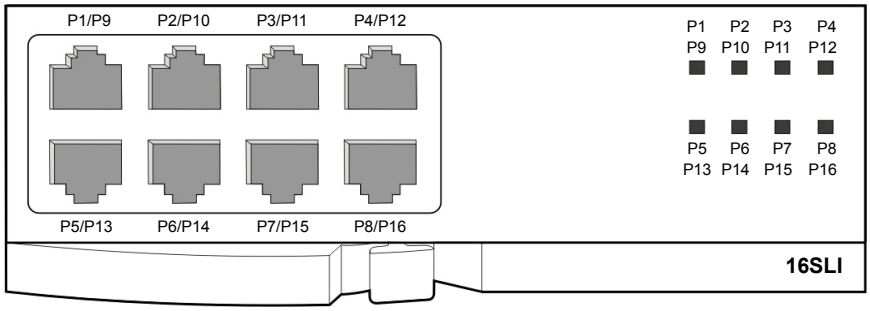

Figure 2.8 Front View of the 16SLI

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

Table 2.9 Ports and LEDs of the 16SLI

Ports & LEDs	Function Description
P1~P16	Station ports for analog phones.
P1~P16 LED	These LEDs indicate the status of the ports. - Off : The station is not being used. - On : The station is being used. If the LED turns green, it shows that the P1-P8 is being used. If the LED turns red, it shows that the P9-P16 is being used. If the LED turns yellow, it shows that both of the ports are being used simultaneously.

3.3.2 8DLI/16SLI

The 8DLI/16DLI board has 8-ports/16-ports for digital stations. It inter-works with the Samsung digital phones via the station to make a voice communication.

Specifications

The specifications of the 8DLI/16DLI board are as follows:

- 8DLI board : 8 station ports and 2B+D(two voice channels and one signal channel) provided
- 16DLI board : 16 station ports and 1B+D(one voice channel and one signal channel) provided

Front View of the 8DLI

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

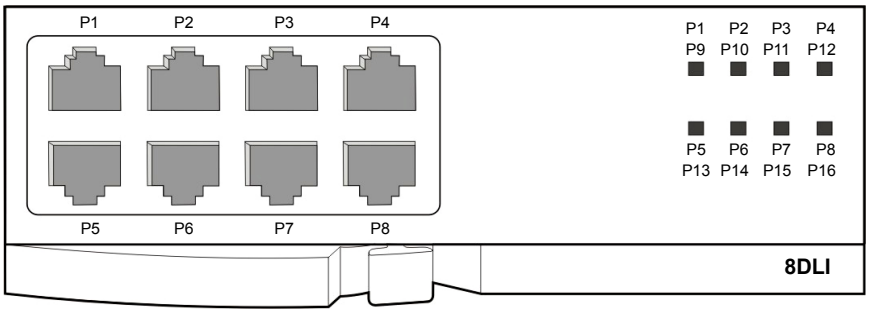

Figure 2.9 Front View of the 8DLI

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

Table 2.10 Ports and LEDs of the 8DLI

Ports & LEDs	Function Description
P1~P8	Station ports of Samsung digital phones.
P1~P8 LED	These LEDs indicate the status of the ports. - Off : The station is not being used. - On : The station is being used.

Front View of the 16DLI

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

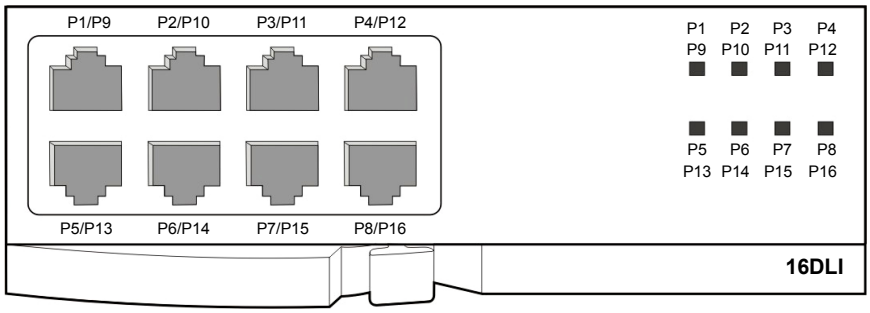

Figure 2.10 Front View of the 16DLI

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

Table 2.11 Ports and LEDs of the 16DLI

Ports & LEDs	Function Description
P1~P16	Station ports of Samsung digital phones.
P1~P16 LED	These LEDs indicate the status of the ports. - Off : The station is not being used. - On : The station is being used. If the LED turns green, it shows that the P1-P8 is being used. If the LED turns red, it shows that the P9-P16 is being used. If the LED turns yellow, it shows that both of the ports are being used simultaneously.

3.3.3 8HYB

The 8HYB board has 8 ports for analog stations and those of digital stations.
It inter-works with analog phones or digital phones to make a voice communication.

Major Functions

The major functions of the 8HYB board 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 8HYB board are as follows:

- 8 analog station ports
- 8 digital station ports

Front View

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

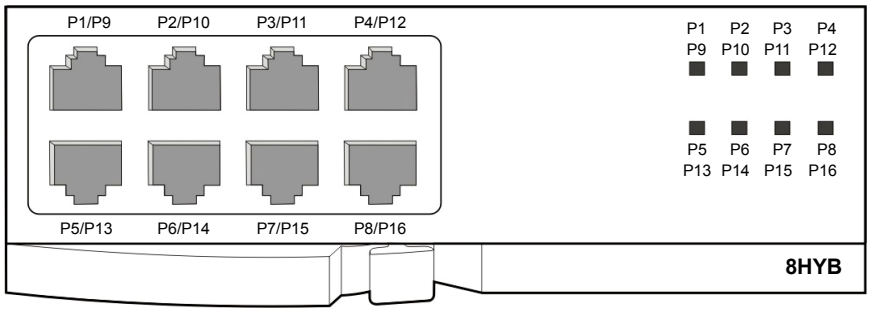

Figure 2.11 Front View of the 8HYB

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

Table 2.12 Ports and LEDs of the 8HYB

Ports & LEDs	Function Description
P1~P16	Station ports of Samsung digital phones.
P1~P16 LED	These LEDs indicate the status of the ports. - Off : The station is not being used. - On : The station is being used. If the LED turns green, it shows that the P1-P8 is being used (analog phone port). If the LED turns red, it shows that the P9-P16 is being used (Samsung digital phone port). If the LED turns yellow, it shows that both of the ports are being used while being connected to an analog phone and Samsung digital phone simultaneously.

3.4 Data Board

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

3.4.1 WIM

The WIM board 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 data board are as follows:

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

Specifications

The specifications of the WIM data board are as follows:

- One V.35 serial port
- Two ports for connecting with the external Ethernet network
- One Ethernet port of 10Base-T/100Base-Tx for the DMZ
- One Ethernet port of 10Base-T/100Base-Tx for the station LAN

Front View

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

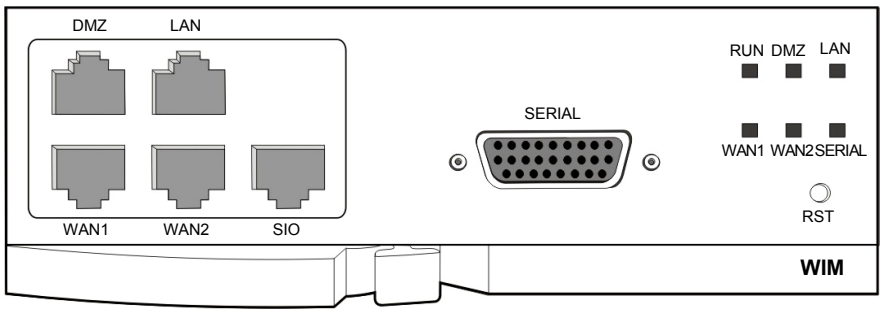

Figure 2.12 Front View of the WIM

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

Table 2.13 Ports and LEDs of the WIM

Ports & LEDs	Function Description
DMZ	Internal port that does not need firewalls
LAN	Ethernet port connected with the Intranet
SERIAL	Port that connects the serial dedicated line that inter-works with the V.35
WAN1, WAN2	WAN interface port that inter-works with Ethernet of 10Base-T/100Base-Tx
SIO	UART port(for tests)
RST	Button for resetting the WIM module
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.
DMZ LED	This LED indicates the operation status of the DMZ. - Off : The link is not connected. - On : The link is operating.
SERIAL LED	This LED indicates the operation status of the LAN. - Off : The link is not connected. - On : The link is operating.
WAN1, WAN2 LED	This LED indicates the operation status of the WAN. - Off : The link is not connected. - On : The link is operating.

