Panasonic®

Hybrid IP-PBX

Installation Manual

Model No. **KX-TDA50**

Thank you for purchasing a Panasonic Hybrid IP-PBX.
Please read this manual carefully before using this product and save this manual for future use.

KX-TDA50: MPR Version 2.0

SD Logo is
a trademark.

System Components

System Components Table

	Model	Description
Main Unit	KX-TDA50	Main Unit
CO Line Cards	KX-TDA5180	4-Port Analog Trunk Card (LCOT4)
	KX-TDA5193	4-Port Caller ID Card (CID4)
	KX-TDA5480	4-Channel VoIP Gateway Card (IP-GW4)
Extension Cards	KX-TDA5170	4-Port Hybrid Extension Card (HLC4)
	KX-TDA5171	4-Port Digital Extension Card (DLC4)
	KX-TDA5172	8-Port Digital Extension Card (DLC8)
	KX-TDA5173	4-Port Single Line Telephone Extension Card (SLC4)
	KX-TDA5174	8-Port Single Line Telephone Extension Card (SLC8)
	KX-TDA5175	4-Port Proprietary Extension Card (PLC4)
	KX-TDA5176	8-Port Proprietary Extension Card (PLC8)
Other Cards	KX-TDA5105	Memory Expansion Card (MEC)
	KX-TDA5161	4-Port Doorphone Card (DPH4)
	KX-TDA5166	8-Channel Echo Canceller Card (ECHO8)
	KX-TDA5168	Extension Caller ID Card (EXT-CID)
	KX-TDA5191	2-Channel Message Card (MSG2)
	KX-TDA5196	Remote Card (RMT)
Optional SD Memory Card	KX-TDA5920	SD Memory Card for Software Upgrade to Enhanced Version
Cell Station (CS)	KX-T0141	2-Channel Cell Station Unit for 2.4 GHz Portable Station
Proprietary Equipment	KX-A236	Additional AC Adaptor
	KX-T30865	Doorphone

Available Proprietary Telephones

The Hybrid IP-PBX supports Panasonic KX-T7000 and KX-TD7000 series telephones:
- Digital/Analog proprietary telephones (e.g., KX-T7625, KX-T7630, KX-T7633, KX-T7636)
- Portable stations (e.g., KX-TD7690)
- DSS consoles (e.g., KX-T7640)

Note

The Hybrid IP-PBX does not support the following telephones:
- KX-T30800 series Proprietary Telephones and DSS consoles
- KX-T61600 series Proprietary Telephones and DSS consoles
- KX-T123200 series Proprietary Telephones and DSS consoles

For the equipment (e.g., Add-on Key Module, USB Module, Headset[*1]) that can be connected to a particular telephone, refer to the telephone's manual.

For other equipment that can be connected to the Hybrid IP-PBX, refer to "1.2.2 System Connection Diagram".

Abbreviations in this manual

Proprietary telephone: PT

Digital proprietary telephone: DPT

Analog proprietary telephone: APT

Portable station: PS

Single line telephone: SLT

[*1] The KX-T7090 headset can be connected to the KX-T7000, KX-T7200, KX-T7300, and KX-T7400 series telephones.

Important Safety Instructions

SAFETY REQUIREMENTS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Clean with a damp cloth.
4. Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
5. Do not place the product on an unstable surface, as a fall may cause serious internal damage.
6. Slots and openings in the front, back and bottom of the cabinet are provided for ventilation; to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface while in use. The product should never be placed near or over a radiator or other heat source. This product should not be placed in a sealed environment unless proper ventilation is provided.
7. The product should only be connected to the type of electrical power supply specified on the product label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
8. For safety purposes this unit is equipped with a grounded plug. If you do not have a grounded outlet, please have one installed. Do not bypass this safety feature by tampering with the plug.
9. Do not allow anything to rest on the power cord. Do not locate this product where the power cord may be stepped on or tripped on.
10. To reduce the risk of fire or electric shock, do not overload wall outlets and extension cords.
11. Do not insert objects of any kind into this product through its slots and openings, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on or in the product.
12. To reduce the risk of electric shock, do not disassemble this product. Only qualified personnel should service this product. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock.
13. Unplug this product from the wall outlet and have it serviced by qualified service personnel in the following cases:
    a) When the power supply cord or plug is damaged or frayed.
    b) If liquid has been spilled into the product.
    c) If the product has been exposed to rain or water.
    d) If the product does not operate according to the operating instructions. Adjust only the controls that are explained in the operating instructions. Improper adjustment of other controls may result in damage and may require service by a qualified technician to restore the product to normal operation.
    e) If the product has been dropped or the cabinet has been damaged.
    f) If product performance deteriorates.
14. Avoid using wired telephones during an electrical storm. There is a remote risk of electric shock from lightning.
15. Do not use a telephone in the vicinity of a gas leak to report the leak.

SAVE THESE INSTRUCTIONS

Precaution

WARNING

DO NOT REMOVE SD MEMORY CARD WHILE POWER IS SUPPLIED TO THE H Y B R I D I P - P B X

Doing so may cause the Hybrid IP-PBX to fail to start when you restart the system.

- Keep the unit away from heating appliances and devices that generate electrical noise such as fluorescent lamps, motors and televisions. These noise sources can interfere with the performance of the Hybrid IP-PBX.
- This unit should be kept free of dust, moisture, high temperature (more than 40 °C [104 °F]) and vibration, and should not be exposed to direct sunlight.
- If you are having problems making calls to outside destinations, follow this procedure to test the CO lines:
    1. Disconnect the Hybrid IP-PBX from all CO lines.
    2. Connect known working SLTs to those CO lines.
    3. Make a call to an external destination using those SLTs.

    If a call cannot be carried out correctly, there may be a problem with the CO line that the SLT is connected to. Contact your telephone company.
    If all SLTs operate properly, there may be a problem with your Hybrid IP-PBX. Do not reconnect the Hybrid IP-PBX to the CO lines until it has been serviced by an authorized Panasonic Factory Servicenter.
- Wipe the unit with a soft cloth. Do not clean with abrasive powders or with chemical agents such as benzene or thinner.

WARNING

- **THIS UNIT MAY ONLY BE INSTALLED AND SERVICED BY QUALIFIED SERVICE PERSONNEL.**
- **IF DAMAGE TO THE UNIT EXPOSES ANY INTERNAL PARTS, DISCONNECT THE POWER SUPPLY CORD IMMEDIATELY AND RETURN THE UNIT TO YOUR DEALER.**
- **UNPLUG THIS UNIT FROM THE AC OUTLET IF IT EMITS SMOKE, AN ABNORMAL SMELL OR MAKES UNUSUAL NOISE. THESE CONDITIONS CAN CAUSE FIRE OR ELECTRIC SHOCK. CONFIRM THAT SMOKE HAS STOPPED AND CONTACT AN AUTHORIZED PANASONIC FACTORY SERVICENTER.**
- **WHEN RELOCATING THE EQUIPMENT, FIRST DISCONNECT THE TELECOM CONNECTION BEFORE DISCONNECTING THE POWER CONNECTION. WHEN THE UNIT IS INSTALLED IN THE NEW LOCATION, RECONNECT THE POWER FIRST, AND THEN RECONNECT THE TELECOM CONNECTION.**
- **TO PREVENT POSSIBLE FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.**
- **THE POWER SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE. ENSURE THAT THE AC OUTLET IS LOCATED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.**

CAUTION

DANGER OF EXPLOSION EXISTS IF A BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE BATTERY MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

When you ship the product
Carefully pack and send it prepaid, adequately insured and preferably in the original carton. Attach a postage-paid letter, detailing the symptom, to the outside of the carton. DO NOT send the product to the Executive or Regional Sales offices. They are NOT equipped to make repairs.

Product Service
Panasonic Factory Servicenters for this product are listed in the servicenter directory. Consult your certified Panasonic dealer for detailed instructions.

For Future Reference

Please print, record, and retain the following information for future reference.

Note

The serial number of this product can be found on the label affixed to the unit. You should record the model number and the serial number of this unit as a permanent record of your purchase to aid in identification in the event of theft.

MODEL NO.   _____

SERIAL NO.   _____

DATE OF PURCHASE   _____

NAME OF DEALER   _____

DEALER'S ADDRESS   _____

      _____

      _____

      _____

DEALER'S TEL. NO.   _____

Introduction

This Installation Manual is designed to serve as an overall technical reference for the Panasonic Hybrid IP-PBX, KX-TDA50. It provides instructions for installing the hardware, and programming the Hybrid IP-PBX using the KX-TDA50 Maintenance Console.

The Structure of this Manual

This manual contains the following sections:

Section 1 System Outline

Provides general information on the Hybrid IP-PBX, including the system capacity and specifications.

Section 2 Installation

Describes the procedures to install the Hybrid IP-PBX. Detailed instructions for planning the installation site, installing the optional service cards, and cabling of peripheral equipment are provided. Further information on system expansion and peripheral equipment installation is included.

Section 3 Guide for the Hybrid IP-PBX PC Programming Software

Explains the installation procedure, structure, and basic information of the KX-TDA50 Maintenance Console.

Section 4 Troubleshooting

Provides information on the Hybrid IP-PBX and telephone troubleshooting.

About the Other Manuals

Along with this Installation Manual, the following manuals are available:

Feature Guide

Describes all basic, optional and programmable features of the Hybrid IP-PBX, and step-by-step instruction for performing system programming using a proprietary telephone or a personal computer (PC).

User Manual

Provides operating instructions for end users using a PT, SLT, PS, or DSS Console.

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F.C.C. REQUIREMENTS AND RELEVANT INFORMATION

1. **Notification to the Telephone Company**

   This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the side of this equipment is a label that contains, among other information, a product identifier in the format US: ACJMF03AKX-TDA50. If requested, this number must be provided to the telephone company.

   Installation must be performed by a qualified professional installer. If required, provide the telephone company with the following technical information:

   - Telephone numbers to which the system will be connected
   - Make: Panasonic
   - Model: KX-TDA50
   - Certification No.: found on the side of the unit
   - Ringer Equivalence No.: 0.3A
   - Facility Interface Code: 02LS2
   - Service Order Code: 9.0F
   - Required Network Interface Jack: RJ11

2. **Ringer Equivalence Number (REN)**

   The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The REN for this product is part of the product identifier that has the format US: ACJMF03AKX-TDA50. The digits represented by 03 are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

3. **Incidence of Harm to the Telephone Lines**

   If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

4. **Changes in Telephone Company Communications Facilities, Equipment, Operations and Procedures**

   The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

5. **Trouble with this equipment**

   If trouble is experienced with this equipment, for repair or warranty information, please see the attached warranty, which includes the Servicenter Directory. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

6. **Connection to Party Line**

   Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

7. **Combined Use with Alarm Equipment**

   If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this device.

When programming emergency numbers and/or making test calls to emergency numbers:

1. Remain on the line and briefly explain to the dispatcher the reason for the call before hanging up.
2. Perform such activities in the off-peak hours, such as early morning hours or late evenings.

WARNING

The software contained in the ARS and TRS features to allow user access to the network must be upgraded to recognize newly established network area codes and exchange codes as they are placed into service. Failure to upgrade the on-premise PBXs or peripheral equipment to recognize the new codes as they are established will restrict the customer and users of the PBX from gaining access to the network and to these codes.
KEEP THE SOFTWARE UP TO DATE WITH THE LATEST DATA.

For Cell Station

CAUTION

Any changes or modifications not expressly approved by the party responsible for compliance could void user's authority to operate this device.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Some wireless telephones operate at frequencies that may cause interference to nearby TVs and VCRs. To minimize or prevent such interference, the base of the wireless telephone should not be placed near or on top of a TV or VCR. If interference is experienced, move the wireless telephone further away from the TV or VCR. This will often reduce, or eliminate, interference.
Operating near 2.4 GHz electrical appliances may cause interference. Move away from the electrical appliances.

CAUTION

To comply with FCC RF exposure requirements in uncontrolled environment:

- This equipment must be installed and operated in accordance with provided instructions and a minimum 20 cm (8 in) spacing must be provided between antenna and all person's body (excluding extremities of hands, wrist and feet) during wireless modes of operation.
- This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

Medical—consult the manufacturer of any personal medical devices, such as pacemakers, to determine if they are adequately shielded from external RF (radio frequency) energy. (The unit operates in the frequency range of 2401 MHz to 2480 MHz, and the power output level can range from 0.004 W to 0.4 W.) Do not use the unit in health care facilities if any regulations posted in the area instruct you not to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF (radio frequency) energy.

Table of Contents

Section 1

System Outline

This section provides general information on the Hybrid IP-PBX, including the system capacity and specifications.

1.1　System Highlights

1.1.1　System Highlights

Networking Features

The Hybrid IP-PBX supports the following private networking features:

TIE Line Service

PBXs can be connected via a privately leased telephone lines forming a private network. These "TIE lines" provide a cost-effective way to route calls and communications, and are often used to connect corporate offices located in different cities.

QSIG Support

TIE line service can be used on a private network that implements the QSIG protocol (Q.931). QSIG offers TIE line service as well as advanced caller and called party identification features.

Voice over Internet Protocol (VoIP) Network

The Hybrid-IP PBX can be used on a private network which implements VoIP. On this type of network, information is sent over the private network in IP packets, which allows voice as well as data to be sent to other devices in the private network.

Built-in Small Call Center Features

Extensions can form an incoming call distribution (ICD) group and be used as a small call center which can take advantage of several features, some of which are highlighted below.

Queuing

When all available extensions in an ICD group are busy, additional calls can be placed in a queue as they arrive. While calls are waiting in the queue, callers can hear background music (BGM), an outgoing message (OGM), etc.

Log-in/Log-out

Members of an ICD group can log-in to or log-out of a group manually. Group members can log-in at the beginning of a work shift, and log-out at the end of the day. While logged-in, ICD group members can be allotted a specified amount of time after completing a call during which new calls will not be received by their extensions, allowing them to finish any necessary paperwork before being eligible to receive new calls (Wrap-up).

VIP Call

The VIP Call feature is one method of making sure that calls from preferred customers or callers are answered quickly. When using VIP Call mode, ICD groups are assigned a priority, allowing calls in higher-priority groups to be answered before calls in lower-priority groups.

Computer Telephony Integration (CTI) Features

Computers can be connected to the Hybrid-IP PBX to provide extension users with access to advanced features such as pop-up display of caller information, computer-based speed dialing, etc.

PC Phone/PC Console

These Panasonic CTI applications can be used on computers connected to each extension, providing their respective extension users with powerful and flexible call handling and display features.

Third Party CTI Applications

The Hybrid IP-PBX supports industry standard protocols, allowing third-party CTI applications to be integrated with the Hybrid-IP PBX and its extensions.

Voice Mail Features

A Voice Processing System (VPS) can be connected to the Hybrid IP-PBX to provide Voice Mail (VM) and Automated Attendant (AA) services. A Panasonic VPS which supports DPT (Digital) Integration can be connected to the Hybrid IP-PBX effortlessly and with minimal setup required. Conventional DTMF (analog) voice mail systems, including those from other manufacturers, are also supported.

Paralleled Telephone Features

By connecting telephones in parallel, you can increase the number of telephones connected to the Hybrid-IP PBX without adding additional extension cards.

Parallel Mode

An SLT can be connected to an APT or DPT which is connected to a Super Hybrid Port of the Hybrid-IP PBX. The SLT shares the same extension number with the APT or DPT.

EXtra Device Port (XDP) Mode

An SLT can be connected to a DPT which is connected to a Super Hybrid Port of the Hybrid-IP PBX. Unlike parallel mode, XDP mode allows each telephone to act as an independent extension with its own extension number.

Digital XDP

A DPT can be connected to another DPT which is connected to a DPT port or a Super Hybrid Port of the Hybrid-IP PBX. Similar to XDP mode, each DPT acts as an independent extension with its own extension number.

Portable Station (PS) Features

A Panasonic PS can be used in place of a PT to provide wireless access to PBX features and call handling. When in Wireless XDP Parallel Mode, a PS can share an extension number with a wired telephone, allowing extension users to use their PSs when they are away from their desks to answer or make calls as if they were using their wired telephones.
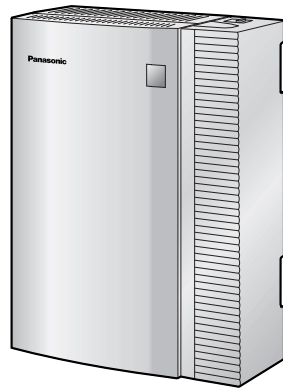
Hospitality Features

This Hybrid IP-PBX has several features that support its use in a hotel-type environment. Extensions corresponding to guest rooms can be "checked in" or "checked out" by a designated hotel operator, who can also check or set wake-up calls.
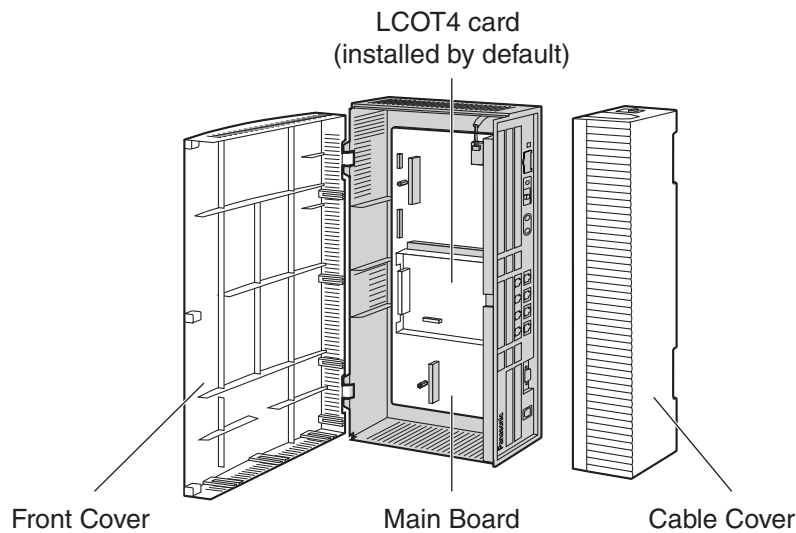
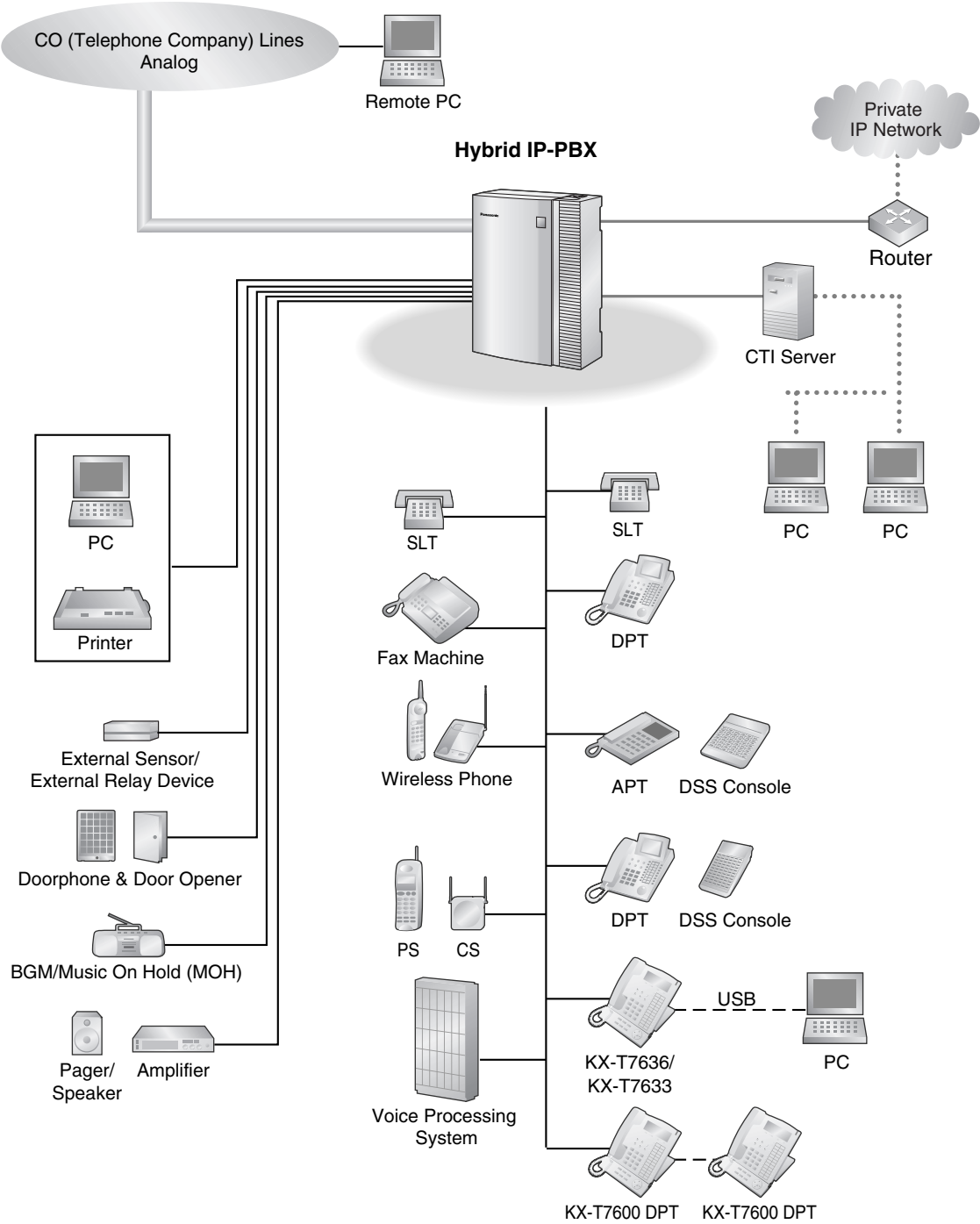# 1.2 Basic System Construction