3.4.2 LIM

The LIM board sends/receives data in the Intranet, and provides an interface of 10Base-T/100Base-Tx. It functions as a hub for switching. The LIM board inter-works with the WIM through the internal back panel to provide the VLAN function for supporting QoS.

Major Functions

The major functions of the LIM data board are as follows:

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

Specifications

The LIM data board provides 16 ports of 10Base-T/100Base-Tx.

Front View

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

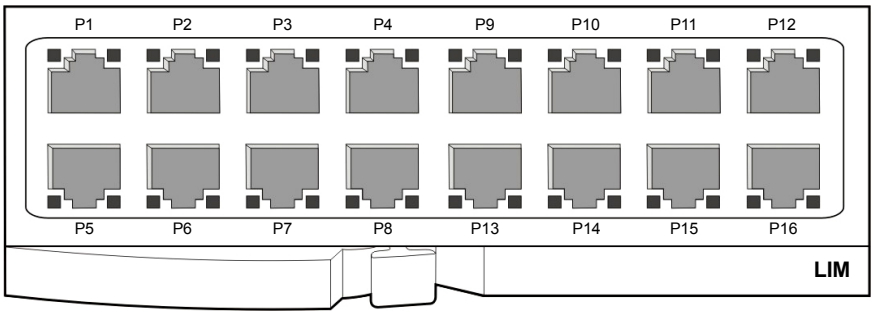

Figure 2.13 Front View of the LIM

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

Table 2.14 Ports and LEDs of the LIM

Ports & LEDs	Function Description
P1~P16	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 10Base-T/100Base-Tx is operating. - Off : The port of 10Base-T is operating. - On : The port of 100Base-Tx is operating.

3.4.3 4DSL

The 4DSL module uses the VDSL technology to send/receive data to/from the external IP devices in the Intranet. The 4DSL provides the VLAN function to support QoS.

Specifications

- 4 xDSL ports
- Transmission distance : 1.2 km
- Up/down link : 5 Mbps

Front View

The front view of the 4DSL data board is shown in the figure below:

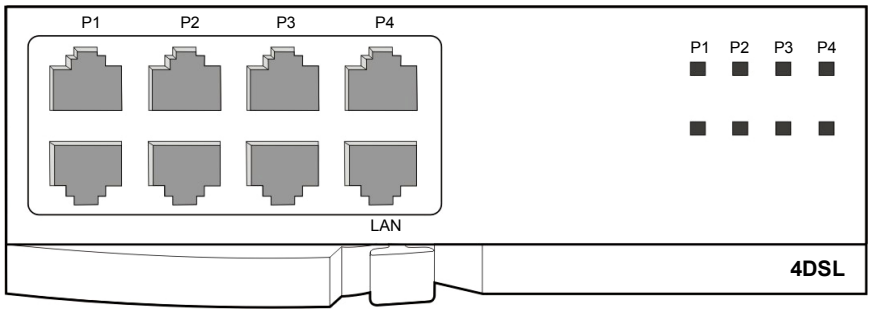

Figure 2.14 Front View of the 4DSL

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

Table 2.15 Ports and LEDs of the 4DSL

Ports & LEDs	Function Description
P1~P4	Ports that connect the VDSL.
LAN	Ethernet port of 10Base-T/100Base-Tx for connecting with the higher-level Intranet.
P1~P4 LED	These LEDs indicate the status of the ports. - Off : The link is not connected. - On : The link is operating. - Blink : The data is being transmitted/sent.

3.5 Voice Application Board

This section describes the interface board that uses the Digital Adaptor for Subscriber Loop(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.

3.5.1 MGI

The MGI board converts voice to data and then sends/receives the data via the data network. The MGI offers up to 16 channels and decompresses the voice of G.729, G.723, G.726, and G.711. The MGI provides the VoIP functions to serve as both a client and server.

Major Functions

The major functions of the MGI voice application board are as follows:

- Voice decompression : G.729, G.723, G.726, and G.711
- Facsimile relay : One out of the four channels is used.
- Echo cancellation
- Volume adjustment(-30~+30 dBm)
- Silence suppression

Front View

The front view of the MGI board is shown in the figure below:

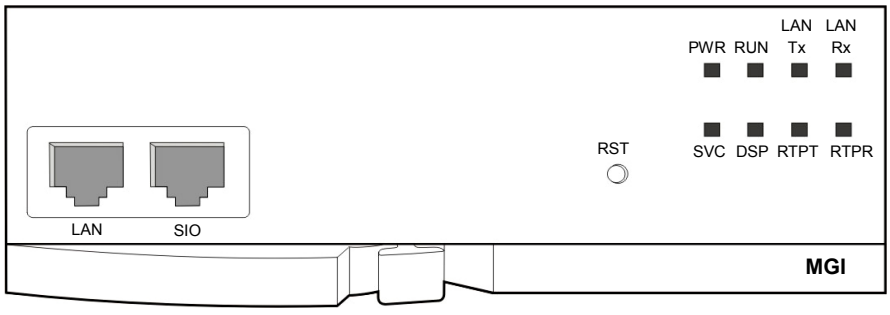

Figure 2.15 Front View of the MGI

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

Table 2.16 Ports and LEDs of the MGI

Ports & LEDs	Function Description
LAN	Port that connects the Ethernet.
SIO	UART port(for tests).
RST	Button for resetting the MGI.
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 MCP 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.

3.5.2 4WLI

The 4WLI interface board uses the DASL to send/receive voice to/from the phone system and wireless BTS. This board decompresses the voice of the G.726 and uses the wireless method of 802.11b WLAN or DECT. The 4WLI accommodates four BTSs and one BTS can accommodate four channels. One WLI platform inter-works the DECT with the WLAN by software conversion to inter-work with the wireless BTS.

Major Functions

The major functions of the 4WLI voice application board are as follows:

- Voice decompression : G.726
- Wireless specification : 802.11b WLAN or DECT

Specifications

The specifications of the 4WLI board are as follows:

- Up to four BTSs.
- Simultaneous calling through up to four channels per BTS.
- The maximum number of mobile station subscribers is 48.

Front View

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

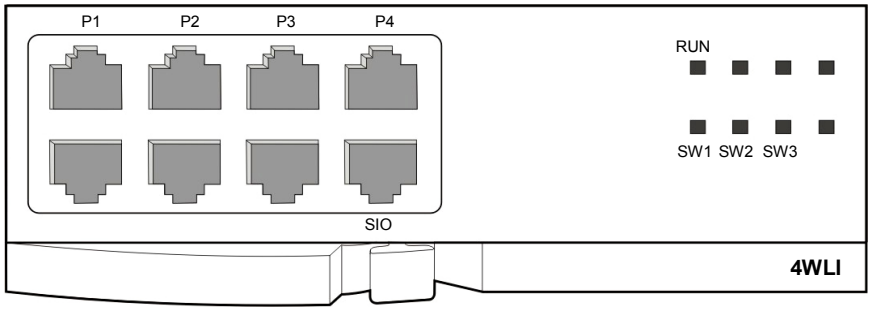

Figure 2.16 Front View of the 4WLI

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

Table 2.17 Ports and LEDs of the 4WLI

Ports & LEDs	Function Description
P1~P4	Port that connects with the WBS24 BTS.
SIO	UART port(for tests).
RUN LED	This LED turns on when the wireless LAN operates.
SW1~SW3 LED	This LED turns on when the software task operates.

3.6 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 specifications of the power I/O are shown in the table below:

Table 2.18 I/O Voltage of the PSU

Item	Specification
Input Voltage	110/240 V
Output Voltage	-48 V/2.2 A -54 V/0.4 A Backup +5 V/8 A +3.3 V/10 A +12 V/0.4 A -5.3 V/1 A

About the configuration of the PSU

For information about the configuration of the PSU and functions of each component, refer to ‘2 Cabinet Configuration’ of this chapter.