1.2.1 Main Unit

The main unit is equipped with 4 analog trunk ports (one LCOT4 card) and 4 extension ports (Super Hybrid Ports). For system expansion, optional service cards can be installed, and an additional AC adaptor can also be connected.
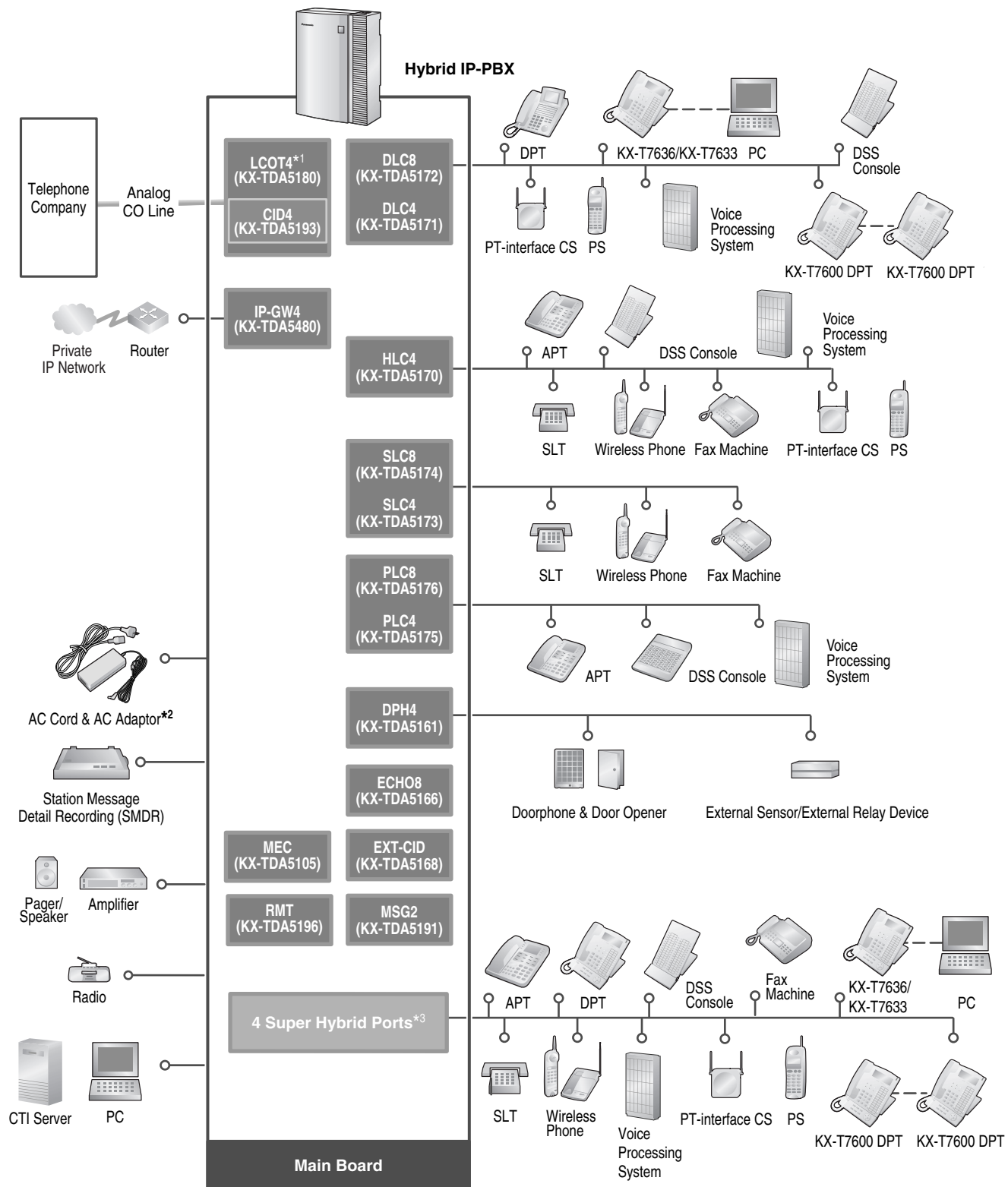

Construction of Main Unit

LCOT4 card
(installed by default)

Front Cover   Main Board   Cable Cover

1.2.2 System Connection Diagram

CO (Telephone Company) Lines Analog

Remote PC

Hybrid IP-PBX

Private IP Network

Router

CTI Server

PC

Printer

External Sensor/ External Relay Device

Doorphone & Door Opener

BGM/Music On Hold (MOH)

Pager/ Speaker

Amplifier

SLT

Fax Machine

Wireless Phone

PS   CS

Voice Processing System

SLT

DPT

APT   DSS Console

DPT   DSS Console

KX-T7636/ KX-T7633

USB

PC

PC   PC

KX-T7600 DPT   KX-T7600 DPT

Hybrid IP-PBX

LCOT4*1
(KX-TDA5180)

CID4
(KX-TDA5193)

DLC8
(KX-TDA5172)

DLC4
(KX-TDA5171)

DPT

KX-T7636/KX-T7633   PC

DSS
Console

Telephone
Company

Analog
CO Line

PT-interface CS   PS

Voice
Processing
System

KX-T7600 DPT   KX-T7600 DPT

IP-GW4
(KX-TDA5480)

Private
IP Network

Router

HLC4
(KX-TDA5170)

APT

DSS Console

Voice
Processing
System

SLT   Wireless Phone   Fax Machine

PT-interface CS   PS

SLC8
(KX-TDA5174)

SLC4
(KX-TDA5173)

SLT   Wireless Phone   Fax Machine

PLC8
(KX-TDA5176)

PLC4
(KX-TDA5175)

APT

DSS Console

Voice
Processing
System

AC Cord & AC Adaptor*2

DPH4
(KX-TDA5161)

Doorphone & Door Opener

External Sensor/External Relay Device

Station Message
Detail Recording (SMDR)

ECHO8
(KX-TDA5166)

MEC
(KX-TDA5105)

EXT-CID
(KX-TDA5168)

Pager/
Speaker

Amplifier

RMT
(KX-TDA5196)

MSG2
(KX-TDA5191)

Radio

4 Super Hybrid Ports*3

APT   DPT

DSS
Console

Fax
Machine

KX-T7636/
KX-T7633

PC

CTI Server   PC

Main Board

SLT   Wireless
Phone

Voice
Processing
System

PT-interface CS   PS

KX-T7600 DPT   KX-T7600 DPT

*1   One LCOT4 card is installed by default.
*2   In addition to the supplied AC adaptor, an additional AC adaptor can be connected to the Hybrid IP-PBX.
*3   The Hybrid IP-PBX has 4 Super Hybrid Ports pre-installed.

1.3 Options

1.3.1 Options

Model No.	Model Name	Description	Maximum Quantity
KX-TDA5105	Memory Expansion Card (MEC)	Memory expansion card to increase Personal/System Speed Dialing number storage space, double the number of DPTs (using Digital XDP connection), and display language selection for VM Menu. To be installed in the MEC slot.	1
KX-TDA5161	4-Port Doorphone Card (DPH4)	4-port doorphone card for 4 doorphones, 4 door openers or external relays, and 4 external sensors.	1
KX-TDA5166	8-Channel Echo Canceller Card (ECHO8)	8-channel card for echo cancellation during conferences.	1
KX-TDA5168	Extension Caller ID Card (EXT-CID)	Sends Caller ID signals to extension ports.	1
KX-TDA5170	4-Port Hybrid Extension Card (HLC4)	4-port extension card for SLTs, APTs, DSS consoles, a Voice Processing System (VPS), and PT-interface CSs.[1]	1
KX-TDA5171	4-Port Digital Extension Card (DLC4)	4-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs.[1]	1
KX-TDA5172	8-Port Digital Extension Card (DLC8)	8-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs.[1]	2
KX-TDA5173	4-Port Single Line Telephone Extension Card (SLC4)	4-port extension card for SLTs.	1
KX-TDA5174	8-Port Single Line Telephone Extension Card (SLC8)	8-port extension card for SLTs.	2
KX-TDA5175	4-Port Proprietary Extension Card (PLC4)	4-port extension card for APTs, DSS consoles, and a VPS.	1
KX-TDA5176	8-Port Proprietary Extension Card (PLC8)	8-port extension card for APTs, DSS consoles, and a VPS.	2
KX-TDA5180	4-Port Analog Trunk Card (LCOT4)	4-port analog CO line card with 2 power failure transfer (PFT) ports.	2[2]
KX-TDA5191	2-Channel Message Card (MSG2)	2-channel message card.	2
KX-TDA5193	4-Port Caller ID Card (CID4)	4-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT4 card.	3

Model No.	Model Name	Description	Maximum Quantity
KX-TDA5196	Remote Card (RMT)	Analog modem card for remote communication with the Hybrid IP-PBX. ITU-T V.90 support.	1
KX-TDA5480	4-Channel VoIP Gateway Card (IP-GW4)	4-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a, G.723.1, and G.711 CODEC methods.	1
KX-TDA5920	SD Memory Card for Software Upgrade to Enhanced Version	Optional SD Memory Card to upgrade the Hybrid IP-PBX with MPR version 1 or 1.1 to version 2.0, and for NDSS feature and CTI enhancement.	1
KX-A236	Additional AC Adaptor	AC adaptor and AC cord for system expansion.	1

[*1] The PT-interface CS can be connected to the Hybrid IP-PBX using a cable like a PT.

[*2] One LCOT4 card is installed by default. Two more LCOT4 cards can be optionally installed in the Hybrid IP-PBX.

1.4   Specifications

1.4.1   General Description

Switching		Non-blocking
AC Adaptor	**AC Input**	100 V AC to 240 V AC, 1.5 A, 50 Hz/60 Hz
	DC Output	40 V, 1.38 A (55.2 W)
DC Input		• DC IN 1: 40 V, 1.38 A (55.2 W) • DC IN 2: 40 V, 1.38 A (55.2 W)
Maximum Power Failure Tolerance		300 ms
Memory Backup Duration		7 years
Dialing	**CO Line**	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialing
	Extension	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialing
Connectors	**CO Line**	RJ11 (2 wire) × each CO ports
	Extension	RJ11 (4 wire) × each extension ports
	Paging Output	1 conductor jack
	External MOH (Music on Hold) Output	1 conductor jack
Mode Conversion		DP-DTMF, DTMF-DP
Ring Frequency		20 Hz/25 Hz (selectable)
Central Office Loop Limit		1600 Ω maximum
Operating Environment	**Temperature**	0 °C to 40 °C (32 °F to 104 °F)
	Humidity	10 % to 90 % (non-condensing)
Conference Call CO Line		From 10 × 3-party conference call to 4 × 8-party conference call
Music on Hold		1 port (Level Control: -11 dB to +11 dB in 1 dB steps) Selectable Tone/External Music Source port
Paging	**Internal**	Level Control: -15 dB to +6 dB in 3 dB steps
	External	1 port (Volume Control: -15 dB to +15 dB in 1 dB steps)
Serial Interface Port	**RS-232C**	1 (maximum 115.2 kbps)
	USB	1

Extension Connection Cable	SLT	1-pair wire (T, R)
	DPT	1-pair wire (D1, D2) or 2-pair wire (T, R, D1, D2)
	APT	2-pair wire (T, R, D1, D2)
	PT-interface CS	1-pair wire (D1, D2)
	DSS Console and Add-on Key Module	1-pair wire (D1, D2)
Dimension	275 mm (W) × 376 mm (H) × 117 mm (D) (10-4/5 in × 14-4/5 in × 4-3/5 in)	
Weight (when fully mounted)	Under 3.5 kg (7.72 lb)	

1.4.2   Characteristics

Terminal Equipment Loop Limit	• PT: KX-T7600 series: 90 Ω; all other DPTs/APTs: 40 Ω • SLT: 600 Ω including set • Doorphone: 20 Ω • PT-interface CS: 65 Ω
Minimum Leakage Resistance	15 000 Ω minimum
Maximum Number of Extension Instruments per Line	**1** for PT or SLT **2** by Parallel or eXtra Device Port connection of a PT and an SLT **3** by Digital eXtra Device Port connection of two DPTs and an SLT
Ring Voltage	75 Vrms at 20 Hz/25 Hz depending on the Ringing Load
Central Office Loop Limit	1600 Ω maximum
Hookswitch Flash Timing Range	24 ms to 2032 ms
Door Opener Current Limit	24 V DC/30 V AC, 1 A maximum
External Relay Current Limit	24 V DC/30 V AC, 1 A maximum
External Sensor Current Limit	Power to the external sensor is provided from the DPH4 card and must be grounded through the DPH4 card. For the connection diagram, refer to "2.5.1 DPH4 Card". The Hybrid IP-PBX detects input from the sensor when the signal is under 100 Ω.
Paging Terminal Impedance	600 Ω
MOH Terminal Impedance	10 000 Ω

1.4.3   System Capacity

Maximum CO Line and VoIP Line

The Hybrid IP-PBX supports the following number of CO lines and VoIP lines.

Line Type	Maximum Number
CO Line	12
VoIP Line	4

Maximum Terminal Equipment

The following number of items of terminal equipment can be supported by the Hybrid IP-PBX. For how to count the total number of items of equipment to be connected, refer to "MEC Card Calculation".

Terminal Equipment Type		Without Additional AC Adaptor	With Additional AC Adaptor	
		Without MEC Card	Without MEC Card	With MEC Card
SLT		24	24	
KX-T7600 series DPT/DSS console		Total 24	Total 24	Total 48
	KX-T7600 series DPT	24	24	48
	KX-T7600 series DSS console	4	4	
Other DPT/DSS console and APT		Total 4	Total 24	
	Other DPT	4	24	
	Other DSS console	4	4	
	APT	4	24	
DSS console		4	4	
CS		4	8	
PS		28	28	
VPS		4 ports (1 VPS)[*1]	4 ports (1 VPS)[*1]	
SLT, PT, DSS console, and VPS		Total 28	Total 28	Total 52
Doorphone		4	4	
Door Opener/External Relay		4	4	
External Sensor		4	4	
Add-on Key Module		Total 24	Total 24	48
USB Module				24

[*1]   A maximum of 4 ports (8 channels) of a single VPS can be connected to the Hybrid IP-PBX.

Note
Devices connected to the Hybrid IP-PBX that exceed the system capacity will not function.

MEC Card Calculation

Calculate the MEC figure from the type and total number of items of equipment to be connected. If the MEC figure exceeds 28, you need to install an MEC card. Note that you also need to connect an additional AC adaptor in this case.

MEC Card Calculation

Equipment Type		MEC Figure
PT	KX-T7600 series DPT/DSS console	1
	Other DPT/DSS console	1
	APT	1
Pre-installed 4 Super Hybrid Ports		4
Extension Card[*1]	SLC4	4
	SLC8	8
	HLC4	0
	PLC4	0
	PLC8	0
CS (1 unit)		0
VPS (1 port)		1

[*1] Only the extension cards that can support SLTs count for the MEC figures.

Calculation Example

Equipment Type		MEC Figure
Pre-installed Super Hybrid Ports	4 ports	4
KX-T7600 series DPT	16 units	16
SLC4	2 cards	8
VPS	4 ports	4
Total		32

The total MEC figure is 32. As this exceeds 28, you need to install an MEC card for this configuration.

AC Adaptor Selection

You must connect an additional AC adaptor in any of the following conditions:
•   A total of more than 4 APTs, DPTs (except KX-T7600 series), and DSS consoles (except KX-T7600 series) are connected.
•   More than 4 CSs are connected.
•   An MEC card is required to support a configuration with a total MEC figure exceeding 28.

Note

For how to connect an AC adaptor or additional AC adaptor, refer to "2.11.1 Starting the Hybrid IP-PBX".

Section 2

Installation

This section describes the procedures to install the Hybrid IP-PBX. Detailed instructions for planning the installation site, installing the optional service cards, and cabling of peripheral equipment are provided. Further information on system expansion and peripheral equipment installation is included.

2.1 Before Installation

2.1.1 Before Installation

Please read the following notes concerning installation and connection before installing the Hybrid IP-PBX and terminal equipment.
Be sure to comply with all applicable laws, regulations, and guidelines.

Safety Installation Instructions

When installing telephone wiring, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Never install telephone wiring during a lightning storm.

2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

4. Use caution when installing or modifying telephone lines.

Installation Precautions

This Hybrid IP-PBX is designed for wall mounting only, and should be installed in a location where it is accessible for inspections and maintenance.
To prevent malfunction, noise, or discoloration, avoid installing the system in the following locations:

1. In direct sunlight and hot, cold, or humid places. (Temperature range: 0 °C to 40 °C [32 °F to 104 °F])

2. Areas where sulfuric gases may be present, such as near thermal springs.

3. Areas where shocks or vibrations are frequent or strong.

4. High-dust areas, or places the system may come into contact with water or oil.

5. Near devices that generate high frequencies, such as sewing machines or electric welders.

6. On or near computers, telexes, or other office equipment, as well as microwave ovens or air conditioners. (It is preferable not to install the system in the same room as the above equipment.)

7. Within 1.8 m (6 ft) of radios and televisions. (Both the Hybrid IP-PBX and PTs should be at least 1.8 m [6 ft] away from such devices.)

8. Locations where other objects will obstruct the area around the Hybrid IP-PBX. Be especially careful to leave at least 20 cm (8 in) of space above and 10 cm (4 in) to the sides of the Hybrid IP-PBX for ventilation.

9. Do not stack up the optional service cards. To avoid damage to the optional service cards, always use the extension bolts.

Wiring Precautions

Be sure to follow these instructions when wiring the unit:

1. Do not run unshielded telephone cables near AC power cables, computer cables, AC power sources, etc. When running cables near other noise-generating devices or cables, use shielded telephone cables or shield the telephone cables with metal tubing.

2. If cables are run on the floor, use protectors to prevent the cables from being stepped on. Avoid running cables under carpets.

3. Avoid using the same AC outlet for computers, telexes, and other office equipment, as noise generated by such equipment may hamper system performance or interrupt the system.

4. Use 2-pair telephone cables when connecting PTs.
Use 1-pair telephone cables when connecting SLTs, data terminals, answering machines, computers, Voice Processing Systems, etc.

5. Unplug the system from its power source when wiring, and plug the system back in only after all wiring is completed.

6. Mis-wiring may cause the Hybrid IP-PBX to operate improperly. Refer to Section 2 "Installation" when wiring the system.

7. If an extension does not operate properly, disconnect the telephone from the extension line and connect it again, or turn off the Hybrid IP-PBX using power switch then turn it on again.

8. For safety purposes this unit is equipped with a grounded plug. If you do not have a grounded outlet, please have one installed. Do not bypass this safety feature by tampering with the plug.

9. Use twisted pair cable for CO line connection.

10. CO lines should be installed with surge protectors. For details, refer to "2.2.10 Surge Protector Installation".

11. To assure good quality telephone connection, it is recommended new and modifications to existing installation of customer premise wiring shall use solid twisted pair copper conductors with minimum 24 gauge that comply with the electrical specifications for Category 3 wiring as detailed in ANSI/EIA/TIA-570A Building Wiring Standards.