4 Station Phones

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

4.1 Analog Phones

The analog phones used for voice calls are connected to the ports of the 8SLI/16SLI/8HYB board mounted on the universal slot of the OfficeServ 7200 system.

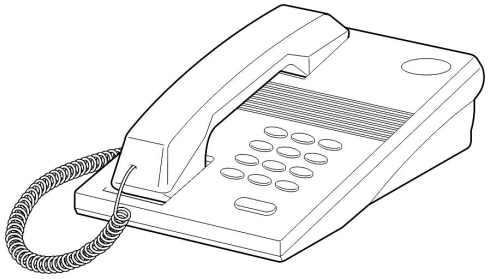

Figure 2.17 Analog Phone

4.2 Digital Phones

Digital phones are used for voice calls or data transmittance and connected to the ports of the 8DLI/16DLI/8HYB board mounted on the universal slot of the OfficeServ 7200 system.
The digital phones can be connected with devices such as the AOM, KDB-D, or KDB-S for use.

4.2.1 DS-24SE

The DS-24SE phone has 24 programmable buttons which allow subscribers to register their desired functions and use the [Up]/[Down] key to easily adjust the volume of the speaker or handset. The DS-24SE phone, which has a speaker phone, is available to both desks and walls.

Figure 2.18 DS-24SE

4.2.2 DS-2000 Series

The DS-2000 series has a speaker and programmable buttons that allow subscribers to easily register their desired functions for use and use the [Up]/[Down] key to easily adjust the volume of the speaker or handset. Up to 32 characters can be displayed on the LCD by using three soft key buttons and a scroll key.

Figure 2.19 DS-2024E

4.2.3 DS-3020S

The DS-3020S phone allows the users to easily adjust the volume of the handset or speaker by using the [Adjust Volume] button. Also, the users can use the DSS button to dial the saved phone numbers conveniently. The DS-3020S allows the users to check time in the cities over the world, calculate numbers, or use an alarm.

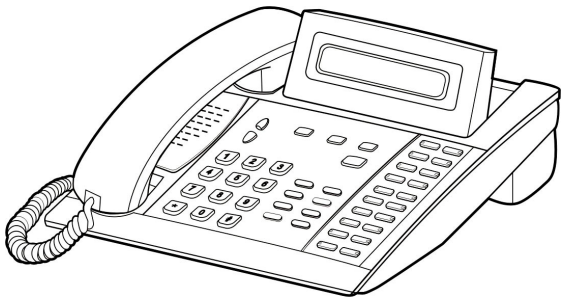

Figure 2.20 DS-3020S

4.2.4 DS-4000 Series

The DS-4000 series are digital phones with a new design. The DS-4000 series allow the users to make voice calls, transmit data, and provide advanced functions such as a full-duplex speaker phone module(KDB-F), dual LED button, 2x16 character LCD, and multi-functional indicator. The DS-4000 series are connected with the ports of the 8DLI/16DLI/8HYB board mounted on the universal slot of the OfficeServ 7200 system.

Figure 2.21 DS–4028D

4.2.5 DS-5000 Series

DS-5012L

The DS-5012L is a large LCD phone and allows the users to transmit data, make calls using the handset/speaker phone, or use full-duplex speaker phones.
Also, a USB interface can be made(at all types of mobile stations) and a variety of functions are provided through the LCD.
The buttons of the DS-5012L are convenient to operate because the DS-5012L has navigation buttons as well as regular buttons. Also, it provides the functions of a phone book and call recording. For detailed information about how to use this phone, refer to 'OfficeServ DS-5012L User Guide'.

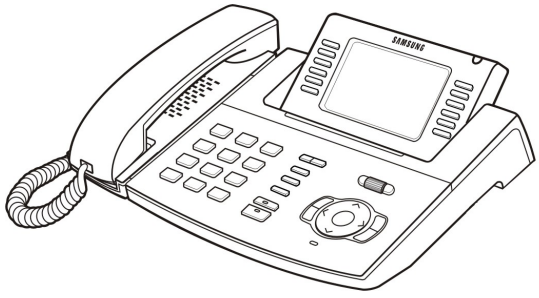

Figure 2.22 DS-5012L

NOTE

Connecting the DS-5012L to the system

Up to 8xDS-5012L phones can be connected with the DLI board(8DLI/16DLI) of the OfficeServ 7200 system. 24xDS-5012L phones can be connected to both the basic cabinet and expansion cabinet.

DS-5038D/21D/14D

The DS-5038D/5021D/5014D phone is a two-line LCD digital phone and has 38, 21, or 14 programmable buttons that allow the subscribers to register their desired functions and make calls by using a handset/speaker phone.
The DS-5021D/5014D phone has navigation buttons that allow the users to easily use the phone functions(recent called number, recent connected number, search phone numbers by name, call forwarding, search abbreviated numbers, or alarm setting) and connect with the KDB-D/S/F. For detailed information about the phones, refer to 'OfficeServ DS-5021/14D User Guide'.

Figure 2.23 DS-5014D

Figure 2.24 DS-5021D

Figure 2.25 DS-5038D

4.2.6 ISDN Phone

The ISDN phone is used only for the ISDN service.

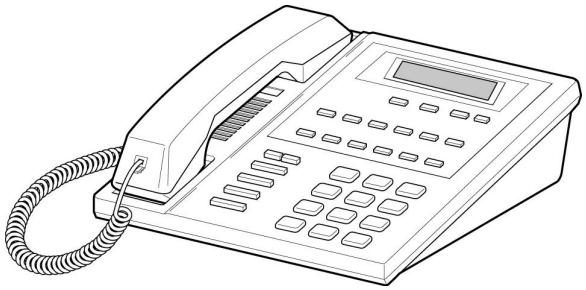

Figure 2.26 ISDN Phone

4.3 IP Phones

IP phones are a new concept of Internet phones that use an IP address to send/receive voice or data. The IP phones use the installed data network lines to make voice communications and do not need telephone lines. The IP phones can be connected with the devices such as a switching hub and are connected with other digital phones through the MGI board of the OfficeServ 7200 as well.

4.3.1 ITP-5000 Series

ITP-5012L

The ITP-5012L is a large LCD phone, which allows the users to transmit data, make calls using a handset/speaker phone, or use the full-duplex speaker phone. A variety of functions are provided through the large LCD.
The buttons of the ITP-5012L are convenient to operate because the ITP-5012L phone has navigation buttons as well as regular buttons. Also, it provides the functions of a phone book and call recording. For detailed information about how to use this phone, refer to ‘OfficeServ ITP-5012L User Guide’.

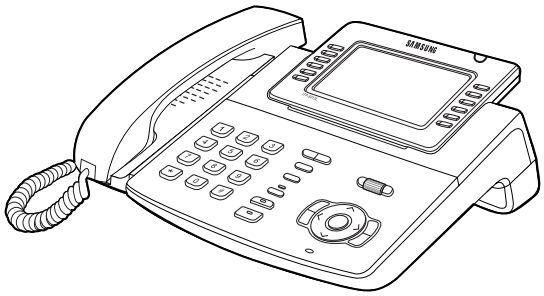

Figure 2.27 ITP-5012L

ITP-5021D/14D

The ITP-5021D/5014D phone is a two line LCD digital phone and has 21 or 14 programmable buttons that allow the subscribers to register their desired functions and make calls by using a handset/speaker phone.
The ITP-5021D/5014D phone has the navigation buttons that allow the users to easily use the phone functions(recent called number, recent connected number, search phone numbers by name, call forwarding, search abbreviated numbers, or alarm setting).
For detailed information about the phones, refer to 'OfficeServ ITP-5021/14D User Guide'.

Figure 2.28 ITP-5014D

Figure 2.29 ITP-5021D

4.4 Add On Module

The Add On Module(AOM) is a station module type of digital phone where the programmable buttons and LEDs are expanded. Desired functions can be specified into the buttons on the AOM. For information about the figure of each AOM or how to connect the AOM, refer to the User's Guide about the AOM.

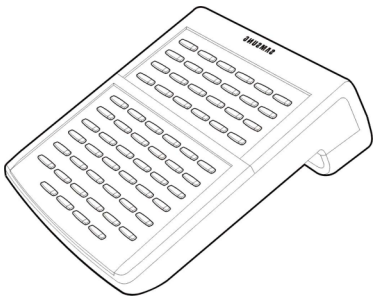

Figure 2.30 DS-5064B

The AOMs available to the OfficeServ 7200 system and phones that can be connected with the AOM are as follows:

Table 2.19 AOM Types

AOM Types	Connectable Phones
DS-5064B AOM	DS-5000 series digital phone
DS-4014 AOM	DS-4000 series digital phone
DS-4064 AOM	
DS-24SE AOM	DS-24SE digital phone
DS-2024E AOM	DS-2000 series digital phone
DS-3020S AOM	DS-3000 series digital phone

4.5 Door Phone Interface Module

The Door Phone Interface Module(DPIM) connects door phones and door open/close devices with the OfficeServ 7200. The line port of the door phone connection device is connected with the DLI port of the OfficeServ 7200 system. The door box port of the door phone connection device is connected with the line port of the door phone.

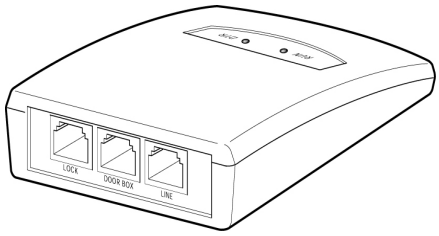

Figure 2.31 DPIM

NOTE

Reference

For information about how to connect terminals such as a door phone connection device, refer to ‘OfficeServ 7200 Installation Guide.’

4.6 KDB-D/S

The KDB-D module is attached to the digital phones connected with the DLI board for use. The KDB-D enables a digital terminal to use one out of the two B channels received by another digital phone from the DLI board.

The KDB-S module is attached to the digital phones connected with the DLI board for use as well. The difference from the KDB-D module is that the KDB-S module enables an analog terminal to use one out of the two B channels received by a digital phone from the DLI board. Both the KDB-D and KDB-S are only installed into the digital phones which are connected with the 8DLI board for use and are not available to ones connected with the 16DLI board.

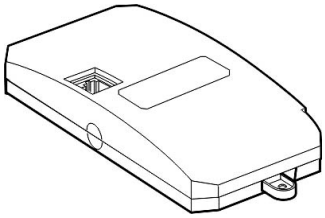

Figure 2.32 KDB-D/S for DS Phones

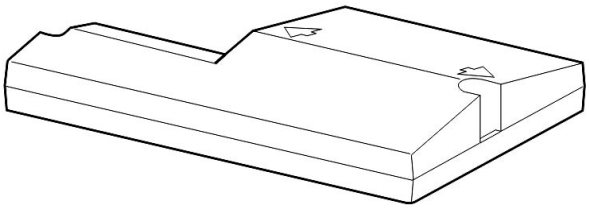

Figure 2.33 KDB-D/S for Digital Phones

5 Wireless LAN Equipment

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

5.1 Wireless LAN Base Station

The Wireless Base Station(WBS24) of 2.4 GHz consists of both wire and wireless processing parts.
The wire processing part has an ISDN BRI interface connected with the OfficeServ 7200 and an IEEE 802.3 Ethernet interface connected with the LAN. The wireless processing part has an IEEE 802.11b standard and wireless LAN RF interface with the wireless frequency band of 2.4 GHz.

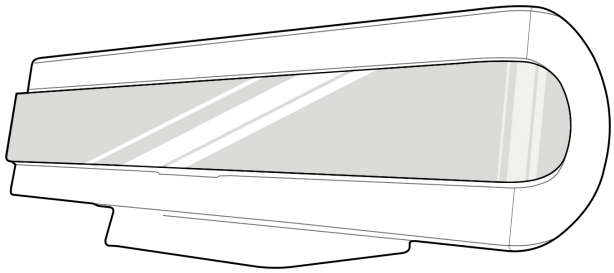

Figure 2.34 WBS24

The wire Ethernet interface is connected with the LAN based on 10Base-T/100Base-Tx 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.
The maximum transmittance speed on the wireless section is 5~6 Mbps. About 20 people can simultaneously access the wireless Internet using a WBS24.

5.2 Mobile Station

The WIP-5000M(Wireless IP-Phone Mobile type), which is a local wireless mobile station, uses the wireless LAN of IEEE802.11b to allow the users to make voice calls. The WIP-5000M supports hand-over when moving between the APs(WBS24) and can use data terminals such as laptops that enable the wireless LAN in the same place. The WIP-5000M performs the message service functions supported by the OfficeServ 7200 system as well.

Figure 2.35 WIP-5000M

6 Additional Devices

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

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

Output Resistance

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

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 MCP card to the MIS option board. The MIS option board is installed in the MCP.

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 MCP 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.

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 MCP board to the MIS option board.

6.5 PCMMC

The PC Man Machine Communication(PCMMC) is software for maintaining the OfficeServ 7200. The functions for controlling the system database are implemented in the form of menus in the PCMMC; thus, the PCMMC is convenient to use when the system data is displayed or changed. Also, the users can understand and use the system operational commands easily because the commands for maintenance are unified.

6.6 SMDR

The Station Message Detail Recording(SMDR) manages the entire calling data such as calls between the station subscribers connected with the OfficeServ 7200 as well as local/long distance/international calls. The OfficeServ 7200 provides calling data. Connect the SMDR printer or SMDR computer with the OfficeServ 7200 to use the SMDR data provided by the OfficeServ 7200 system.

The SMDR printer can display the calling history received from the OfficeServ 7200, however it does not display data other than the calling history(i.e. toll data). The SMDR computer displays calling history received from the OfficeServ 7200 and calculates the toll using the SMDR software based on the calling history. Accordingly, the SMDR computer allows the users to use data more efficiently than the SMDR printer.

6.7 CTI

The Computer Telephony Integration(CTI) is an integrated system for computer and telephony. That is, the CTI inter-works computers with PBXs so that the computers make use of the PBXs as computer resources and the PBXs share the computer resources. The CTI provides the operator with convenience and reduced costs and the customers with enhanced services and reduced call-processing time.

Particularly, the CTI call center system configures data on the customers into databases. Based on these databases, the call center can consult with the customers on a one-to-one. The CTI integrates communications, computers, and databases based on phones as a basic medium to allow the users to perform marketing using computers such as customer-focused telemarketing.

The OfficeServ 7200 supports the standard Telephony Application Programming Interface(TAPI), which is implemented in a client/server environment and controls the third party calls.

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.

1 System Capacity

Up to 160 lines can be installed and operated in the OfficeServ 7200 system, and the line ratio of the station and trunk line can be adjusted within the capacity limit depending on the users' needs. Table 3.1 below shows the maximum line capacity of the OfficeServ 7200:

Table 3.1 Capacity of the OfficeServ 7200

System Configuration	Maximum Line Capacity
Basic cabinet	When using the E1 : 90 When using the 8TRK : 40 When using the station : 80 When using the maximum capacity : 122(voice) When using the LAN switch : 64 When using the VDSL : 20 When using the WLAN terminal : 48
Basic cabinet+expansion cabinet	When using the E1 : 120 When using the 8TRK : 80 When using the station : 96 When using the maximum capacity : 216(voice) When using the LAN switch : 128 When using the VDSL : 40 When using the WLAN terminal : 48

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 3.2 Trunk Line Capacity

System Configuration	Analog	Digital			
	LOOP TRK	BRI	T1 TRK	E1 TRK	PRI TRK
Basic cabinet	40	40	72	90	T1 : 72 E1 : 90
Basic cabinet+expansion cabinet	80	80	96	120	T1 : 96 E1 : 120

1.2 Station (Subscriber) Line Capacity

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

Table 3.3 Station Line Capacity

System Configuration	Analog phones	Digital Phones
Basic cabinet	80	80(DS-5012L : 24)
Basic cabinet+expansion cabinet	160	160(DS-5012L : 48)

2 Electrical Specifications

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.

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.