2.2   Installation of the Hybrid IP-PBX

2.2.1   Unpacking

Unpack the box and check the items below:

Main Unit	1
AC Cord	1
AC Adaptor	1
Screws for Wall Mounting	5
Washers for Wall Mounting	5
Mini Plug (for pager and music source)	2
SD Memory Card	1
Main Strap	1
Strap (for the pre-installed LCOT4 card)	1
Optional Card Label Sheet	1

2.2.2   Names and Locations

Ground Terminal

DC IN 2
DC IN 1
Power Switch

SD Memory
Card Slot Cover
Reset Button
System Initialize
Switch
MOH port
Pager port

Super Hybrid
Ports

RS-232C port

USB port
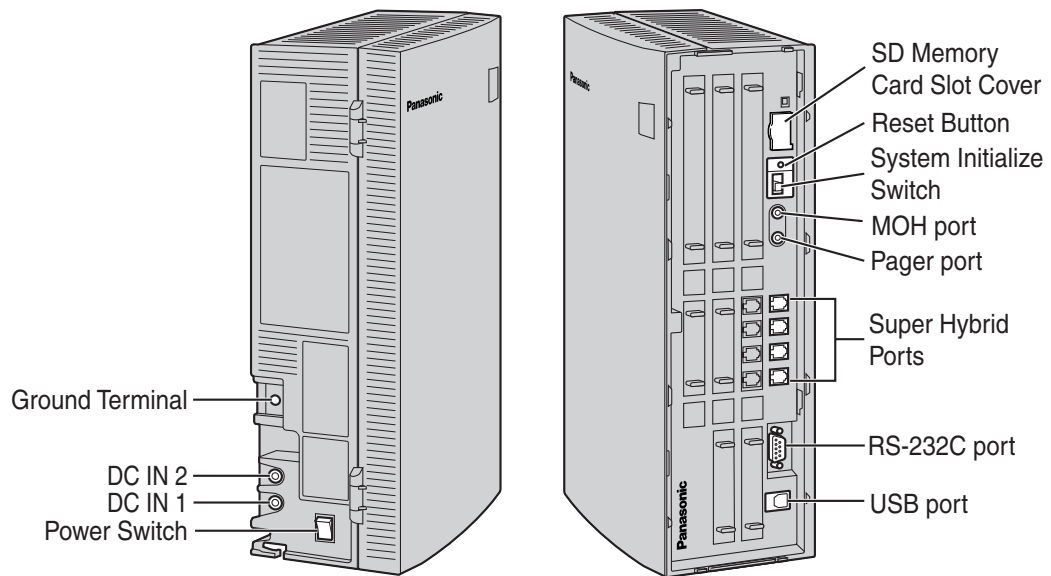
2.2.3   Opening/Closing the Covers

Opening the Covers

1. Pull the slide button to the right and, holding it, slide the cable cover upwards. Then turn the cable cover slightly to remove it.
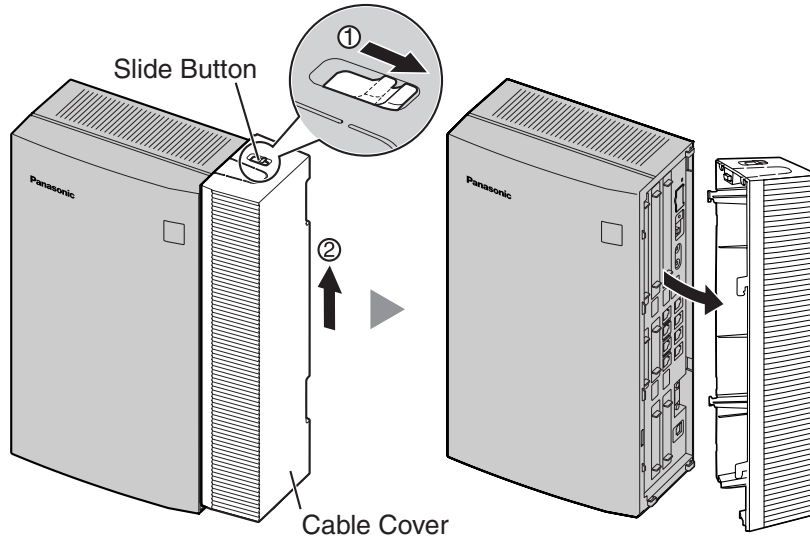
2. Remove the three screws.
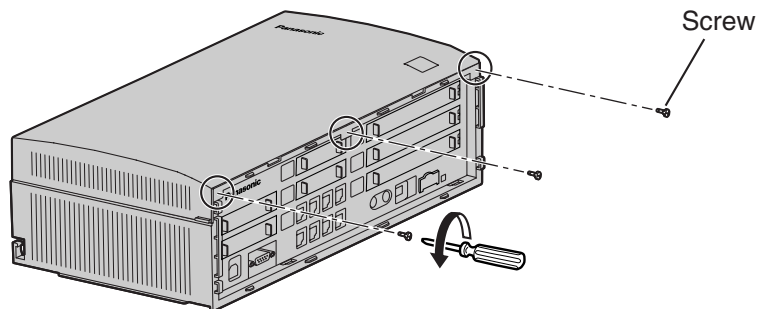
3. Holding the protrusions on both sides of the front cover, swing the cover open.
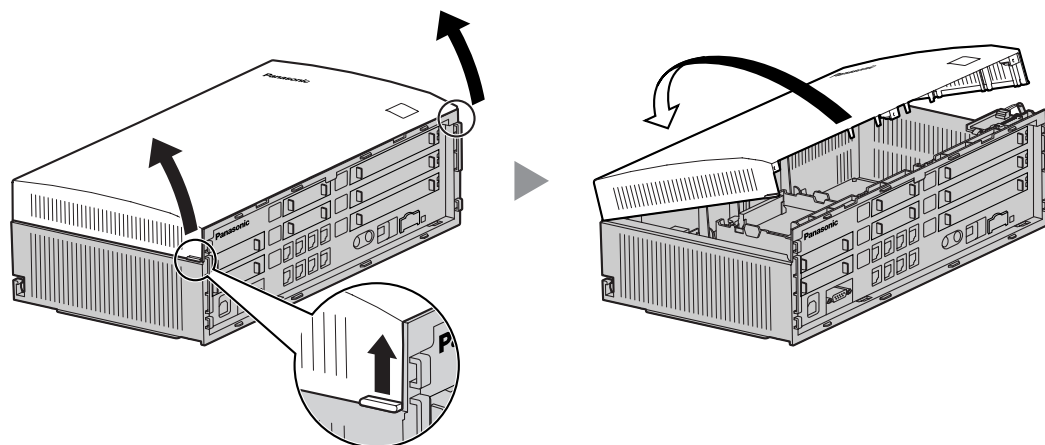
Removing/Attaching the Front Cover

If you prefer, you can remove the front cover.

Removing the Front Cover

Holding the front cover open at about a 45° angle, remove the front cover by pushing it in the direction of the arrow as shown below.
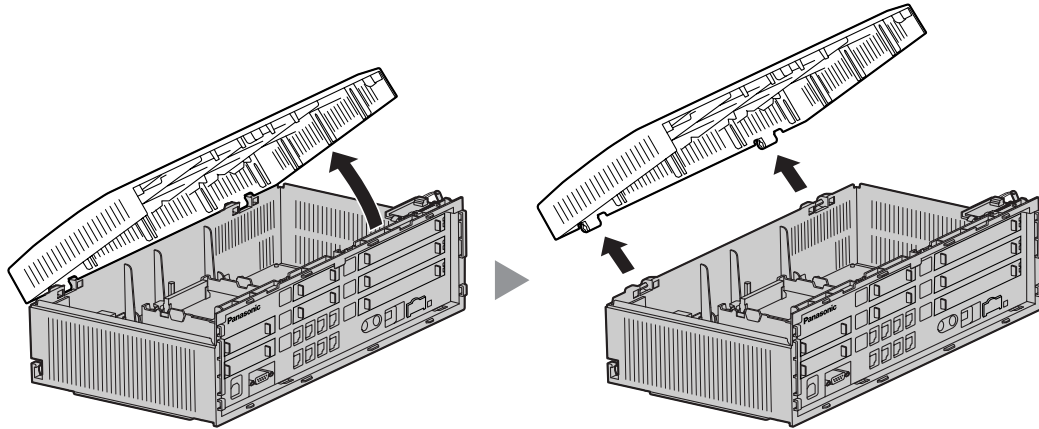
Attaching the Front Cover

Fit the front cover to the main unit as shown below, and then close the front cover.
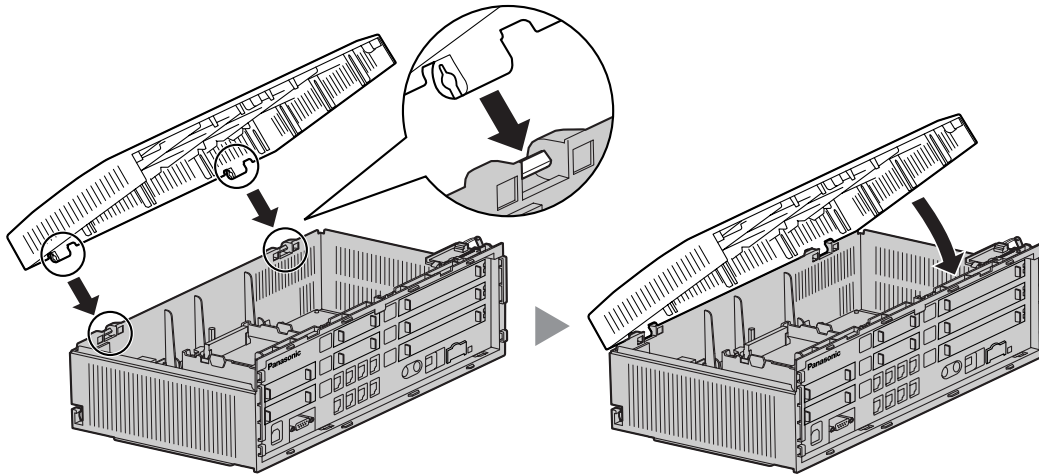
Closing the Covers

1. Close the front cover, then tighten the three screws.

Screw
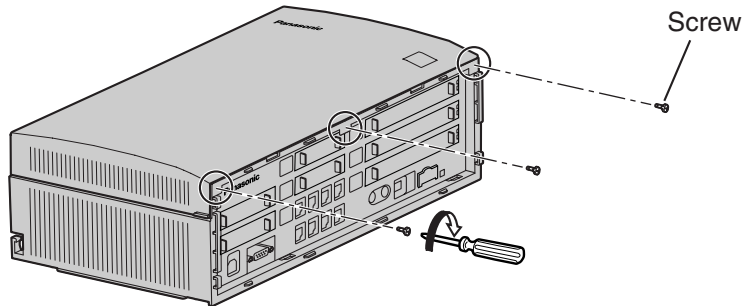
2. Attach the rear hooks on the cable cover to the main unit, then swing the cable cover closed so that the front hooks fit in place.
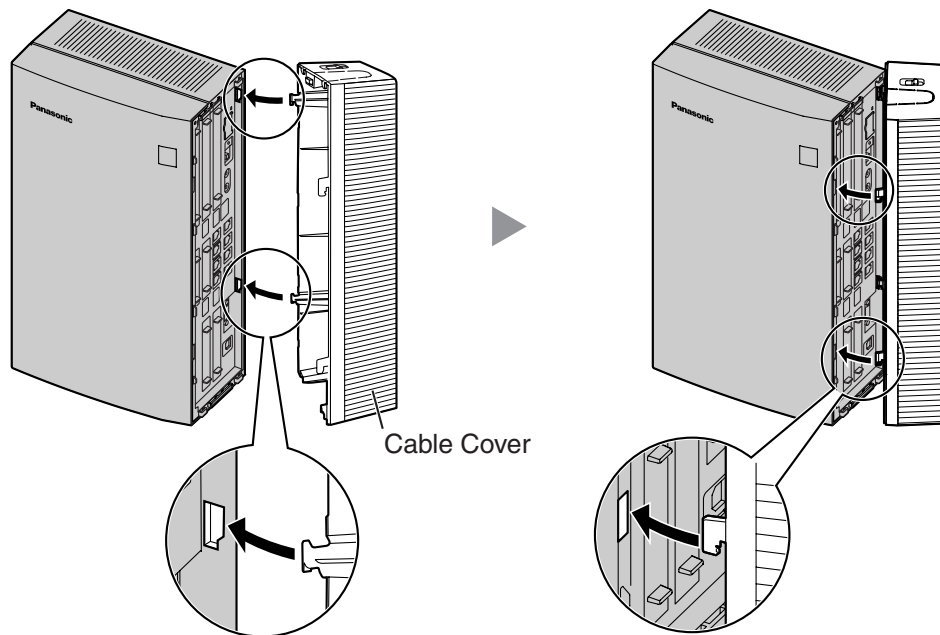
Cable Cover

3. Slide the cable cover down until it locks.
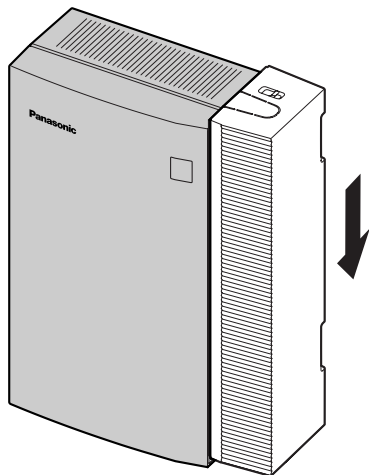
2.2.4   Installation of the SD Memory Card
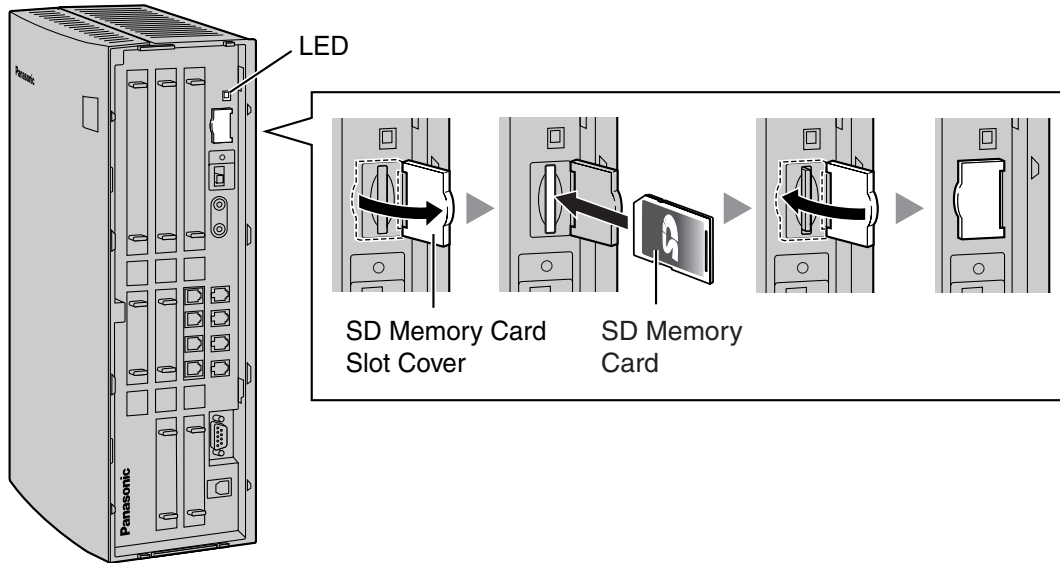
CAUTION

- Use only the SD Memory Card included with the Hybrid IP-PBX, or a Panasonic optional upgrade SD Memory Card.
- The SD Memory Card contains software for all the processes of the Hybrid IP-PBX and all the customer data. The SD Memory Card must be inserted before start up.
- Do not remove the SD Memory Card while power is supplied to the Hybrid IP-PBX. Doing so may cause the Hybrid IP-PBX to fail to start when you try to restart the system.

Note

If you need to remove the SD Memory Card:
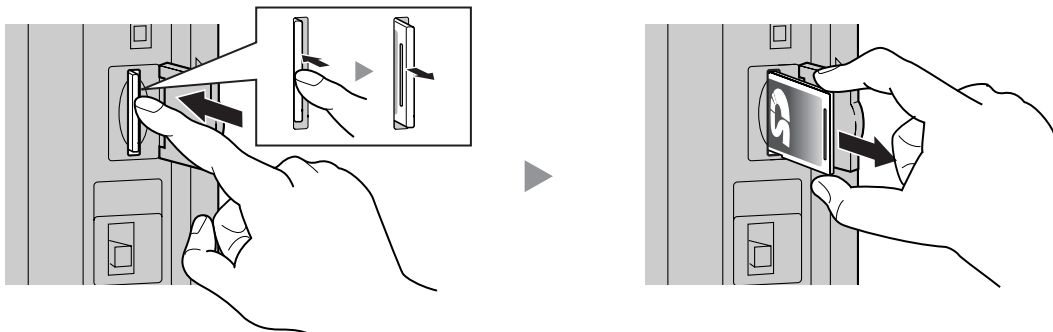
LED Indications

Indication	Color	Description
SD ACCESS	Green	SD memory card status • ON: Accessing

2.2.5   Frame Ground Connection

IMPORTANT

Connect the frame of the Hybrid IP-PBX to ground.

1. Loosen the screw.

2. Insert a grounding wire (user-supplied)*.

3. Tighten the screw.

4. Connect the grounding wire to ground.
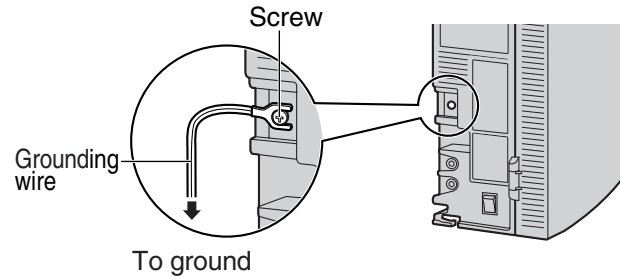
* For grounding wire, green-and-yellow insulation is required, and the cross-sectional area of the conductor must be more than 0.75 mm^2 or 18 AWG.

• Be sure to comply with applicable local regulations (e.g., law, guidelines).

• Proper grounding (connection to ground) is very important to protect the Hybrid IP-PBX from the bad effects of external noise or to reduce the risk to the user of electrocution in the case of a lightning strike.

• The ground wire of the AC cable has an effect against external noise and lightning strikes, but it may not be enough to protect the Hybrid IP-PBX. A permanent connection between ground and the ground terminal of the Hybrid IP-PBX must be made.

In most of the continental United States, the ground provided by the "Third wire ground" at the commercial power outlet will be satisfactory. However, in a small percentage of cases this ground may be installed incorrectly. Therefore, the following test procedure should be performed.

Test Procedure

1. Obtain a suitable voltmeter and set it for a possible reading of up to 250 V AC.

2. Connect the meter probes between the 2 main AC voltage points on the wall outlet. The reading obtained should be 108 V AC to 132 V AC.

3. Move one of the meter probes to the 3rd prong terminal (GND).
Either the same reading or a reading of 0 volt should be obtained.

4. If a reading of 0 volt at one terminal and a reading of 108 V AC to 132 V AC at the other terminal is not obtained, the outlet is not properly grounded.
This condition should be corrected by a qualified electrician (per article 250 of the National Electrical Code).

5. If a reading of 0 volt at one terminal and a reading of 108 V AC to 132 V AC at the other terminal is obtained, then set the meter to the "OHMS/RX1" scale, place one probe at the GND Terminal and the other probe at the terminal which gave a reading of 0 volt.
A reading of less than 1 ohm should be obtained. If the reading is not obtained, the outlet is not adequately grounded. See qualified electrician.

2.2.6   Installing/Removing the Optional Service Cards

Slot Position
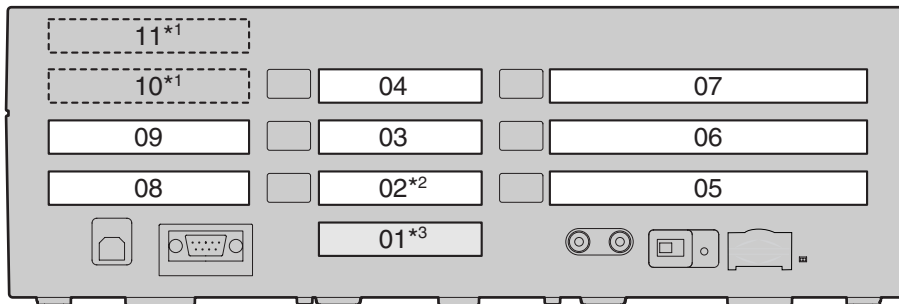
*[1]   Slots 10 and 11 accept only cards that do not have external ports. Therefore, these slots do not have removable cover plates.

*[2]   Slot 02 has an LCOT4 card pre-installed.