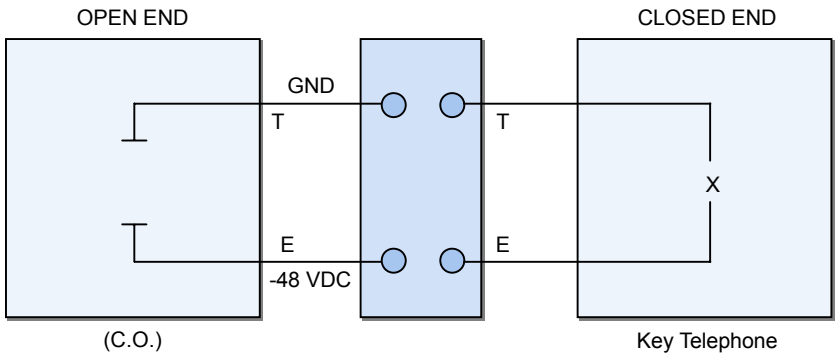

Figure 3.1 Trunk Line Loop Start Signaling

T1 Trunk Line

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

Table 3.4 Electrical Characteristics of the T1 Trunk Line

Category		Specification
Transfer speed		1544 kbit/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		120 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 3.5 Electrical Characteristics of the E1 Trunk Line

Category	Specification
Transmission speed	2048 kbit/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 3.6 Electrical Characteristics of the BRI Trunk Line

Category	Specification
Transmission speed	192 kbit/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

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

Table 3.7 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 3.8 Electrical Characteristics of the DLI Line

Category	Specification
Transmission speed	144 kbits/s
Code	AMI
Pulse type	Typical AMI waveform

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 3.9 Electrical Characteristics of the WIM Interface (V.35 Interface)

Category	Specification
Maximum transmission speed	10 Mbit/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:

Table 3.10 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-7K Ω
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 3.11 Electrical Characteristics of the WIM Interface (RS-499 Interface)

Category	Specification
Maximum transmission speed	10 Mbit/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

2.1.3 Signaling Type of the LAN

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

Table 3.12 Electrical Characteristics of the LAN Interface (10Base-T)

Category	Specification
Transmission speed	10 Mbit/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	CSMA/CD
Transmission media	UTP CAT3, CAT4, CAT5, STP
Number of the UTP pairs	2 pairs
Characteristic resistance	100 Ω
Cable thickness	Diameter : 0.51 mm(24 AWG), External diameter : 5 mm

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

Table 3.13 Electrical Characteristics of the LAN Interface (100Base-Tx)

Category	Specification
Transmission speed	100 Mbit/s ±50 ppm
Transmission code	4B/5B+MLT-3(4bit/5bit) converts the data of 4bits to the data of 5bits and encodes the data on the physical layer. Multi Level Transmission-3(MLT-3)i 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

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 msec(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.

2.1.5 Signaling Type of the VDSL

The electrical characteristics of the VDSL for using long-distance Ethernet are shown in the table below:

Table 3.14 Electrical Characteristics of the VDSL Interface

Category	Specification
Transmission speed	1 M~16 Mbps
Modulation code	Quadrature Amplitude Modulation(QAM)
Error detection	Reed Solomon coding method
Transmission distance	1.2 km
Transmission media	One pair of twisted lines
Characteristic resistance	Splitter installed
Used frequency	138 kHz~12 MHz
Link speed	Down link : 47 Mbps(300 m), Up link : 8 Mbps(300 m)

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

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

3 Power Specifications

3.1 Power Supply Board

This board operates using the AC input power or battery power of the OfficeServ 7200 and supplies the system cabinet with the backup power of -48 V, -5 V, +5 V, +3.3 V, +12 V, or -56 V.

Table 3.15 Specification of the Power Supply Board

Category	Power Specifications
Input condition	AC 110 V/220 V
Output condition	48 V DC, 2.2 A +5 V DC, 8.0 A -5 V DC, 1.0 A +3.3 V DC, 10 A +12 V DC, 0.4 A -56 V Back-up 0.4 A

4 Rings and Tones

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:

Table 3.16 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.

4.2 Tones

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

- Output voltage : 75 V
- Frequency : 20 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 below:

Table 3.17 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

Tone ON/OFF Cycle

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

5 Available Terminals

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

Table 3.18 OfficeServ 7200 Compatible Terminals

Type	Terminal
DS-5000 series digital phone	DS-5014D, DS-5021D, DS-5038D, DS-5012L
ITP-5000 series IP phone	ITP-5014D, ITP-5021D, ITP-5012L
Wireless LAN device(WLAN)	WIP-5000M(MS), WBS24(Access Point device)
DSS	DS-64B
Digital phone	DS-4000 series, DS-24SE, DS-24D, DS-2024E, DS-2024E, DS-2021E, DS-3020S
AOM	DS-5064BAOM, DS-4014AOM, DS-4064AOM, DS-24SE AOM, DS-2024EAOM, DS-3020SAOM
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.

6 Equipment Specifications

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

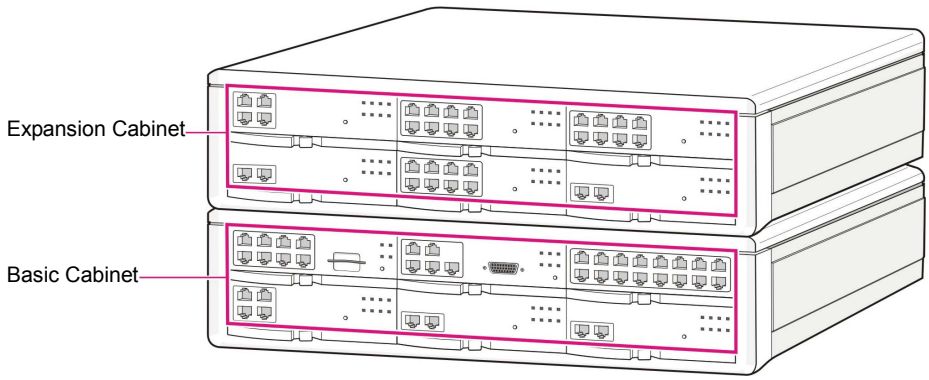

Figure 3.2 Cabinet Configuration of the OfficeServ 7200

- 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

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.

1 Call Functions

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

1.1 Dynamic IP Address Allocation

DHCP Client of the MCP

The MCP is the call processing control part of the OfficeServ 7200. The MCP uses the DHCP client function to get the IP address allocated by the data server and operate. In this case, the data server recognizes the MCP of the call server from the host ID of the required DHCP information and allocates the IP address specified in the DHCP allocation table. The MCP can be operated by the fixed IP address, which is not the dynamic DHCP allocation method.

MGI Configuration

The MGI 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 SIP(Session Initiation Protocol) 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.

1.2 VoIP UMS Interface

Auto Attendant/Mailbox Interface

The OfficeServ 7200 uses the SIP and RTP that are the VoIP protocols to provide the auto attendant and mailbox functions through the UMS and IP network operating in the feature server. To interface with the VoIP UMS, the MGI board should be mounted in the cabinet slot of the OfficeServ 7200.

E-mail Notice

The OfficeServ 7200 periodically checks whether any e-mails are received in the e-mail account registered to the UMS and notifies the result to the user in voice or through the LCD screen or LED of the telephone connected to the OfficeServ 7200.
To be notified in voice, the user should set the TTS(Text-To Speech) function.

1.3 SIP Server Interface

Standard SIP Phone Registration

The OfficeServ 7200 registers the SIP phones, which operate through the SIP interface, to provide the call process services according to the system-numbering plan. In this case, the user should install and operate the SIP server in the feature server.

Basic Call Process of the Standard SIP Phone

The OfficeServ 7200 provides the station and trunk line call services by using the standard SIP phones registered to the OfficeServ 7200.
Since the standard SIP phones do not provide the various functions of the key phone system, they provide only the basic station and trunk line call services.

Additional Call Process of the Standard SIP Phone

The OfficeServ 7200 provides the additional services related to the station and trunk line call services by using the standard SIP phones registered to the OfficeServ 7200. The additional services provided by the OfficeServ 7200 are as follows:

- Call forwarding
- UMS mailbox services
- Group Ring(Parallel Forking) : This function is available to the called party.

1.4 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.

Firewall ALG

When various functions such as the VoIP signal processing function and gateway function executed through the IP network in the OfficeServ 7200 are executed in the network that has a firewall, the system should be set to prohibit the firewall from cutting off the packets not manually but automatically for smooth firewall traversing. This function operates only between the call server and data server of the OfficeServ 7200.

VPN 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 Virtual Private Network(VPN), the system should be set to prevent packet blocking during the IP address conversion due to the tunneling. In this case, the call server and data server interface with each other and share the tunneling conversion information for smooth services. This function operates only between the call server and data server of the OfficeServ 7200.

2 VoIP Functions

The VoIP functions indicate the functions executed in the SIP server. The SIP server is a software module operating in the feature server. The SIP server is based on the standard SIP protocol and provides the gateway function for smoothly processing signals between the existing phones and the standard SIP user equipment. It also provides an interface function through which the standard SIP user equipment can interface to the phones of the OfficeServ 7200.

2.1 VoIP Network

To communicate with another system through the VoIP networking, the MGI board must be installed in the OfficeServ 7200. The functions of the VoIP networking coincide with that of the PRI/Q-SIG networking.

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 MGI board connects the speech path.

2.3 Proxy Server

The OfficeServ 7200 serves as the SIP equipment controller, which interfaces the standard SIP equipment(user agent) defined in the RFC3261 SIP standard with the call services of the OfficeServ 7200. The OfficeServ 7200 uses the proxy server function to perform the routing for the call process requirements such as call setting, cancel, and the call termination through the SIP, which are received from the SIP equipment. The OfficeServ 7200 also manages the SIP equipment status and performs smooth call services between the SIP equipment.

2.4 User Registration

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.

2.5 SIP Telephone Configuration

The standard SIP telephone should be configured so that it can be used like the telephone of the OfficeServ 7200. When entering the phone number and user ID of the standard SIP telephone in the call server, the configuration file corresponding to each SIP telephone is created in the IP server. When operating the SIP telephone, the required configuration data of the SIP telephone will be downloaded to the TFTP. The downloaded data includes the telephone number, user name, and the order information of the OfficeServ 7200 system, which correspond to the SIP telephone. This configuration data is used for setting the SIP telephone.

2.6 SIP Telephone Registration

After a standard SIP telephone is registered as a telephone of the OfficeServ 7200, the OfficeServ 7200 provides the call process services between the SIP telephones, between an SIP telephone and a digital telephone, and between an SIP telephone and a PSTN trunk by using the assigned telephone number of the OfficeServ 7200.

2.7 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.

2.8 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.

2.9 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.

2.10 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.

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(WAN, LAN, DMZ).

3.1 Switches

Unmanaged Switch

- 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 10Base-T/100Base-Tx 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.

IGMP Snooping

L2 switch(located in the lower layer of the IP router) without the IGMP(Internet Group Management Protocol) 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.

3.2 Routers

Various Network Interfaces

The OfficeServ 7200 provides the WAN1 and WAN2 network interfaces, which are connected to the WAN through an Ethernet interface, provides the serial network connected through the V.35 serial interface, and provides the LAN and DMZ network 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 WAN1 and WAN2 Ethernet WAN 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 WAN1, WAN2, LAN, and DMZ are configured with different sub-network interfaces, which enable them to perform the routing process with each other.

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 RTP(Real-Time Transport Protocol) 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.

IP-ToS Process

This function checks the ToS(Type of Service) 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.

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 more smooth 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.

Intrusion Detection System (IDS)

This function monitors the packets on the network and detects the packets, which can damage the network operation, making the network more stably operated. The IDS 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.

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.

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.

Outside ALG Interface

This function enables the outside application to retrieve or control information such as the NAT/PT conversion information, firewall blocking information, and the VPN tunnel information processed in the data server. This function supports the control packets, which are used for H.323, VoIP networking, and IP telephone operating in the Call server, to be smoothly serviced without any blocking.

System Management Interface

This function allows the administrator to report and manage the alarms, events, traffic, and logging information including the IDS 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 CLI(Command Line Interface) on the Telnet. The user can configure and view the operation of the data server functional block by using a web browser.

4 UMS Functions

The OfficeServ 7200 provides the Unified Messaging System(UMS) such as the auto answering, voice message, and the integrated e-mail message management functions.
The VoIP-UMS of the OfficeServ 7200 processes the call signal using the VoIP module which has the SIP protocol for the interface to the voice switch, and transmits the media through the RTP protocol of the TCP/IP. Accordingly, the OfficeServ 7200 has superior architecture for capacity expansion and is economical from the financial aspect, since there is no need of the physical interface required for the existing UMS or VMS.

4.1 Auto Attendant

Announcement Replay and Auto Call Forward

- This system replays an announcement when a calling party is connected to the auto attendant. This announcement can be specified based on holiday, working hour, or non-working hour.
- The auto call forward connects the calling party to the desired subscriber's station when the calling party dials a station number in the auto attendant. In this case, the call routing function will be also provided, which detects whether the entered phone number is valid, or intellectually detects that the length of the phone number can be changed.

Announcement Auto Change Based on the Schedule

This function allows the administrator to automatically change and replay the announcement based on holiday, working hour, and non-working hour.

Announcement Change by Telephone

This function allows the administrator to change the announcement by interfacing with the auto attendant from a remote site.

Call Forwarding to the Mailbox on the Busy Line

When a party interfaces to the auto attendant and tries to connect a call to a busy station, the called party on the busy station can use this function to forward the call to a voice mailbox.

Queuing Process on the Busy Line

When a party interfaces to the auto attendant and tries to connect a call to a busy station, the message 'Please hold on because the line is busy now' is played and the phone retries to connect the call for a specific time, if the 'Call Forward to the Mailbox for a Busy Line' function is not set. If the line continues to be busy after the maximum queuing time, a voice message is provided asking the user whether to forward the call to their voice mailbox or disconnect the call.

Direct Connection to the Mailbox

This function allows the user to access the auto attendant and directly connect the call to the mailbox of a specific user by using the prefix rather than trying a call to the subscriber's station.

Time Control for the Announcement

This function allows the administrator to control the maximum input time for the announcement when the administrator directly records the announcement for the auto attendant.

Cutting off Announcements when Digits are Entered

If the user enters digits as the target station number when the voice announcement is played in the auto attendant, the system stops the announcement and processes the entered digits.

Announcement Replay

This function allows the administrator to listen to multiple voice announcements on a specific telephone which have been already recorded.

4.2 General Functions Related to Voice Mail

Subscriber Authentication and Auto Login

- When a subscriber tries to login to their mailbox, the subscriber authentication function checks the password to prohibit an invalid party from logging into a mailbox of another party. In this case, the mailbox number and password are entered and checked in the order.
- When any party directly connects a call to the mailbox with the key number of the mailbox on the station phone, the system uses the auto login function to require only the password, without the mailbox number, since the UMS server knows the caller's phone number. The user can enter their mailbox number and connect a call to their mailbox by using the hot key(speed key) on the telephone.

Voice Message Record/Replay/Store/Delete/Re-Send/Reply

- A caller can make a call to the mailbox of the called party and leave a voice message. The caller can send the message at a specific time(Send reservation) or listen to their recorded message and record again.
- A subscriber can login to their own mailbox to listen to voice messages as well as the message recording time, calling number, and caller ID. The subscriber can delete, send to another party or group, or reply to the corresponding message while listening to the message.
- The subscriber can delete all messages currently stored in the mailbox.

Voice Message Pause/Play Continue/Next Play/Previous Play/Play Again

The user can pause and replay the current message, play the next or previous messages, or play the current message again while listening to a message.

New Message Auto Replay

The user logged-in to the mailbox can optionally set whether to automatically replay new voice messages.

Setting the Maximum Message Number for a Mailbox

This function is used for specifying the maximum message number for a mailbox. The number of messages in the mailbox cannot exceed the specified maximum message number. In this case, the corresponding announcement is provided.

Setting the Maximum Time for Storing Messages

The system automatically deletes the voice messages after a specific time if the user does not delete the message after listening to the voice message. In this case, the user can specify the time for auto message deletion.

Setting the Maximum Message Length

The message length is limited. Therefore, if the user records a message for a specific time, the recording is automatically completed and a voice announcement is provided saying ‘Message recording is completed’.

Announcement Change based on the Schedule

This function automatically changes and provides the announcement based on a holiday, working hour, or non-working hour.

Voice Message Notice

A new voice message is notified to the user on the LCD screen or by the LED of the user’s telephone.