*[3]   Slot 01 contains the pre-installed Super Hybrid Ports. No optional service card can be installed.

Slot Restrictions

The following table shows the slot restrictions. " ✔" indicates that the slot supports the optional service card.

Card		Slot Number									
Type	Max	02	03	04	05	06	07	08	09	10	11
LCOT4	3*[1]	✔	✔	✔							
HLC4	1*[2]	✔	✔	✔							
DLC4		✔	✔	✔							
SLC4		✔	✔	✔							
PLC4		✔	✔	✔							
IP-GW4	1				✔	✔	✔				
DLC8	2*[3]				✔	✔	✔				
SLC8					✔	✔	✔				
PLC8					✔	✔	✔				
DPH4	1							✔	✔		
ECHO8	1							✔	✔	✔	✔
EXT-CID	1							✔	✔	✔	✔
MSG2	2							✔	✔	✔	✔

*[1]   Including one LCOT4 card that is installed by default.

*[2]   Only one of HLC, DLC4 , SLC4 or PLC4 card can be installed.

[*3] A maximum of two DLC8, SLC8 and PLC8 cards can be installed.

CAUTION

To protect the main board from static electricity, do not touch parts on the main board or on the optional service cards. To discharge static electricity, touch ground or wear a grounding strap.

Notes

- When installing or removing the optional service cards, the power switch of the Hybrid IP-PBX must be in the off position.
- For each card, the maximum number that can be installed in the Hybrid IP-PBX is listed in "1.3.1 Options".
- Any card that exceeds the capacity of the Hybrid IP-PBX will be ignored.
- When the Hybrid IP-PBX starts up with an invalid configuration, some cards will be ignored.

Installing Optional Service Cards

1. Before installing the optional service cards, cut and remove the appropriate dummy cover plates from the main unit.
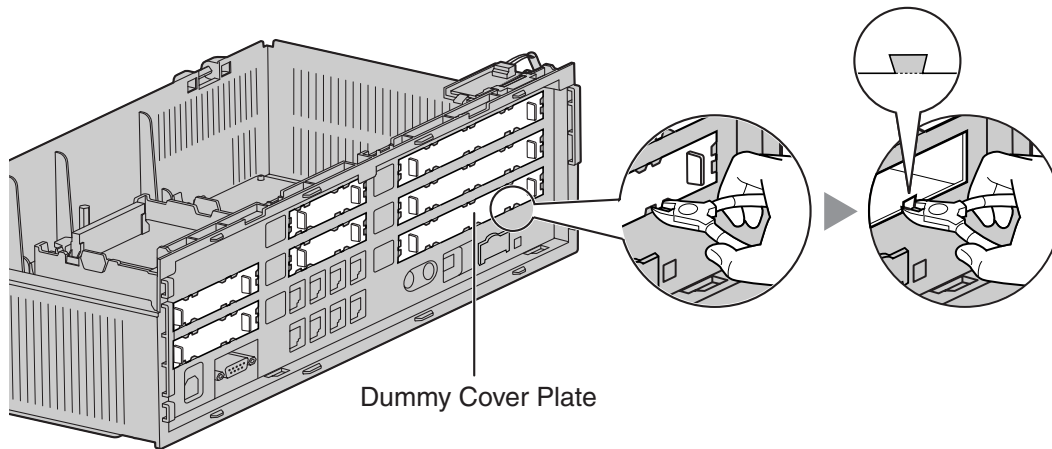
Dummy Cover Plate

CAUTION

For safety reasons, smooth the cut edges after removing the dummy cover plates.

2. Position the card in the open slot, making sure that the tabs on the both sides of the card fit into place. Then, holding the card firmly in place, lower the rear end so that the hole of the card fits over the extension bolt.

Optional Service Card
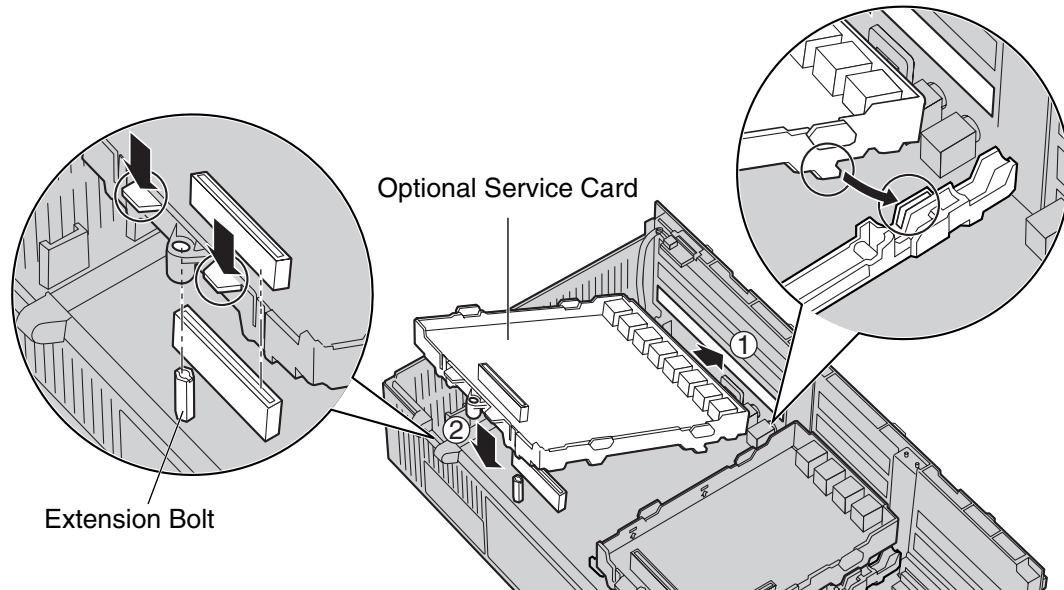
Extension Bolt

CAUTION

When installing the optional service cards, do not put pressure on any parts of the main board (e.g., tall capacitors). Doing so may result in damage to the Hybrid IP-PBX.
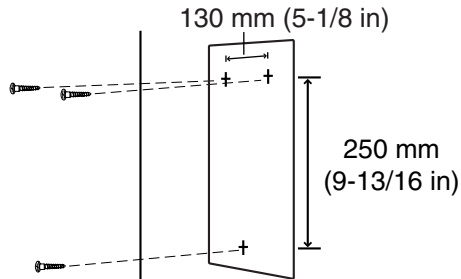
3. Insert the new extension bolt (included with the card) into the hole on the card, and tighten it to secure the card.

Extension Bolt
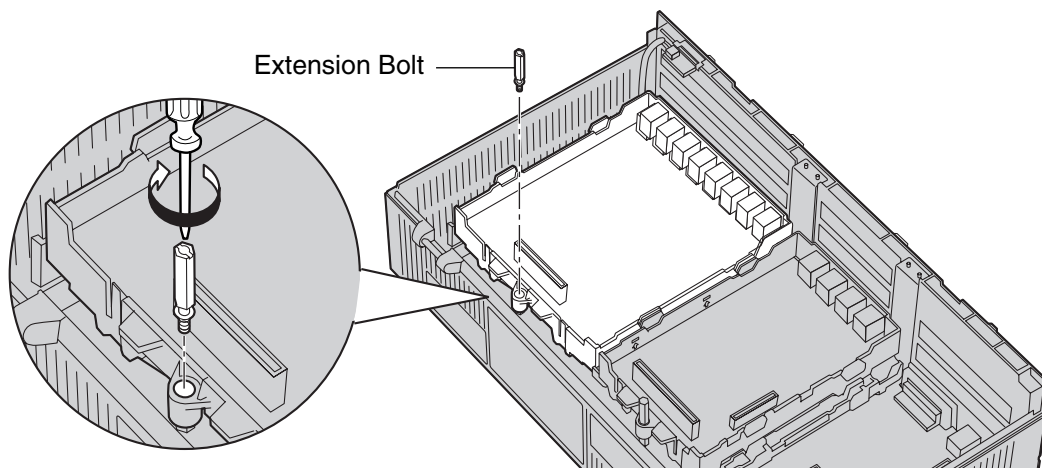
4. Stick an appropriate optional card label (included) to the left side of the corresponding card.

Optional Card Label
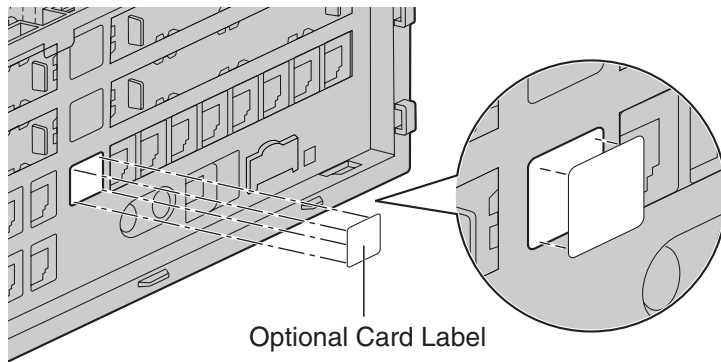
5. Connect a cable to an appropriate port of the card.
For details about pin assignments, refer to the appropriate section in "2.3 Installation of the CO Line Cards" and "2.4 Installation of the Extension Cards".
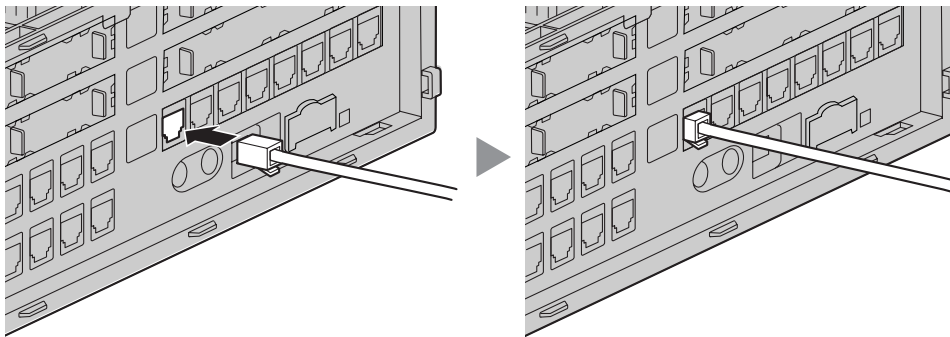
<u>**Note**</u>

Make sure to connect cables after installing the card in the Hybrid IP-PBX, not before.

6. Repeat the procedure for other cards.

   A. When installing a card in Slot 07, make sure to detach the LED holder first. After installing the card, reattach the LED holder.

To detach the LED holder
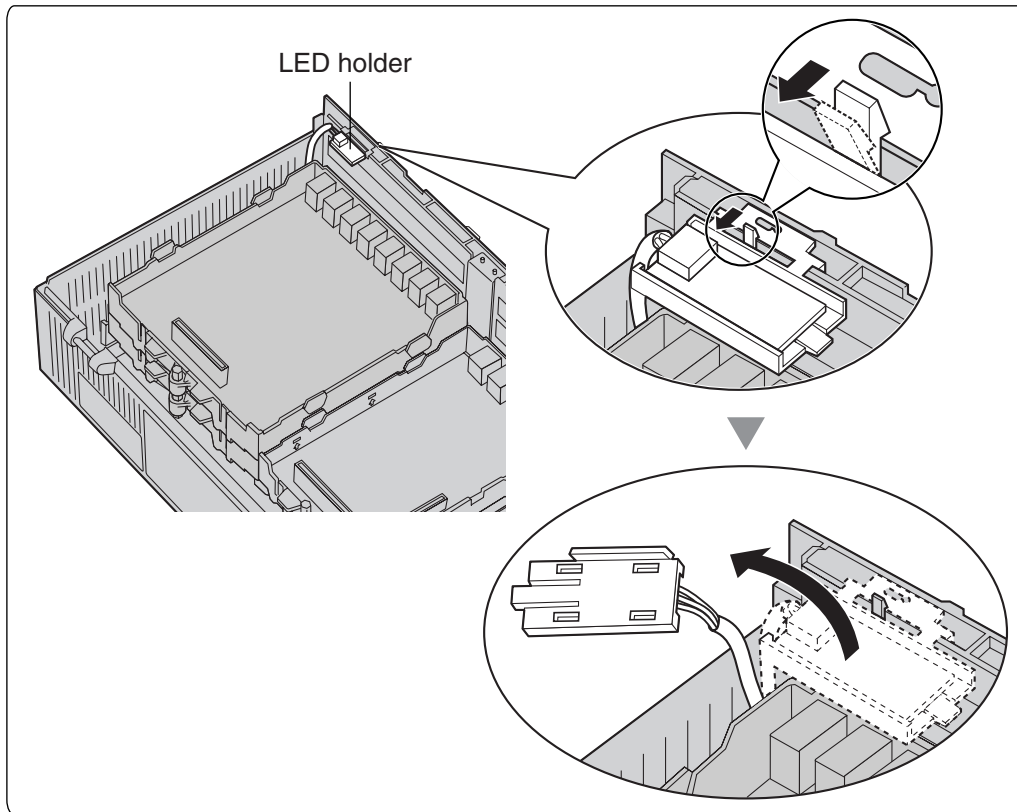
LED holder

To attach the LED holder
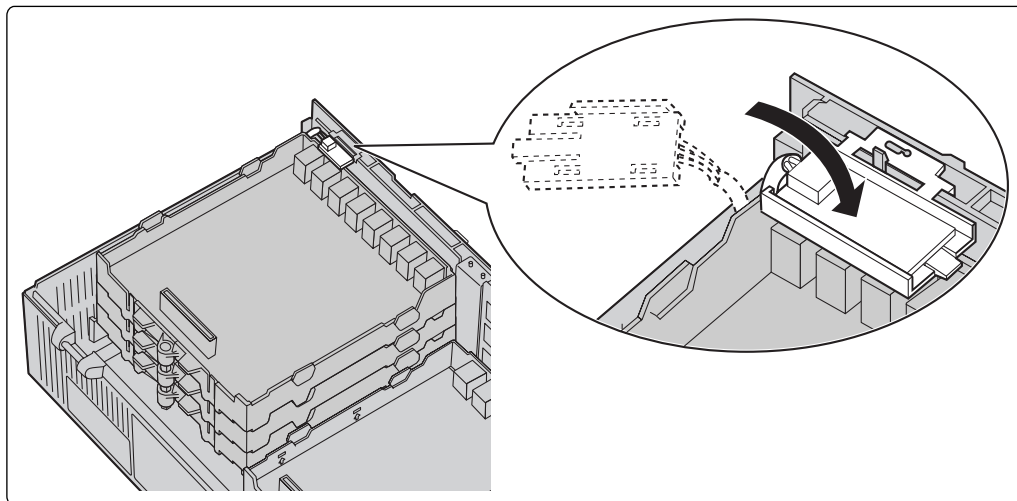
B. When installing a card in Slot 11, tighten the card using the screw included with the card, instead of the extension bolt.

Screw
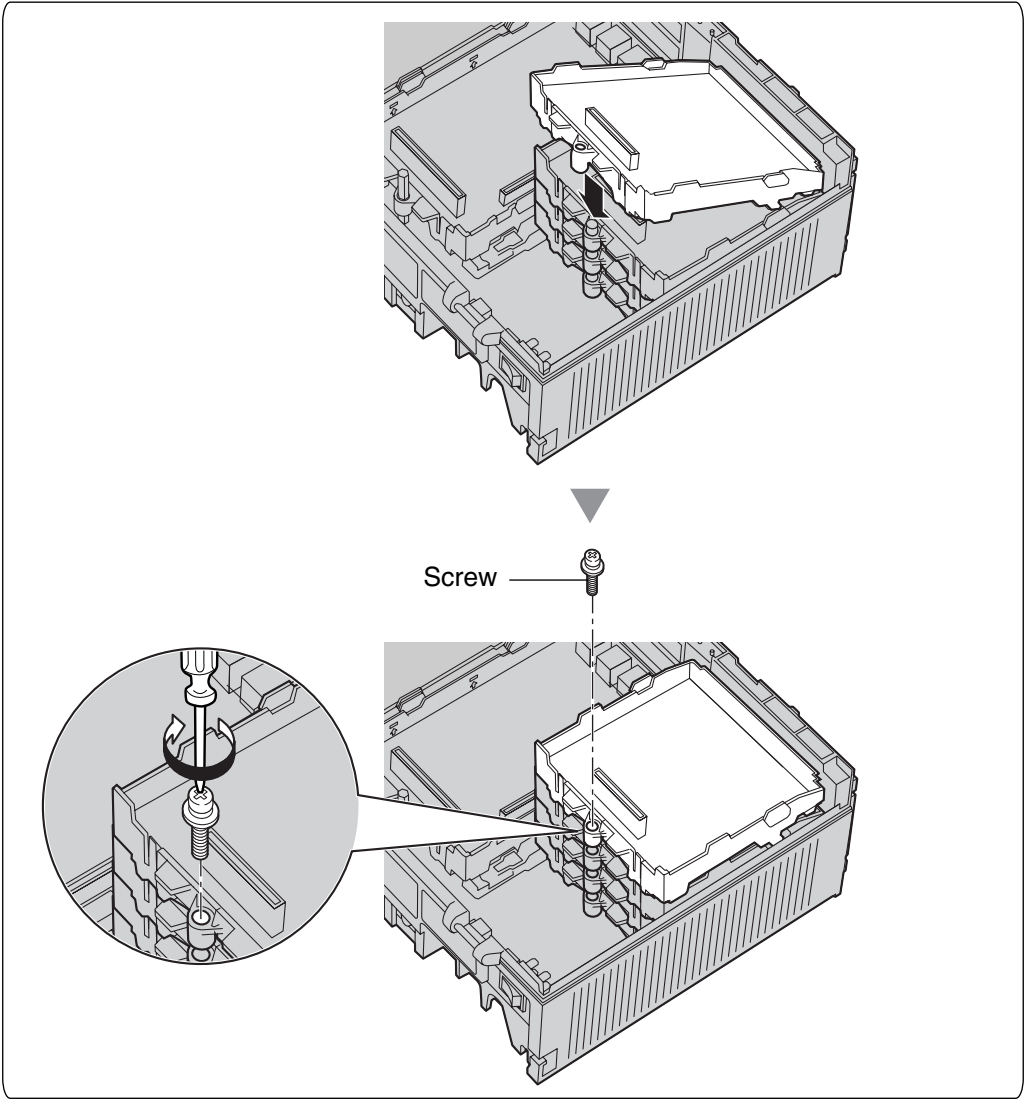
Handling of the Cables

   1.   Attach the strap included with the card to one of the connected cables.
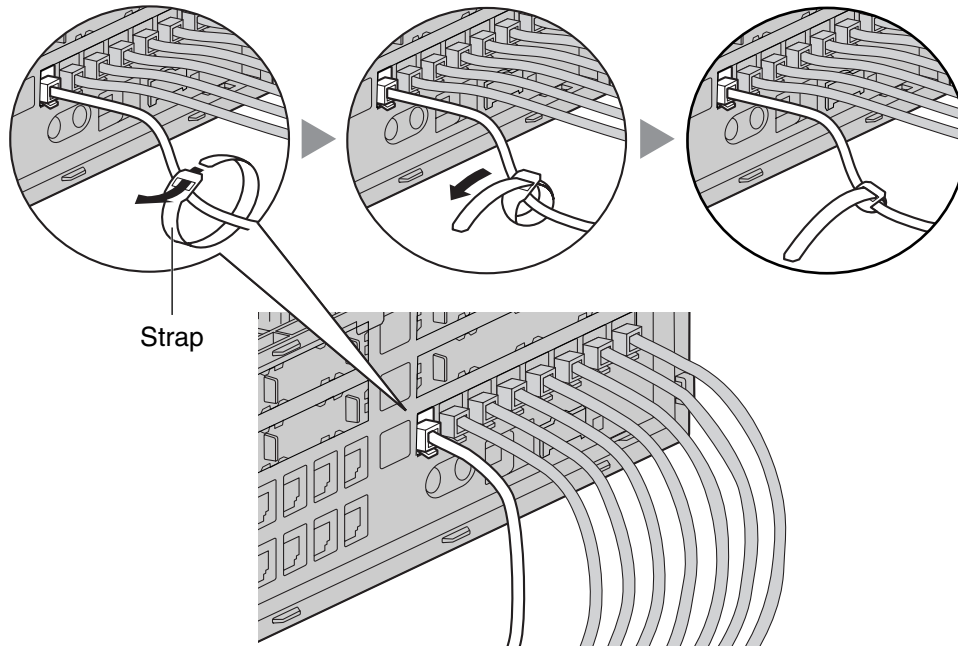
Strap

   2.   Bind all the connected cables together using the strap.
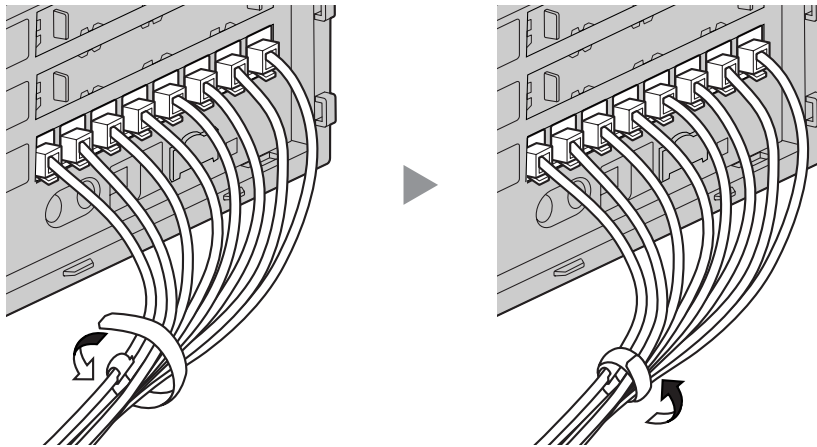
   3.   Repeat the procedure for other cards.