Private Mailbox Management

The user can record/listen to/delete the name of the private voice mailbox or change the password of the private voice mailbox. The user can also record/listen to/delete the greeting of the private voice mailbox.

4.3 Additional Functions Related to Voice Mail

Answering Machine Emulation (AME)

This function is almost the same as that of the auto answering machine. If a called party does not receive the call, the call is forwarded to the AME. In this case, the called party can listen secretly to the forwarded call or reply to the call by using the functional key.

Call Back to the Caller ID/Call Number

This function allows the users to call back to the Caller ID or called number (a telephone number left with a voice message).

Voice Message Notification

The UMS directly connects the voice message to the subscriber's station then notifies the message on the LCD screen or the LED of the phone when a new voice message arrives. Therefore, the user optionally can listen to the new message by picking up the phone.

Call Record

This function allows the users to record the contents of the call in the user's voice mailbox during the call. The digital phone has a hot key through which the user can record it by just pressing the hot key. Since the analog phone does not have the hot key, the user should login to the web and click the corresponding button to use this function.

Private Voice Memo

This function allows the users to memorize information such as a schedule or telephone number by voice. This function is usually the same as the general voice message function. However, this voice memo can be separately managed as if a memo.

Stop the Private Mailbox Function

This function allows the users to stop the private mailbox function. If any party tries to access the prohibited mailbox, a message will be displayed notifying that this mailbox cannot be used.

4.4 General Functions Related to E-mail

Inbox

This function allows the users to read stored mails.

- List View
  This function allows the users to view the list of mails stored in the Inbox.
  This functional button is displayed only when two frames are selected as ‘mail reading frame’ in setting the environment.

- Modify
  This function allows the users to modify and forward the read mails.
  This functional button is displayed only in the Draft Folder.

- Reply
  This function allows the users to reply to read mail.

- Forward
  This function allows the users to forward the currently read mail to another counterpart.

- Delete
  This function allows the users to forward read mail to the Deleted Folder.
  To permanently delete a mail, move into the Deleted Folder and select the ‘Delete’ function.

- Reject Receipt
  This function allows the users to reject a mail from the sender of the currently read mail. If the Reject Receipt button is clicked, a message will be displayed notifying that the address of the party of the currently read mail is added in the Receipt Reject list.

- Transfer the Mail to Another Box
  This function allows the users to forward the read mail to another box.
  This functional button is not displayed in the Draft Folder since the mails stored in the Draft folder cannot be transferred to other boxes.

Compose

- This function allows the users to write or send mails.

- To:
  Enter the address of the receiver in this field. Up to six addresses can be entered. When entering multiple addresses, enter a comma between each address. (e.g. : abcd@samsung.co.kr, efgh@samsung.co.kr)
  If the address of the receiver has been registered, click the address from the address list to select the address.

- Cc:
  Enter the addresses of those who will refer to the mail. Up to six addresses can be entered. Refer to the method above for the 'To' field for entering into this field.

- Subject
  Enter the subject of the mail. Up to 128 English characters or 64 Korean characters can be entered.

- Text
  Write the text of the mail. Up to 2 Gbytes is available for a mail.

- Original Text
  This function displays the text of the originally received mail. This is displayed only when replying to the original mail or transferring the original mail.

- Attachments
  Specify the number of files to append. Up to 10 files can be appended and the capacity is unlimited. Enter the number of files to append and click the button. Then a message will be additionally displayed asking the user to select the appendix file.

- Attachment 1
  Enter the target file name in the empty field or click the 'Find' button to select a file saved in their own computer.

- Copy Message to 'Sent Folder'
  This function allows the users to store the sent mail in the 'Sent Folder'.

- Append Signature
  This function allows the users to send the mail with the composer's signature at the end of the mail. The signature can be specified by the server administrator when first making a mail account. The account user later can change the signature. To change the signature, click the corresponding button.

- Send
  This function allows the users to send the mail after composing the mail.

- Save Draft
  This function allows the users to temporarily store the mail into a Draft while composing the mail. The user can modify the contents of the mail in the Draft.

Deleted Folder

This function allows the users to temporarily store the deleted mails. If the user deletes the mails stored in the Deleted Message, the mails will be permanently deleted.

Draft

This function allows the users to temporarily store a mail while writing the mail.

Mailbox List

This function allows the users to manage their private mailbox lists such as the Inbox, Sent Items, Deleted Items, and Draft folders.

Mailbox Creation

- Specify the name of a newly created mailbox. The name should be configured with up to 32 English characters, or 16 Korean characters.
- Enter the name in the 'Create New Mailbox' field and click 'Add'. Then verify that a message notifying that the mailbox is correctly created is displayed and the name is displayed in the 'User Mailbox' list on the upper part of the screen.

Mailbox Change/Removal

This function allows the users to change or delete the existing mailbox.

Address List

This function allows the users to create the address list by saving frequently used addresses.

- Select Group
  This function allows the users to select an address group for changing the name or deleting the address.

- Change Group Name
  This function allows the users to change a group name.

- Delete Group Name
  This function allows the users to delete a group name.

- Select All
  This function allows the users to select all addresses from the address list. If this function is enabled, all the addresses will be checked.

- Selection Cancel
  This function allows the users to cancel the address selection. If this function is enabled, the checked addresses will be unchecked from the address list.

- Delete Address
  This function allows the users to delete an address. To delete an address, select the target address and click the 'Delete' button.

- Transfer Address
  This function allows the users to change the address group.

- Add Address
  This function allows the users to add new addresses. If this item is clicked, a separate window will be displayed.

- A~Z
  This function allows the users to retrieve an address staring with a specific character from the address list.

External Mail Importing

- The user can import mails from other accounts into the mail account of the OfficeServ 7200. For instance, if the user already has a mail account on a site such as 'Yahoo' or 'Naver', the user can read the mails of the corresponding site in their OfficeServ 7200 mailbox by registering the site in the 'External Mail Management' item.

- External mail address
  Enter the external mail address to register. Ex) jjkim@yahoo.co.kr

- External mail server name
  Enter the external mail server name to register. Ex) yahoo.co.kr

- User ID
  Enter the user ID to access an external mail. Ex) jjkim

- Password
  Enter the password to access an external mail.

- Protocol
  Select the protocol type for the external mail server. To find the protocol type, access the corresponding server.

- Leaving the original message
  The user can leave the original message in the external mail account when setting an external mail to be read in the current mail account. To execute this function, Select 'Yes'.

Mail Receipt Rejection

- The user can register the corresponding mail ID to automatically cutoff undesired mails such as junk mail. In this case, the system automatically rejects the mail receipt.

- Enter the e-mail address for mail receipt rejection
  Ex) sagopalgo@shopping.com

Mail Filtering

- When a new mail arrives, the system sorts it according to a specific word selected such as the sender name, receiver name, notice, or subject and then sends it to a separate mailbox.

- Filter addition
  The user can set a mail that includes a specific word selected such as the sender name, receiver name, notice, or subject to be stored in a specific mailbox.

SMTP Sending Interface

The system supports the SMTP(Simple Mail Transfer Protocol) as an E-mail sending protocol.

POP3 Receive Interface

The system supports POP3(Post Office Protocol 3) as an E-mail receiving protocol.

IMAP4 Receive Interface

The system supports IMAP4(Internet Message Access Protocol version 4) as an E-mail receiving protocol.

Web Mail Interface

The system provides the user and administrator with services for e-mails via the web browser.

4.5 Additional Functions Related to E-mail

User Account Management

The administrator can retrieve or delete an E-mail user account and register a new user.

Mailbox Capacity Management

The system can restrict the storage capacity of a mailbox, and display an alarm signal when the assigned capacity is exceeded.

Notice Management

The E-mail user can register or change the notices in their work group.

Logo Management

The user can register or change a screen from the screens in his work group for the web login screen.

4.6 Integrated Messaging

Converting Voice mails to E-mails

When a new voice mail arrives, the system converts it into a file format such as WAV, MP3, or OGG, and then appends the converted voice mail to an e-mail.

New E-mail Notice

This function notifies of a new e-mail arrival on the LCD screen of the digital phone or by the LED. The UMS(Unified Messaging System) optionally dials the user's station to notify that a new e-mail has arrived.

Reporting and Playing New E-mails

When a new e-mail arrives, the UMS dials the user's station and reports the mail information by using the TTS(Text-To Speech) function.

- Mail information includes the number of total mails and the number of new mails. The user can listen to the list of the mail subject or the text of a mail.
- The user can login to their mailbox and listen to their mail information with their mailbox key number.
- If the e-mail is in an HTML format, the system extracts the text of the mail to report it by using the TTS.

4.7 UMS Management

Database Backup and Recovery

The user can backup or recover the UMS(Unified Messaging System) database operating in the OfficeServ 7200.

- For the backup, the database should be compacted as a file into a specific directory. This compacted database can be downloaded to an external computer.
- The backup type is divided into two types as follows : Auto backup-The system automatically executes the backup periodically. Manual backup-The user can backup on the web when needed.

Mailbox Management

The mailbox administrator can add or delete mailboxes. This function can be executed on a telephone. The mailbox administrator can retrieve the mailbox information on the web.

Voice Text Upload/Download

The user can upload/download the audio text from/to the external computer to/from the system, which will be used as the announcement for the OfficeServ 7200.

Alarm Information Management

The user can specify the alarm level(including Major, Minor) for alarms in the UMS and view the alarm information which has occurred for a specific time.

Operational Information Management

The user can view information such as the currently busy channel status and web login history.

Voice CODEC Selection

The user can specify the CODEC format for the voice files of the OfficeServ 7200.

- The user can select the voice CODEC(WAV, MP3, OGG) to be appended while sending mails.
- The user can select the voice CODEC(G.726, G.729) to be appended while creating the TTS.

5 Web/System Management

The OfficeServ 7200 provides a user interface that manages various functional blocks of the system on the web through a web browser. The OfficeServ 7200 performs the call server configuration management and information retrieving function through the PCMMC package. The OfficeServ 7200 also monitors and collects the operational status of the functional blocks in the system.

5.1 Web Management

Database Backup

The user can backup the database of the data server and feature server through the web.(However, the database of the call server cannot be backed up)
Since the database backup is actually executed in the feature server, the user can use regular menus only when the feature server operates.
Follow the steps below to perform the backup, download, upload, and restore functions.

- Backup the database file in the /home/dbbackup directory of the feature server.
- The name of the backed up file should be in the ‘module name_date_hour.tar’ format as shown below:
  Ex) /home/dbbackup/MS_20030620_145632.tar
- Collect the MS_*.tar, US_*.tar, SS_*.tar, and DS_*.tar files in the /home/database directory in one ‘tar’ file and transmit it to the web client.
  Ex) FSDB_20030620_142310.tar
- Upload the database file of the web client into the feature server.
- Restore the database file in the /home/database directory of the feature server to the system.

User Information

The user can view user names and e-mail IDs of each station number. The mailbox number is the same as the corresponding station number. If any regular user forgets their password, the administrator can initialize the password.(The default password is the phone number.)

Server Information

The user can view the information(IP address, web port, IPC port) on each server module(call server, data server, feature server, system administrator) through this function.

VoIP Web Administrator

This function displays or changes the setting status for VoIP services.

Data Web Administrator

This function displays or changes the setting status for data services.

Voice-Mail Web Administrator

This function displays or changes the setting status for voice-mail services.

E-Mail Web Administrator

This function displays or changes the setting status for e-mail services.

5.2 System Management

Multi Site Management

The user can enter and manage the information in the site where the OfficeServ 7200 is installed.(Addresses, phone numbers, notes, system installation date, and administrator, etc.)

Integrated System Management

The user can view the current status of(e.g. operational status, alarm information, etc) the OfficeServ 7200 in real time. The user can collectively manage each functional block(call server, data server, or feature server) by operating the PCMMC package or connecting the web servers of the corresponding server.

Configuration Management

The configuration information of the OfficeServ 7200 can be displayed.
The configuration information is as follows:

- OfficeServ 7200 unit configuration
- OfficeServ 7200 version information
- Data function setting/version information
- NAT information
- Feature server(SIP, UMS, mail) function setting/version information

Event Management

This function displays the various event information in the OfficeServ 7200 such as critical errors, warnings, etc.

Access Log Management

This function displays the access log for the OfficeServ 7200. The user can group each access log by using the arranging and searching function.

Traffic Management

The user can view traffic information(telephone usage, the amount of the data transmitting and receiving, VoIP call process, mail transmission/receive) generated in the OfficeServ 7200 for a specified time through this function. This information can be used as statistics for a specified time.

Call Detail Record Management

The Call Detail Record(CDR) serviced in the OfficeServ 7200 can be saved and viewed.

ABBREVIATION

A

AAA	Authentication, Authorization and Accounting
AC	Alternating Current
ALG	Application Level Gateway
AMI	Alternate Mark Inversion
AOM	Add On Module
AP	Access Point

B

BRI	Basic Rate Interface

C

CA	Call Agent
CID	Caller Identification
COM	Communication
CR Mode	Constant Resistance Mode
CSU	Communication Service Unit
CTI	Computer Telephony Integration

D

DASL	Digital Adaptor for Subscriber Loop
DC	Direct Current
DECT	Digital Enhanced Cordless Telecommunications
DGP	Digital Phone
DHCP	Dynamic Host Configuration Protocol
DLI	Digital Line Interface
DSU	Data Service Unit

E

EMI	Electro-Magnetic Interference

F

FXO	Foreign Exchange Office
FXS	Foreign Exchange Station

G

GARP	Generic Attribute Registration Protocol
GK	Gatekeeper
GVRP	GARP VLAN Registration Protocol

H

HDLC	High level Data Link Control
HLR	Home Location Register
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol

I

ID	Identification
IDS	Intrusion Detection System
IGMP	Internet Group Management Protocol
IMAP	Internet Messaging Access Protocol
IN-SCP	Intelligent Network Service Control Point
IP	Internet Protocol
IPC	Inter Processor Communication
IPDC	Internet Protocol Device Control
IP-SCP	Internet Protocol Service Control Point
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part

J

JDBC	Java Database Connectivity

K

KDB	Keyset Daughter Board

L

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

M

MCP	Main Control Processor
MEGACO	Media Gateway Control
MG	Media Gateway
MGC	Media Gateway Controller
MGI	Media Gateway Interface
MGCP	Media Gateway Control Protocol
MMC	Man Machine Communication
MPD	Metering Pulse Detection
MOH	Music On Hold
MUA	Mail User Agent
MTA	Mail Transfer Agent

N

NAT	Network Address Translation

O

OSPF	Open Shortest Path First

P

PAT	Port Address Translation
PBA	Printed circuit Board Assembly
PCM	Pulse Code Modulation
PCMMC	PC based Man Machine Communication
PLL	Phase Locking Loop
POP3	Post Office Protocol version 3
PPP	Point to Point Protocol
PPPoE	Point to Point Protocol over Ethernet
PRI	Primary Rate Interface
PRS	Polarity Reverse detection
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit

Q

Q-SIG	Q-Signaling
QoS	Quality of Service

R

RIP	Routing Information Protocol
RTCP	Real-time Transmission Control Protocol
RTP	Real-time Transmission Protocol

S

SCP	Signal Control Processor
SDP	Session Description Protocol
SG	Signaling Gateway
SGCP	Simple Gateway Control Protocol
SIGTRAN	Signaling Transport
SIP	Session Initiation Protocol
SLI	Single Line Interface
SLT	Single Line Telephone
7200	Small Medium Enterprise
SMTP	Simple Mail Transfer Protocol
SoL	Server optimized Linux
STA	Spanning Tree Algorithm
STP	Signaling Transfer Point

T

TCAP	Transmission Control Application Part
TCP	Transmission Control Protocol
TEPRI	T1E1PRI
TRK	Trunk

U

UA	User Agent
UAC	User Agent Client
UART	Universal Asynchronous Receiver and Transmitter
UAS	User Agent Server
UCD	Uniform Call Distribution
UDP	User Datagram Protocol
USB	Universal Serial Bus

V

VAD	Voice Activation Detect
VLAN	Virtual LAN
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network

W

WAN	Wide Area Network
WIM	WAN Interface Module
WLI	Wireless LAN Interface

X

xDSL	x-Digital Subscriber Line

OfficeServ 7200

General Description Guide

SAMSUNG ELECTRONICS