4. Attach the main strap (included with the Hybrid IP-PBX) to any of the 5 rails depending on your preference.
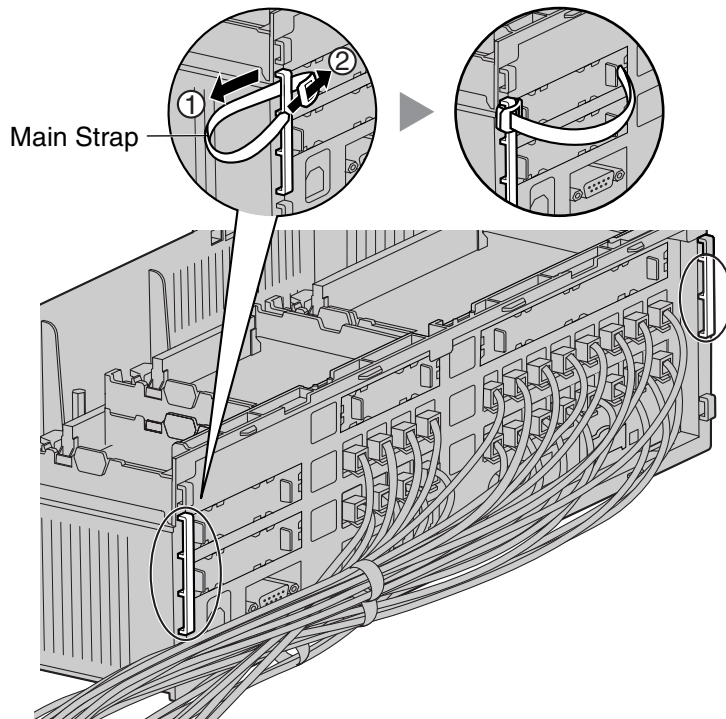
Main Strap

5. Bind all the connected cables together using the main strap, and then close the cable cover. For how to close the cable cover, refer to "2.2.3 Opening/Closing the Covers".

Cable Cover

Main Strap
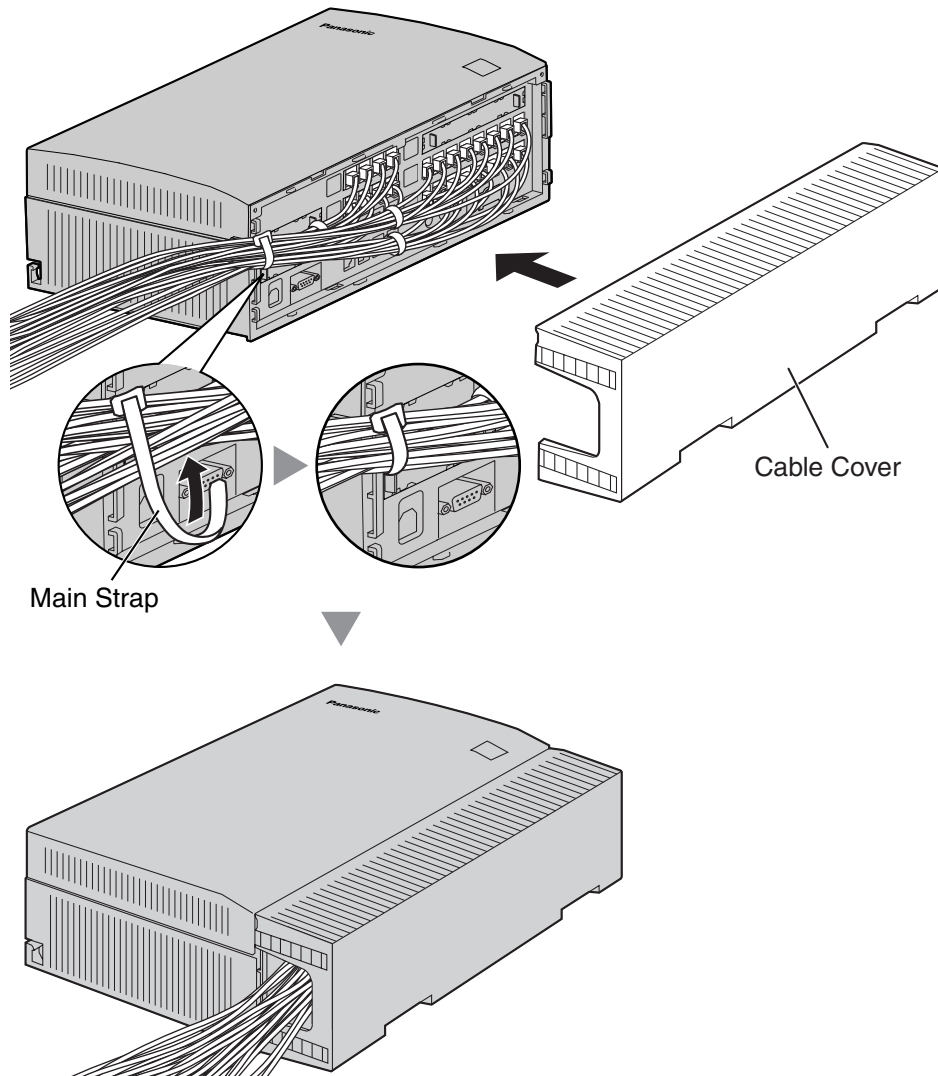
Notes

- For safety reasons, do not stretch, bend, or pinch the cables.
- If you prefer, you can cut the other side of the cable cover and run the cables through that opening. For safety reasons, smooth the cut edges.
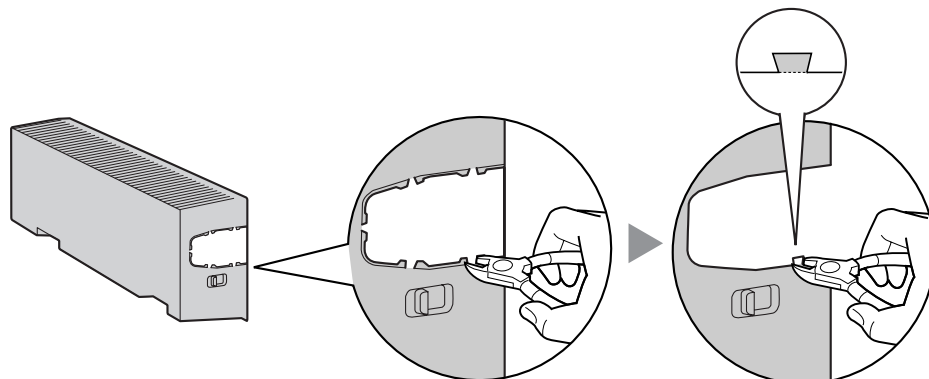
Removing the Optional Service Cards

1.   Loosen the extension bolt.
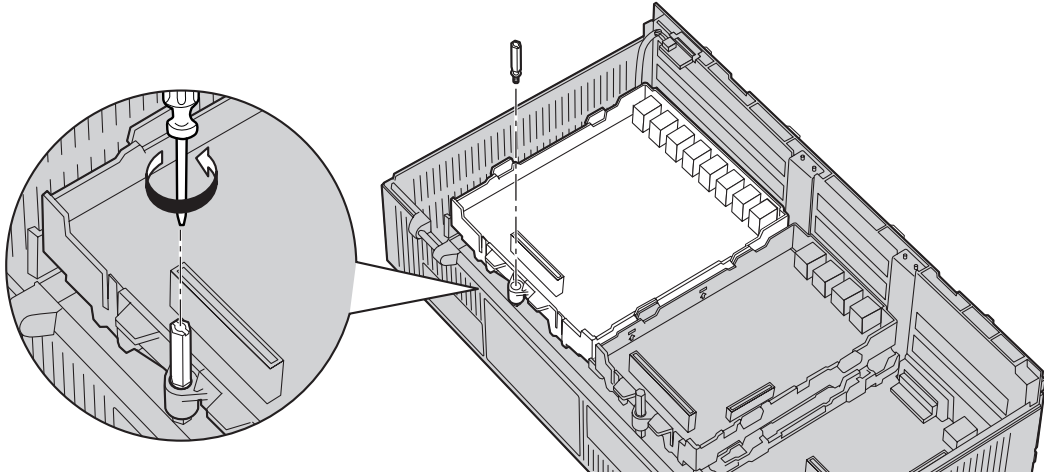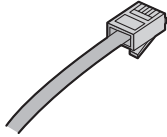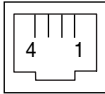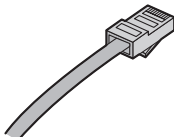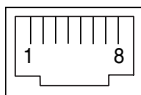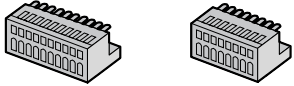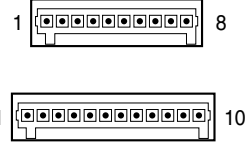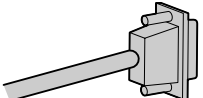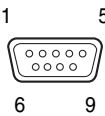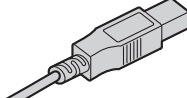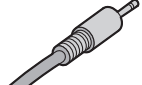
2.   Holding the protrusions of the card, pull the card in the direction of the arrows.
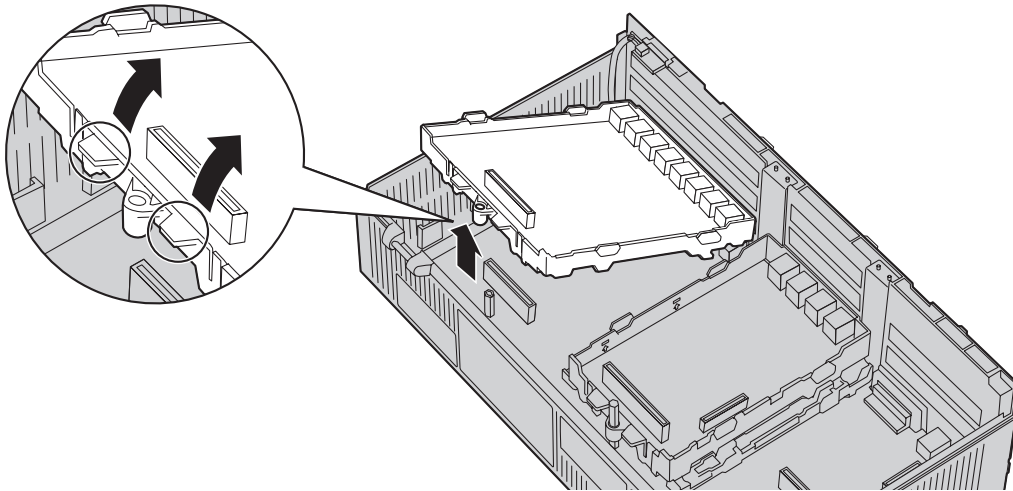
CAUTION

When removing the optional service cards, do not put pressure on any parts of the main board (e.g., tall capacitors). Doing so may result in damage to the Hybrid IP-PBX.

2.2.7   Types of Connectors

Connector Type	Pin Number	Used for
RJ11 (Twisted pair cable)		• DPH4 (KX-TDA5161) • HLC4 (KX-TDA5170) • DLC4 (KX-TDA5171) • DLC8 (KX-TDA5172) • SLC4 (KX-TDA5173) • SLC8 (KX-TDA5174) • PLC4 (KX-TDA5175) • PLC8 (KX-TDA5176) • LCOT4 (KX-TDA5180) • Super Hybrid Ports (Main Board)
RJ45 (Twisted pair cable)		• IP-GW4 (KX-TDA5480)
10-pin Terminal Block 8-pin Terminal Block		• DPH4 (KX-TDA5161)
RS-232C		• Main Board
USB		• Main Board
Mini Plug		• Main Board (Pager port, MOH port)

2.2.8   Wall Mounting (KX-TDA50)

Mounting on Wooden Wall

1.   Place the reference for wall mounting (on the last page of this manual) on the wall to mark the three screw positions.
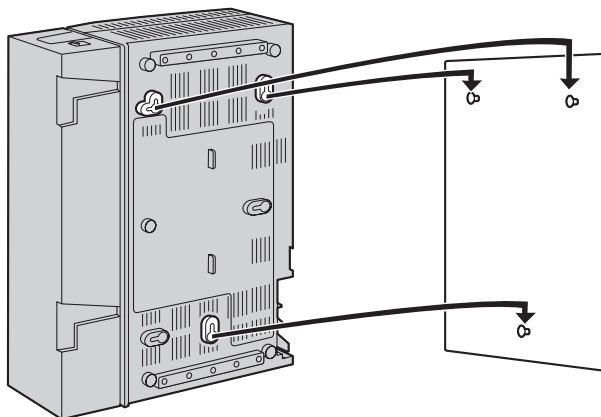
130 mm (5-1/8 in)

250 mm
(9-13/16 in)

2.   Install the screws and washers (included) in the wall.

Washer

Drive the screw
to this position.
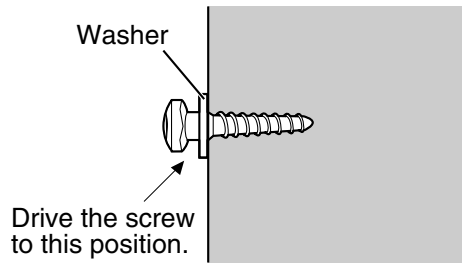
Notes

•   Make sure that the screw heads are at the same distance from the wall.

•   Install the screws perpendicular to the wall.

3.   Hook the main unit on the screw heads.
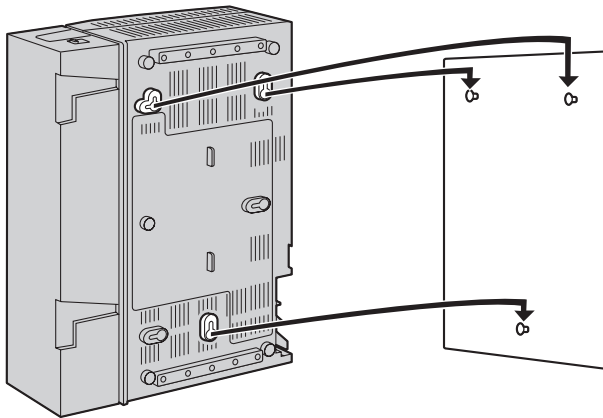
Notes

•   Do not block the openings of the cabinet. Leave at least 20 cm (8 in) of space above and 10 cm (4 in) to the sides of the Hybrid IP-PBX for ventilation.

•   Make sure that the wall behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
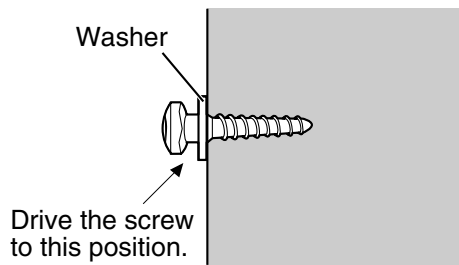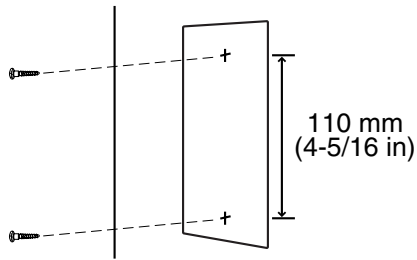
•   Be careful not to drop the cabinet.
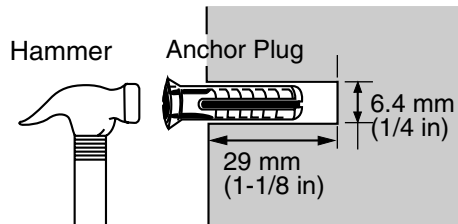
Mounting on Concrete or Mortar Wall

CAUTION

Drive mounting screws into the wall. Be careful to avoid touching any metal laths, wire laths or metal plates in the wall.

1. Place the reference for wall mounting (on the last page of this manual) on the wall to mark the three screw positions.

130 mm (5-1/8 in)

250 mm
(9-13/16 in)
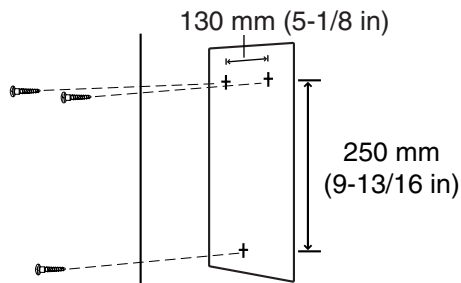
2. Install three anchor plugs (user-supplied) in the wall.

Hammer   Anchor Plug

6.4 mm
(1/4 in)

29 mm
(1-1/8 in)

3. Install the screws (included) in the wall.

Drive the screw
to this position.
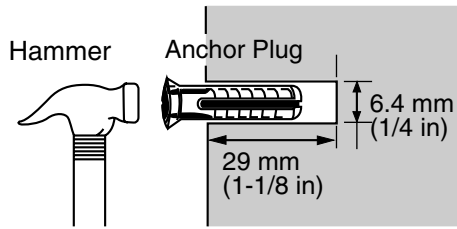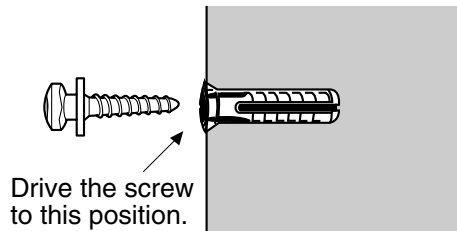
4. Hook the main unit on the screw heads.

Notes

- Do not block the openings of the cabinet. Leave at least 20 cm (8 in) of space above and 10 cm (4 in) to the sides of the Hybrid IP-PBX for ventilation.
- Make sure that the wall behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
- Be careful not to drop the cabinet.

2.2.9   Wall Mounting (AC Adaptor)

Mounting on Wooden Wall

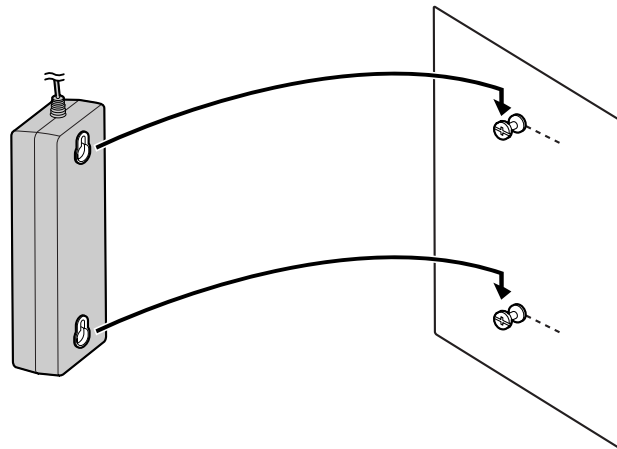1. Place the reference for wall mounting (on the following page) on the wall to mark the two screw positions.

110 mm
(4-5/16 in)

2. Install the screws and washers (included) in the wall.

Washer

Drive the screw
to this position.
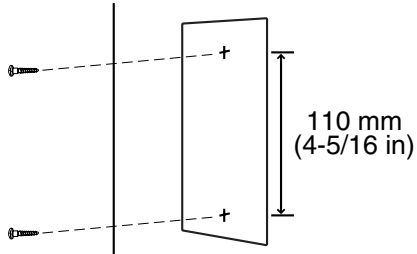
Notes

- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the AC adaptor on the screw heads.
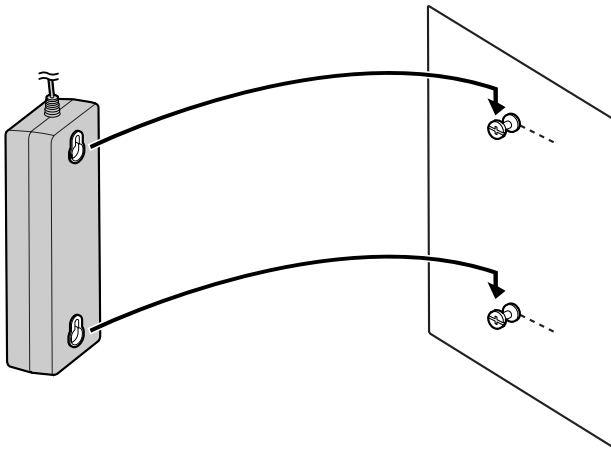
Note

Be careful not to drop the AC adaptor.

Mounting on Concrete or Mortar Wall

CAUTION

Drive mounting screws into the wall. Be careful to avoid touching any metal laths, wire laths or metal plates in the wall.

1. Place the reference for wall mounting (on the following page) on the wall to mark the two screw positions.

110 mm
(4-5/16 in)

2. Install two anchor plugs (user-supplied) in the wall.

Hammer   Anchor Plug

6.4 mm
(1/4 in)

29 mm
(1-1/8 in)

3. Install the screws (included) in the wall.

Drive the screw
to this position.
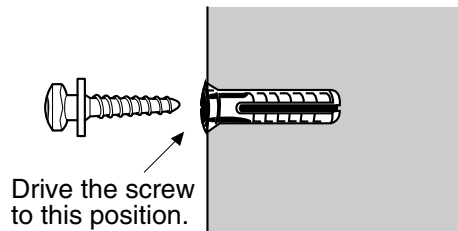
4. Hook the AC adaptor on the screw heads.

Note

Be careful not to drop the AC adaptor.

Reference for Wall Mounting
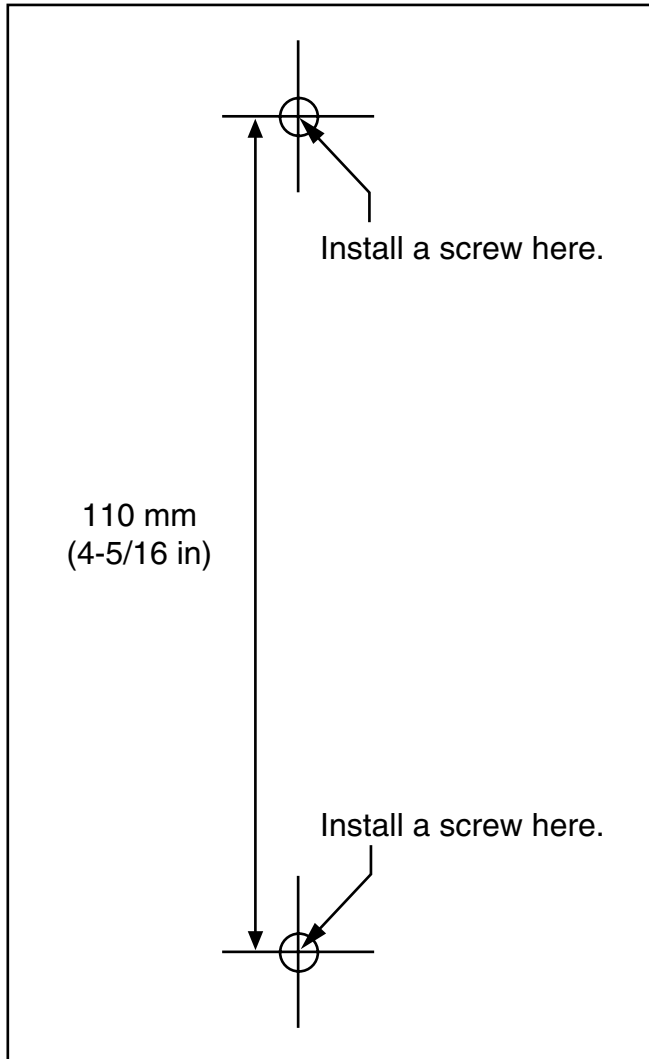
Please copy this page and use as a reference for wall mounting.

Install a screw here.

110 mm
(4-5/16 in)

Install a screw here.

Note

Make sure to set the print size to correspond with the size of this page. If the dimension of the paper output still deviates slightly from the measurement indicated here, use the measurement indicated here.

2.2.10 Surge Protector Installation

Overview

A massive electrical surge can be caused if lightning strikes a telephone cable 10 m (33 ft) above ground, or if a telephone line comes into contact with a power line. A surge protector is a device that is connected to a CO line to prevent potentially dangerous electrical surges from entering the building via the CO line and damaging the Hybrid IP-PBX and connected equipment.

To protect the system from electrical surges, we strongly recommend connecting the system to a surge protector that meets the following specifications:

- Surge arrestor type: 3-electrode arrestor
- DC spark-over voltage: 230 V
- Maximum peak current: at least 10 kA

Additionally, proper grounding is very important for the protection of the system (refer to "2.2.5 Frame Ground Connection").

Many countries/areas have regulations requiring surge protection. Be sure to comply with all applicable laws, regulations, and guidelines.
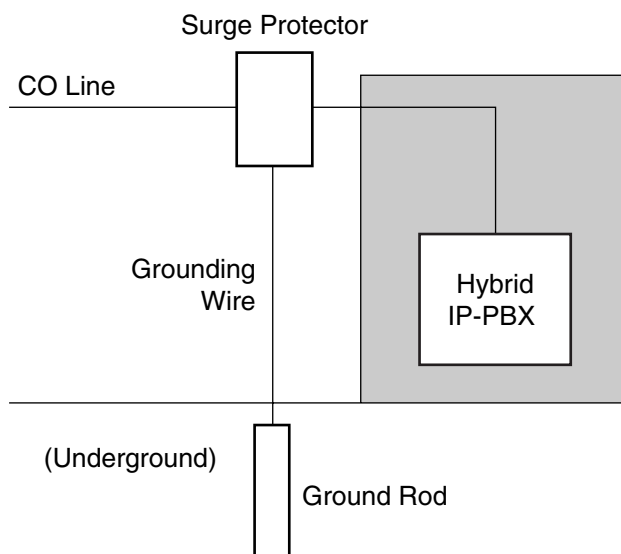
Installation

Outside Installation

(Main Building)

Surge Protector

CO Line

CO Line

Terminal
Board

Hybrid
IP-PBX

Extn.

Extn.   Extn.

SLT   PT   CS

(Another Building)

SLT

PT

CS

Extn.

Surge
Protector

Ground

Extn.: Extension Line
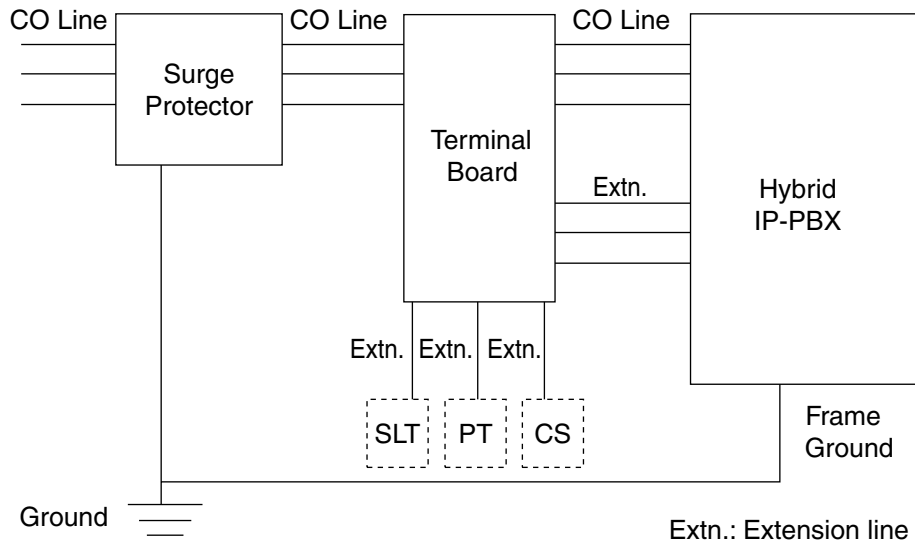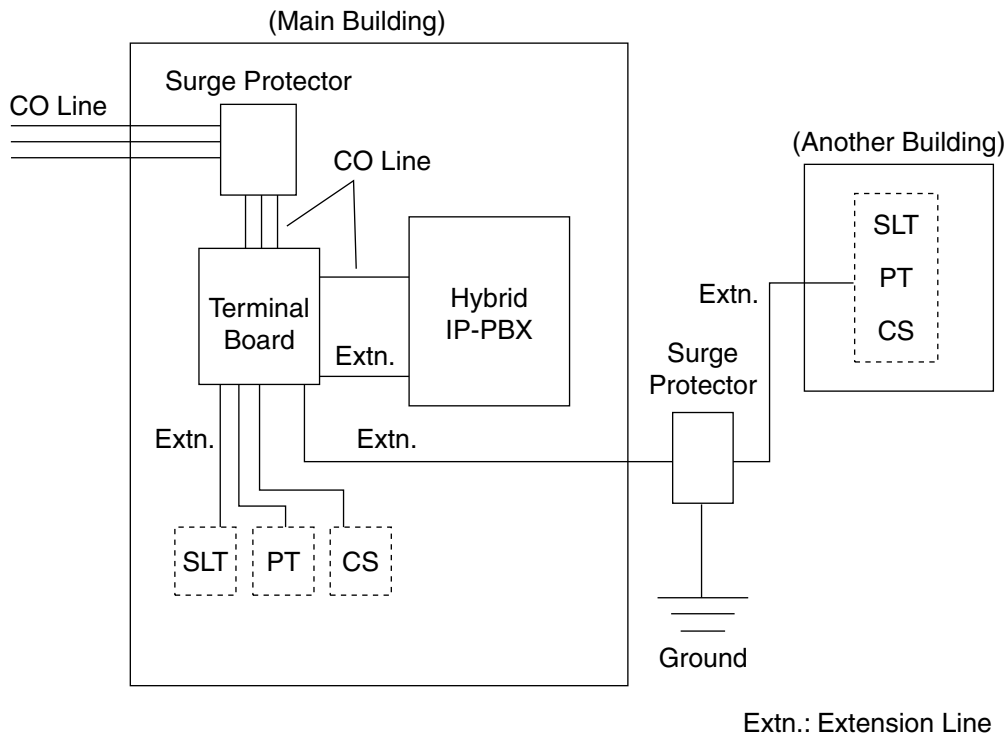
If you install an extension outside of the building, the following precautions are recommended:

a. Install the extension wire underground.

b. Use a conduit to protect the wire.

Note

The surge protector for an extension and CS is different from that for a CO line.

Installation of a Ground Rod

Surge Protector

CO Line

Grounding
Wire

Hybrid
IP-PBX

(Underground)

Ground Rod

1. Connect the ground rod to the surge protector using a grounding wire with a cross-sectional area of at least 1.3 mm^2.

2. Bury the ground rod near the protector. The grounding wire should be as short as possible.

3. The grounding wire should run straight to the ground rod. Do not run the wire around other objects.

4. Bury the ground rod at least 50 cm (20 in) underground.

<u>**Notes**</u>

- The above figures are recommendations only.
- The length of ground rod and the required depth depend on the composition of the soil.

2.3 Installation of the CO Line Cards

2.3.1 LCOT4 Card

Function

4-port analog CO line card with 2 power failure transfer (PFT) ports. One CID4 card can be mounted on the LCOT4 card (refer to "2.3.2 CID4 Card").
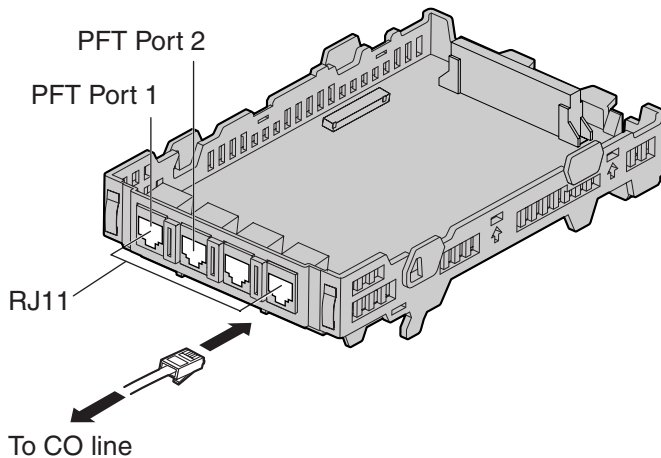
PFT Port 2
PFT Port 1

RJ11

To CO line

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1
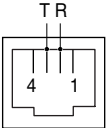
User-supplied (not included): RJ11 connector

<u>Notes</u>
- To confirm the CO line connection, refer to "Confirming the CO Line Connection" in "2.11.1 Starting the Hybrid IP-PBX".
- For details about power failure transfer, refer to "2.10.1 Power Failure Connections".

Pin Assignments

RJ11 Connector

	Signal Name	Function
T R 4 1	R	Ring
	T	Tip
	–	Reserved

2.3.2   CID4 Card

Function

4-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT4 card.

CID4 Card

LCOT4 Card
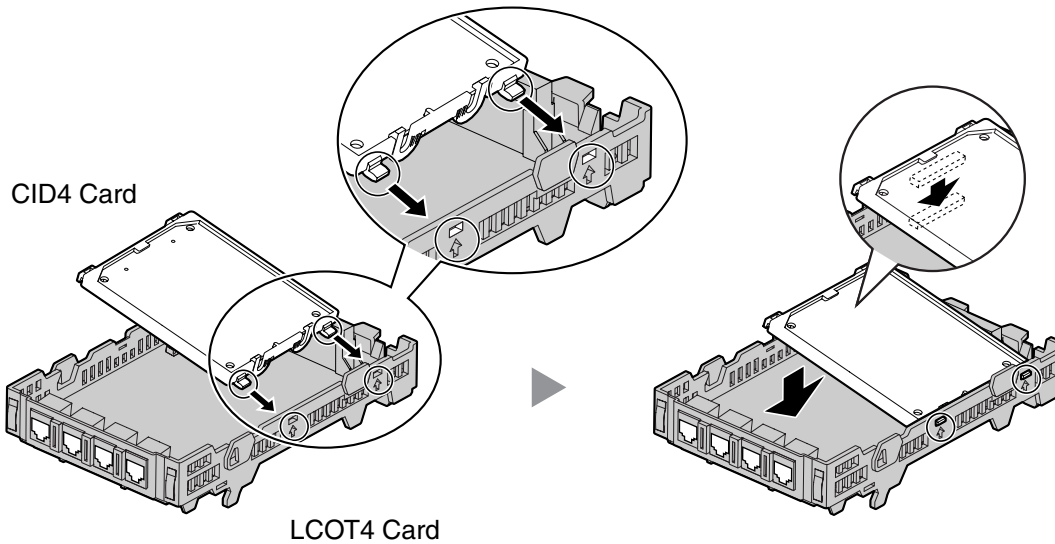
Accessories and User-supplied Items

Accessories (included): none
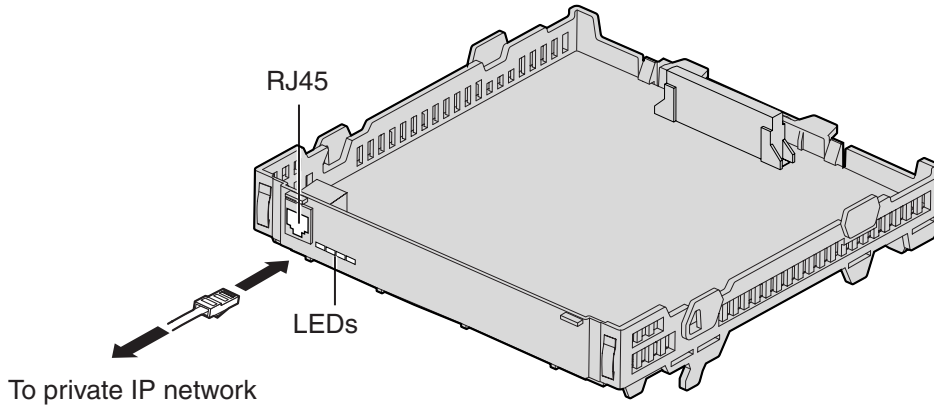
User-supplied (not included): none

Note

If you need to remove the CID4 card:
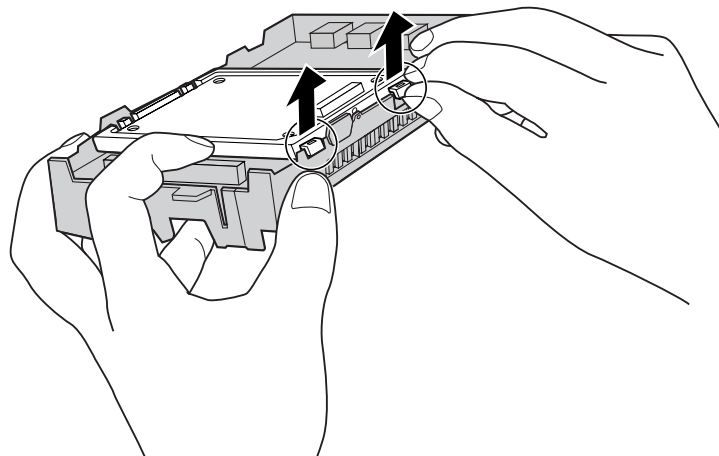
2.3.3   IP-GW4 Card

Function

4-channel VoIP gateway card. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a, G.723.1, and G.711 CODEC methods.

RJ45

LEDs

To private IP network

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connector

<u>Notes</u>

- Maximum length of the cable to be connected to this optional service card is 100 m (328 ft).
- For programming instructions and other information about the IP-GW4 card, refer to the documentation for the IP-GW4 card.
- To confirm the CO line connection, refer to "Confirming the CO Line Connection" in "2.11.1 Starting the Hybrid IP-PBX".

Pin Assignments

RJ45 Connector (10BASE-T/100BASE-TX)

	Signal Name	Input (I)/Output (O)	Function
TPO+ TPO- TPI+ TPI- 1 8	TPO+	O	Transmit data+
	TPO-	O	Transmit data-
	TPI+	I	Receive data+
	TPI-	I	Receive data-
	–	–	Reserved

LED Indications

Indication	Color	Description
ON LINE	Green	On-line status indication • ON: On-line mode • OFF: Off-line mode • Flashing: Maintenance mode **Note** If the LINK indicator is OFF, the ON LINE indicator will also be OFF.
ALARM	Red	Alarm indication • ON: Alarm • OFF: Normal
LINK	Green	Link status indication • ON: Normal Connection • OFF: Connection Error
DATA	Green	Data transmission indication • ON: Data transmitting • OFF: No data transmitted

2.4   Installation of the Extension Cards

2.4.1   HLC4 Card

Function

4-port extension card for SLTs, APTs, DSS consoles, a Voice Processing System (VPS), and PT-interface CSs.[*1]

RJ11

To extension

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1
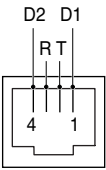
User-supplied (not included): RJ11 connector

Note

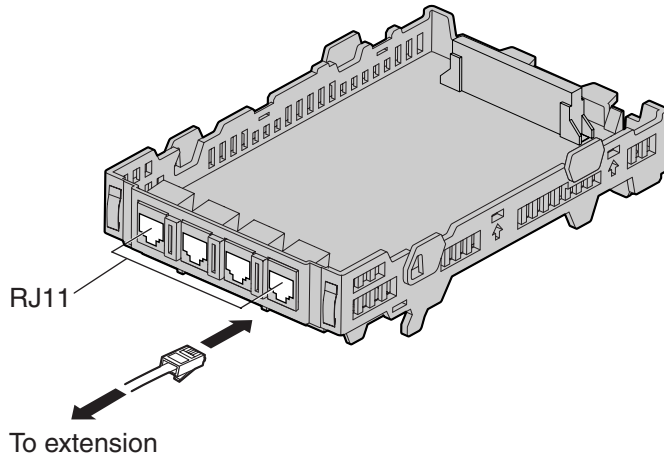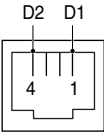For details about connecting the CS, refer to "2.7.7 Connecting a Cell Station to the Hybrid IP-PBX".
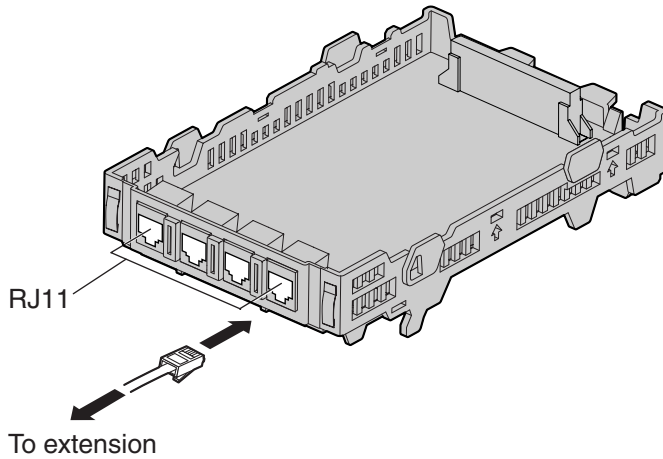
Pin Assignments

RJ11 Connector

	Signal Name	Function
	D1	Data port (High)
	T	Tip
	R	Ring
	D2	Data port (Low)

[*1]   The PT-interface CS can be connected to the Hybrid IP-PBX using a cable like a PT.

2.4.2 DLC4 Card

Function

4-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs.[1]
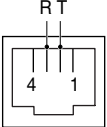

RJ11

To extension

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

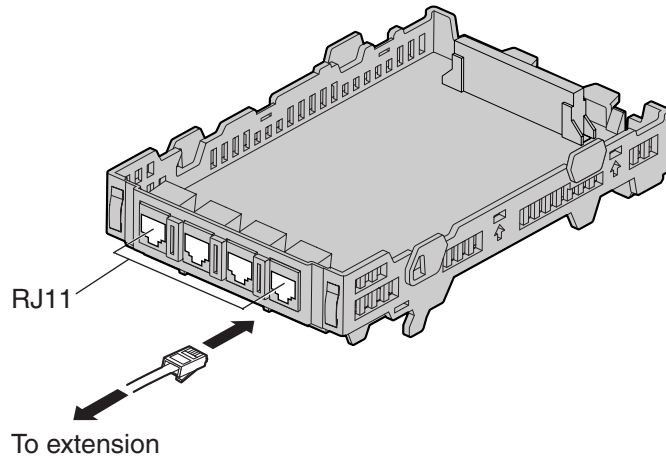**User-supplied (not included):** RJ11 connector

Note

For details about connecting the CS, refer to "2.7.7 Connecting a Cell Station to the Hybrid IP-PBX".

Pin Assignments

RJ11 Connector

	Signal Name	Function
	D1	Data port (High)
	D2	Data port (Low)
	–	Reserved

---

[1] The PT-interface CS can be connected to the Hybrid IP-PBX using a cable like a PT.

2.4.3   SLC4 Card

Function

4-port extension card for SLTs.

RJ11

To extension

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1
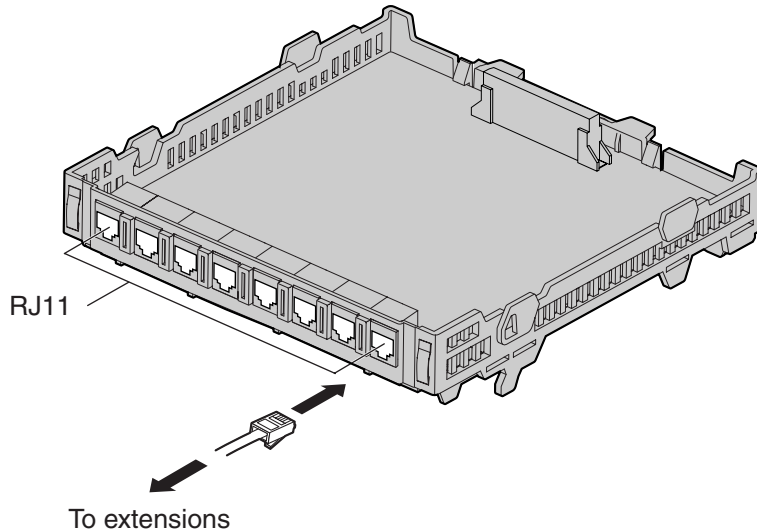
User-supplied (not included): RJ11 connector

Pin Assignments

RJ11 Connector

	Signal Name	Function
R T 4 1	T	Tip
	R	Ring
	–	Reserved

2.4.4   PLC4 Card

Function

4-port extension card for APTs, DSS consoles, and a VPS.

RJ11

To extension

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ11 connector

Pin Assignments

RJ11 Connector

	Signal Name	Function
D2 D1 R T 4 1	D1	Data port (High)
	T	Tip
	R	Ring
	D2	Data port (Low)

2.4.5   DLC8 Card

Function

8-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs.[1]

RJ11

To extensions

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ11 connector

<u>Note</u>

For details about connecting the CS, refer to "2.7.7 Connecting a Cell Station to the Hybrid IP-PBX".
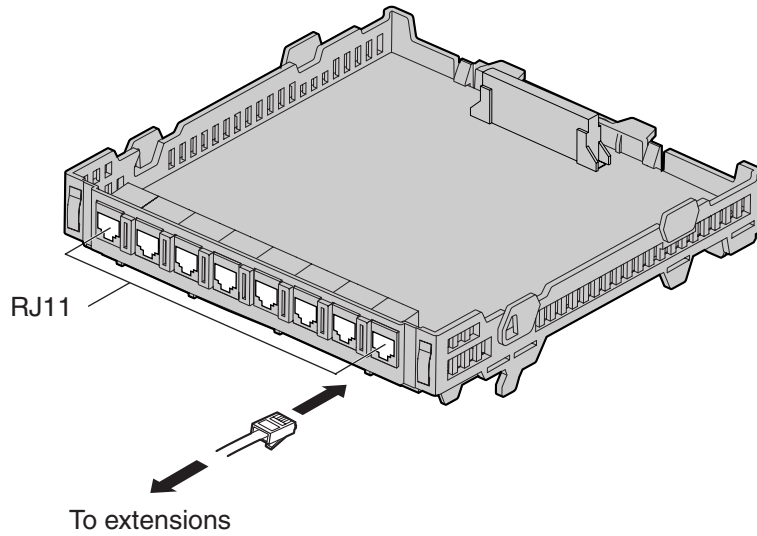
Pin Assignments

RJ11 Connector

	Signal Name	Function
D2 D1 4 1	D1	Data port (High)
	D2	Data port (Low)
	–	Reserved

---

[1]   The PT-interface CS can be connected to the Hybrid IP-PBX using a cable like a PT.

2.4.6   SLC8 Card

Function

8-port extension card for SLTs.

RJ11

To extensions

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1
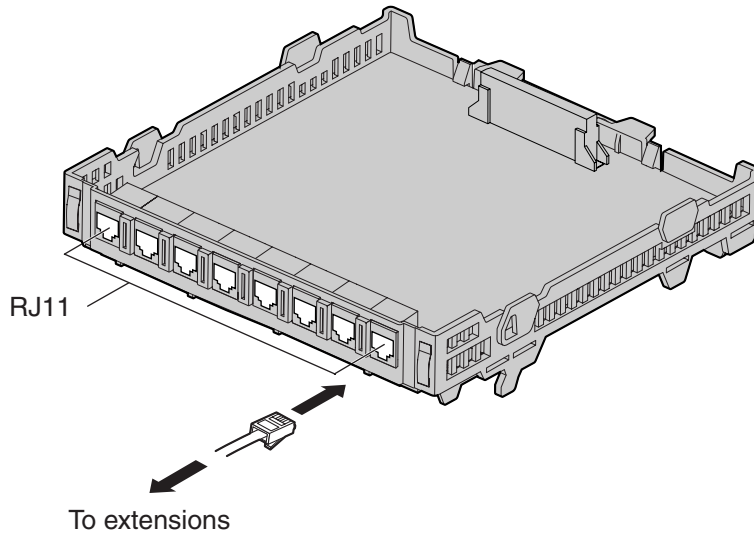
User-supplied (not included): RJ11 connector

Pin Assignments

RJ11 Connector

	Signal Name	Function
R T 4 1	T	Tip
	R	Ring
	–	Reserved

2.4.7   PLC8 Card

Function

8-port extension card for APTs, DSS consoles, and a VPS.

RJ11

To extensions

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1

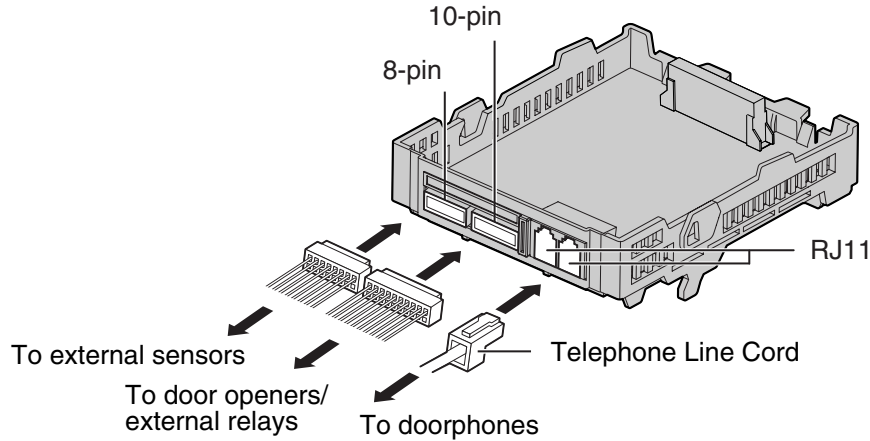**User-supplied (not included):** RJ11 connector

Pin Assignments

RJ11 Connector

	Signal Name	Function
	D1	Data port (High)
	T	Tip
	R	Ring
	D2	Data port (Low)

2.5 Installation of the Other Cards

2.5.1 DPH4 Card

Function

4-port doorphone card for 4 doorphones, 4 door openers or external relays, and 4 external sensors.

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Strap × 1, 8-pin terminal block × 1, 10-pin terminal block × 1, Telephone Line Cord × 2, Terminal Box × 2

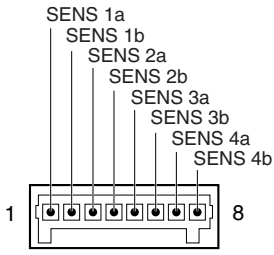**User-supplied (not included):** Copper wire

Note

For details about connection to doorphones, door openers, external sensors, and external relays, refer to "2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".
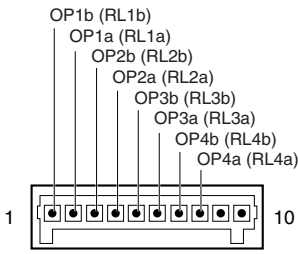
Pin Assignments

RJ11 Connector

	Signal Name	Function
	DP2	Doorphone 2 transmit
	DP1	Doorphone 1 transmit
	com1	Doorphone 1 receive
	com2	Doorphone 2 receive
	DP4	Doorphone 4 transmit
	DP3	Doorphone 3 transmit
	com3	Doorphone 3 receive
	com4	Doorphone 4 receive

8-pin Terminal Block

	Signal Name	Function
SENS 1a SENS 1b SENS 2a SENS 2b SENS 3a SENS 3b SENS 4a SENS 4b 1 ▢▢▢▢▢▢▢▢ 8	SENS 1a	Sensor Input 1
	SENS 1b	com 1
	SENS 2a	Sensor Input 2
	SENS 2b	com 2
	SENS 3a	Sensor Input 3
	SENS 3b	com 3
	SENS 4a	Sensor Input 4
	SENS 4b	com 4

10-pin Terminal Block

	Signal Name	Function
OP1b (RL1b) OP1a (RL1a) OP2b (RL2b) OP2a (RL2a) OP3b (RL3b) OP3a (RL3a) OP4b (RL4b) OP4a (RL4a) 1 ▢▢▢▢▢▢▢▢▢▢ 10	OP1b (RL1b)	Door opener 1 (Relay 1)
	OP1a (RL1a)	Door opener 1 com (Relay 1 com)
	OP2b (RL2b)	Door opener 2 (Relay 2)
	OP2a (RL2a)	Door opener 2 com (Relay 2 com)
	OP3b (RL3b)	Door opener 3 (Relay 3)
	OP3a (RL3a)	Door opener 3 com (Relay 3 com)
	OP4b (RL4b)	Door opener 4 (Relay 4)
	OP4a (RL4a)	Door opener 4 com (Relay 4 com)
	–	Reserved

### Connection Diagram for External Sensors and External Relays

Power to the external sensor is provided from the DPH4 card and must be grounded through the DPH4 card as indicated in the diagram below. A pair of "sensor" and "common" lines must be connected to the DPH4 card for each external sensor. The Hybrid IP-PBX detects input from the sensor when the signal is under 100 Ω.
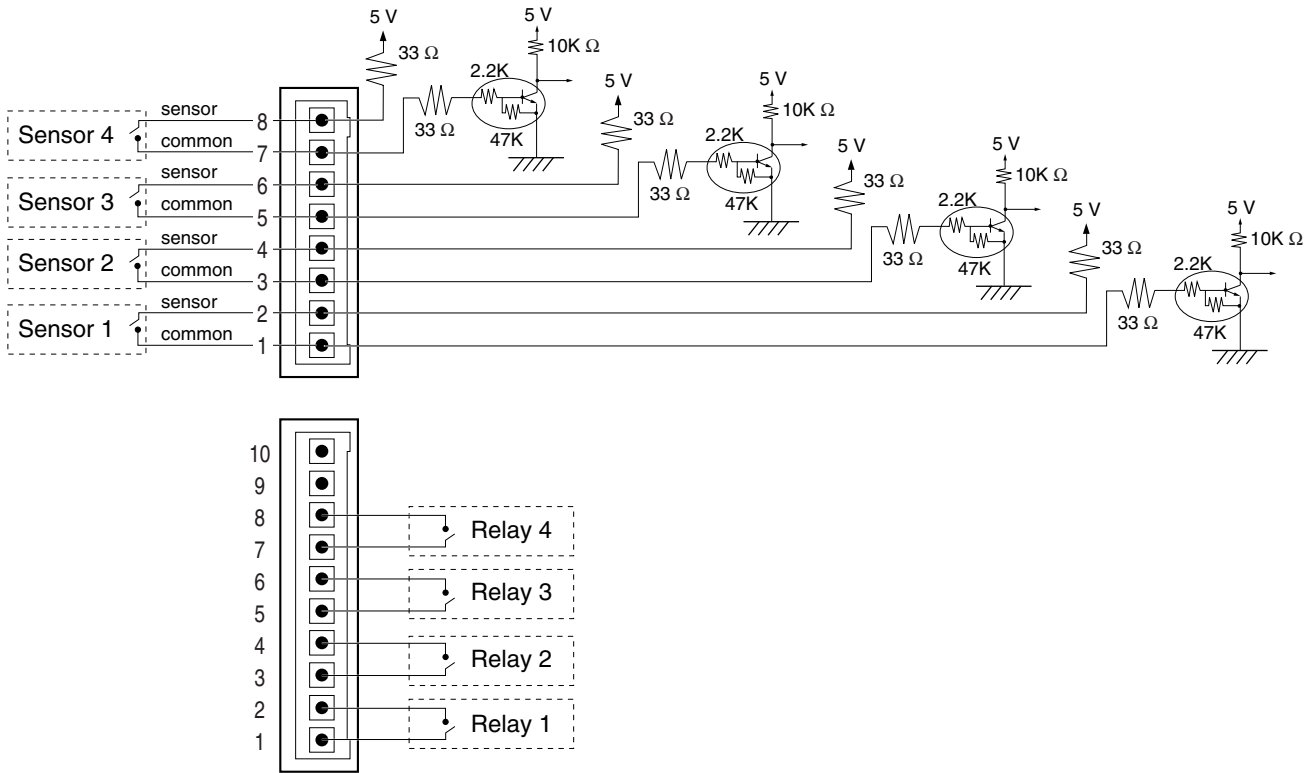
2.5.2   ECHO8 Card

Function

8-channel card for echo cancellation during conferences.
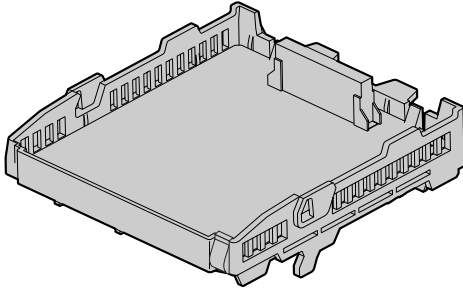
Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Screw × 1

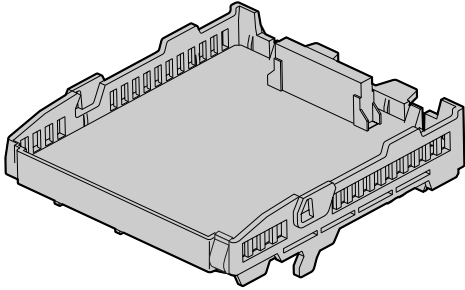**User-supplied (not included):** none

<u>Note</u>

To establish a conference call involving 6 to 8 parties, install an ECHO8 card and enable the echo cancellation for conference using the KX-TDA50 Maintenance Console. For details, refer to the on-line help of the KX-TDA50 Maintenance Console.

2.5.3   MSG2 Card

Function

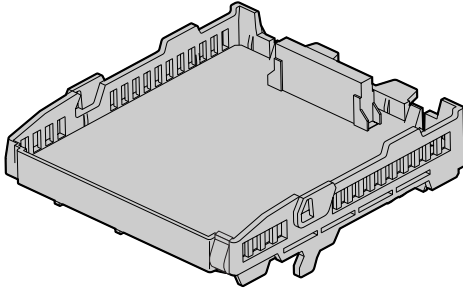2-channel message card.

Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

2.5.4   EXT-CID Card

Function

Sends Caller ID signals to extension ports.
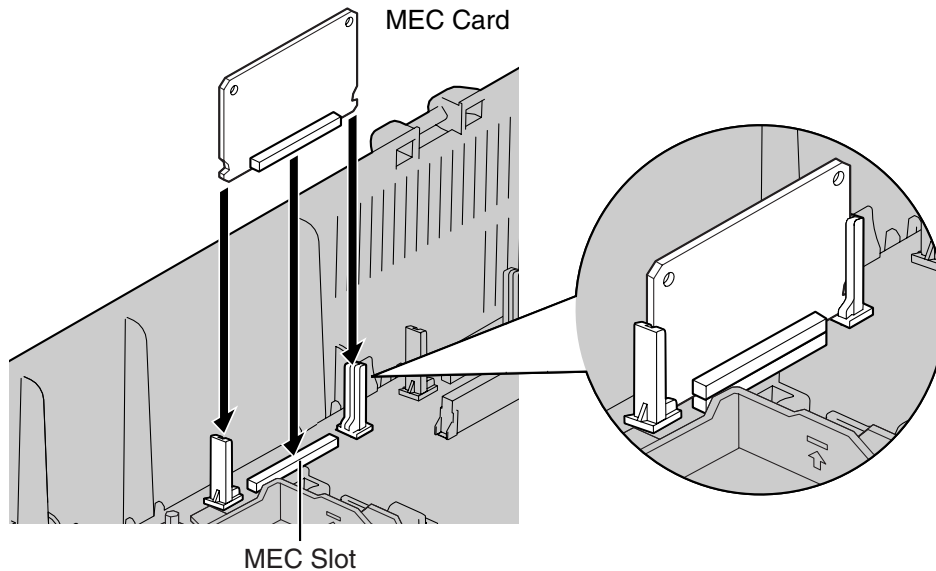
Accessories and User-supplied Items

Accessories (included): Extension Bolt × 1, Screw × 1

User-supplied (not included): none

2.5.5   MEC Card

Function

Memory expansion card to increase Personal/System Speed Dialing number storage space, double the number of DPTs (using Digital XDP connection), and display language selection for VM Menu. To be installed in the MEC slot.

MEC Card

MEC Slot

Accessories and User-supplied Items

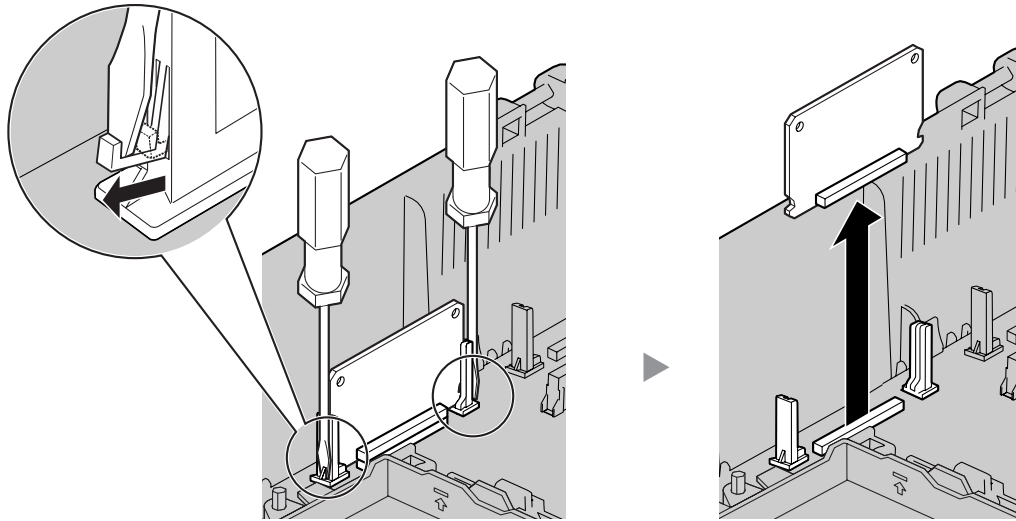**Accessories (included):** none

User-supplied (not included): none

CAUTION

Make sure to insert the MEC card between the guide rails until it locks into the MEC slot. Push the card firmly into place until you hear a clicking sound.
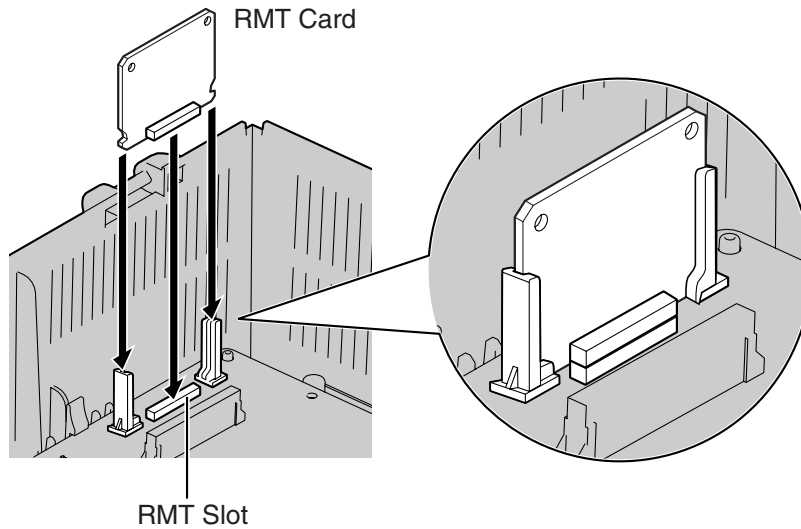
Removing the MEC Card

Pull open the guide rails using a flathead screwdriver and, while holding them open, remove the MEC card.

2.5.6   RMT Card

Function

Analog modem card for remote communication with the Hybrid IP-PBX. ITU-T V.90 support.

RMT Card

RMT Slot

Accessories and User-supplied Items
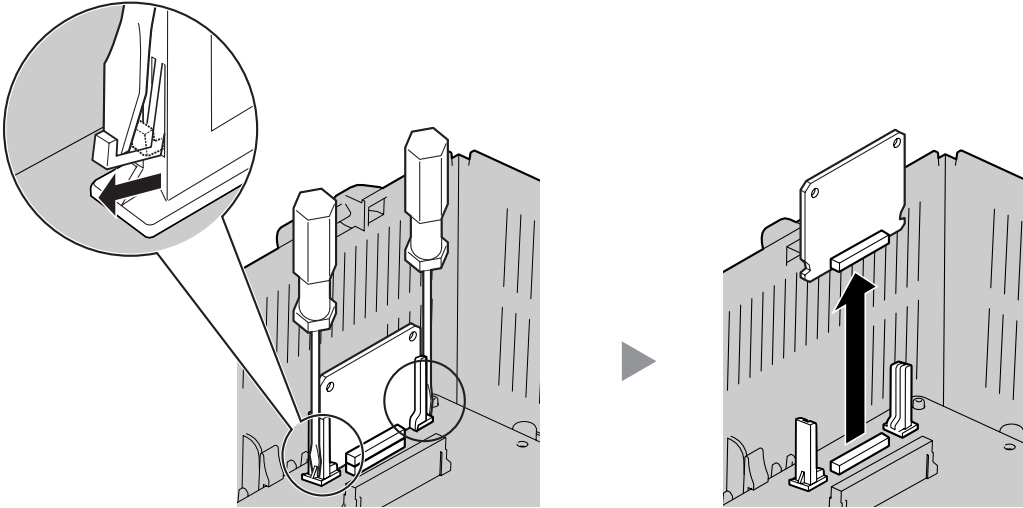
Accessories (included): none

User-supplied (not included): none

CAUTION

Make sure to insert the RMT card between the guide rails until it locks into the RMT slot. Push the card firmly into place until you hear a clicking sound.
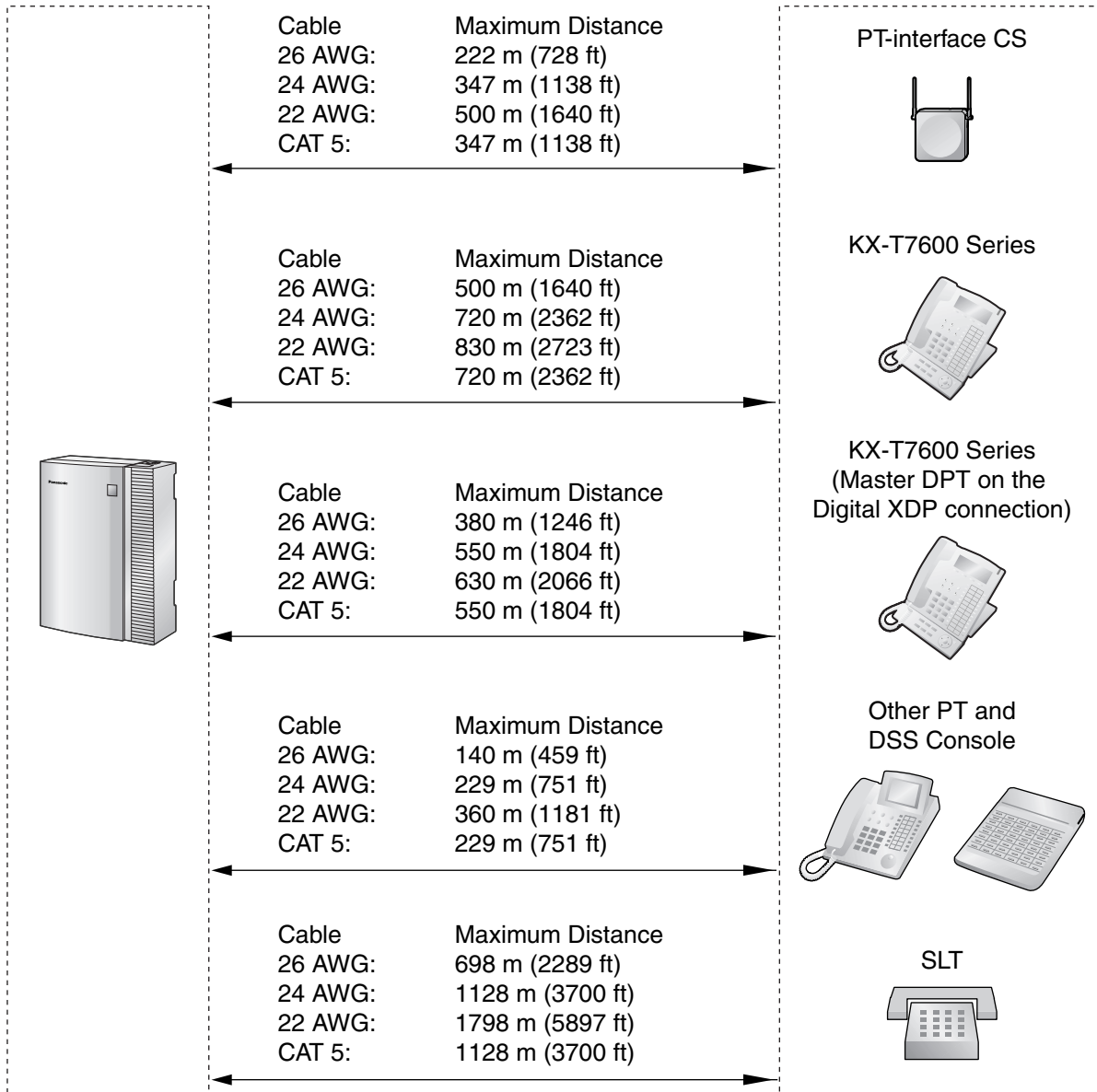
Removing the RMT Card

Pull open the guide rails using a flathead screwdriver and, while holding them open, remove the RMT card.

2.6　Connection of Extensions

2.6.1　Maximum Cabling Distances of the Extension Wiring (Twisted Cable)

Cable	Maximum Distance		PT-interface CS
26 AWG:	222 m (728 ft)		
24 AWG:	347 m (1138 ft)		
22 AWG:	500 m (1640 ft)		
CAT 5:	347 m (1138 ft)		

Cable	Maximum Distance		KX-T7600 Series
26 AWG:	500 m (1640 ft)		
24 AWG:	720 m (2362 ft)		
22 AWG:	830 m (2723 ft)		
CAT 5:	720 m (2362 ft)		

Cable	Maximum Distance		KX-T7600 Series (Master DPT on the Digital XDP connection)
26 AWG:	380 m (1246 ft)		
24 AWG:	550 m (1804 ft)		
22 AWG:	630 m (2066 ft)		
CAT 5:	550 m (1804 ft)		

Cable	Maximum Distance		Other PT and DSS Console
26 AWG:	140 m (459 ft)		
24 AWG:	229 m (751 ft)		
22 AWG:	360 m (1181 ft)		
CAT 5:	229 m (751 ft)		

Cable	Maximum Distance		SLT
26 AWG:	698 m (2289 ft)		
24 AWG:	1128 m (3700 ft)		
22 AWG:	1798 m (5897 ft)		
CAT 5:	1128 m (3700 ft)		

Notice

The maximum cabling distance may vary depending on the conditions.

| | PT-interface CS | DPT | APT | DSS Console | | SLT |
				KX-T7600 series	Other	
Super Hybrid Ports (Main Board)	✔	✔	✔	✔	✔	✔
SLC4, SLC8 Cards						✔
DLC4, DLC8 Cards	✔	✔		✔	✔	
PLC4, PLC8 Cards			✔		✔	
HLC4 Card	✔		✔	✔	✔	✔

" ✔" indicates that the extension card or Super Hybrid Ports support the terminal.

2.6.2   Parallel Connection of the Extensions

Any SLT can be connected in parallel with an APT or a DPT as follows.

Note

> In addition to an SLT, an answering machine, a fax machine or a modem (PC) can be connected in parallel with an APT and a DPT.

With APT

To a Super Hybrid Port

Modular T-Adaptor

2-conductor wiring cord
Connect pins "T" and "R".

4-conductor wiring cord
Connect pins "T", "R", "D1", and "D2".

APT   SLT
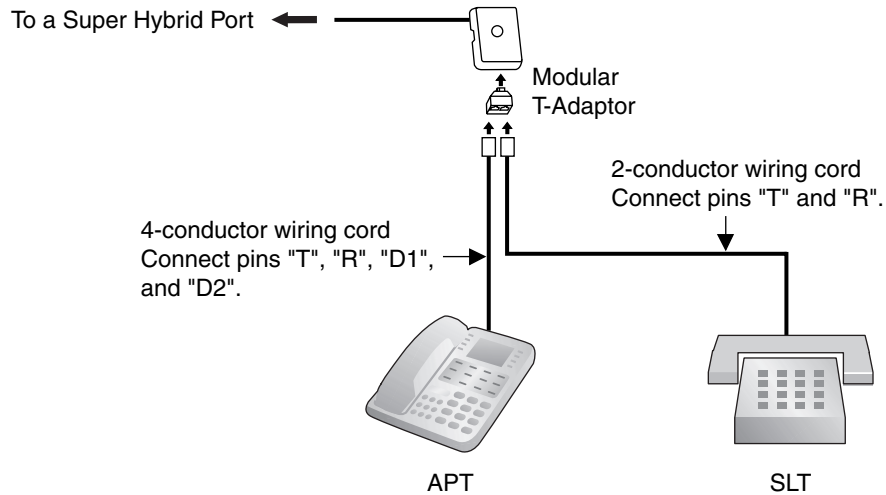
With DPT

Parallel mode or eXtra Device Port (XDP) mode can be selected through system programming.

If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.10.9 Paralleled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

Using a Modular T-Adaptor

To a Super Hybrid Port

Modular T-Adaptor

2-conductor wiring cord
Connect pins "T" and "R".

4-conductor wiring cord
Connect pins "D1" and "D2".

DPT   SLT
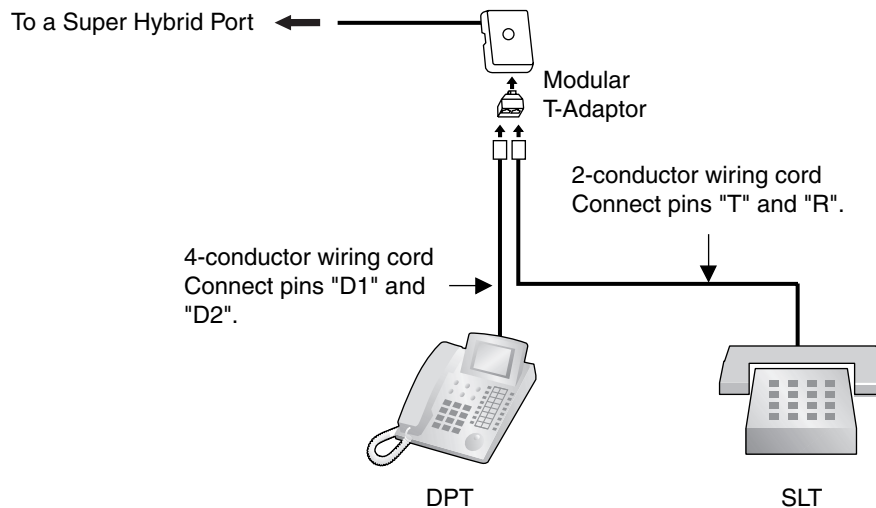
Using an EXtra Device Port
With KX-T7600 Series DPT

To a Super Hybrid Port

4-conductor wiring cord
Connect pins "T", "R",
"D1" and "D2".

2-conductor wiring cord
Connect pins "T" and "R".

DPT   SLT

TO MAIN UNIT
/ PABX

TO TEL

To a Super Hybrid Port
To SLT
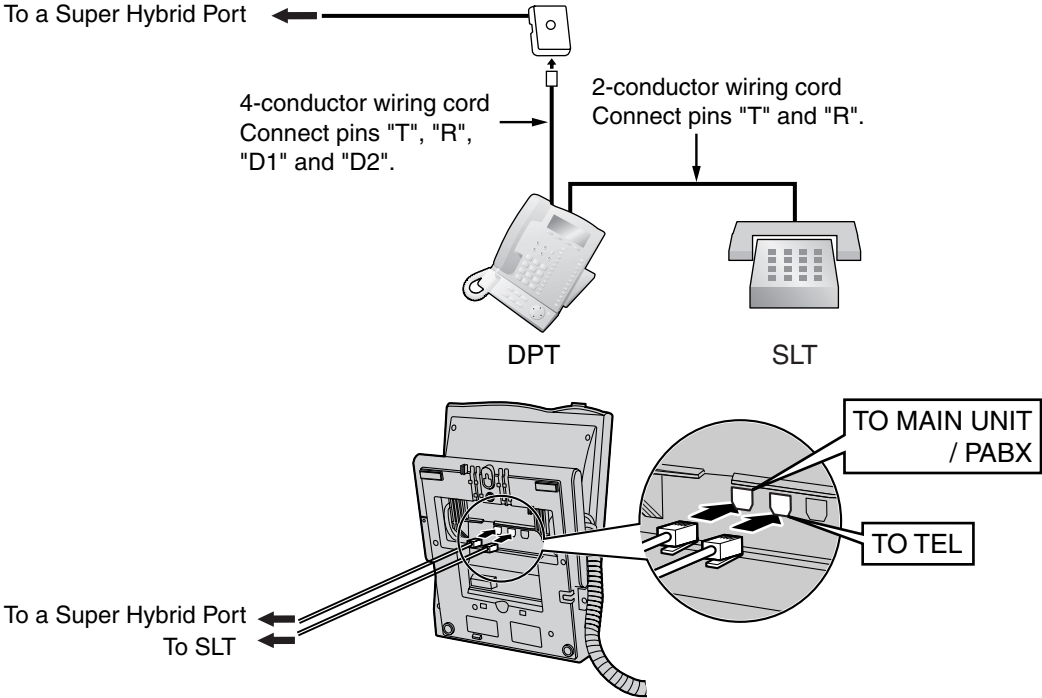
With Other DPT (except KX-T7560 and KX-T7565)

To a Super Hybrid Port

4-conductor wiring cord
Connect pins "T", "R",
"D1" and "D2".

2-conductor wiring cord
Connect pins "T" and "R".

DPT   SLT

TO EMSS or TO MAIN UNIT

TO TEL

To a Super Hybrid Port   To SLT
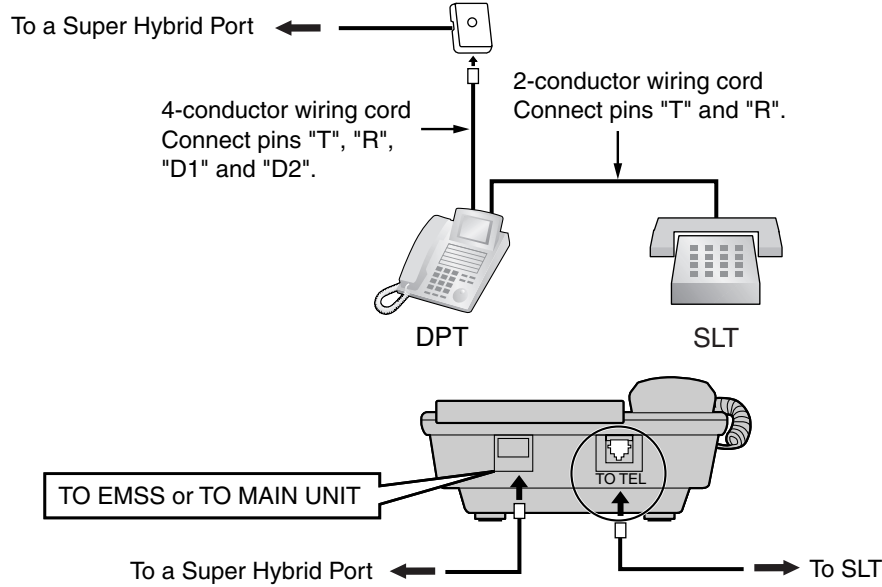
2.6.3 Digital EXtra Device Port (Digital XDP) Connection

A DPT can be connected to another DPT on the Digital XDP connection. In addition, if the DPT is connected to a Super Hybrid Port, it can also have an SLT connected in Parallel mode or XDP mode.

Notes

- Both DPTs must be KX-T7600 series DPTs (excluding KX-T7640).
- Parallel mode or XDP mode can be selected through system programming.
- If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.10.9 Paralleled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

With KX-T7600 Series DPT

Using a Modular T-Adaptor

To DLC4/DLC8 card
OR
To a Super Hybrid Port
(for connection of SLT)

Modular T-Adaptor

2-conductor wiring cord
Connect pins "T" and "R".

4-conductor wiring cord
Connect pins "D1" and "D2".

4-conductor wiring cord
Connect pins "D1" and "D2".

SLT

Master DPT   Slave DPT

Back View of DPTs

TO TEL

TO MAIN UNIT / PABX

TO MAIN UNIT / PABX

Cable	Maximum Distance
26 AWG:	30 m (98 ft)
24 AWG:	50 m (164 ft)
22 AWG:	60 m (196 ft)
CAT 5:	50 m (164 ft)

Master DPT

Slave DPT

To DLC4/DLC8 card
OR
To a Super Hybrid Port
(for connection of SLT)

Using an EXtra Device Port

To DLC4/DLC8 card
⑱
To a Super Hybrid Port
(for connection of SLT)

4-conductor wiring cord
Connect pins "T", "R",
"D1" and "D2".

4-conductor wiring cord
Connect pins "T", "R",
"D1" and "D2".

2-conductor wiring cord
Connect pins "T" and "R".

Master DPT   Slave DPT   SLT

Back View of DPTs

TO TEL

TO MAIN UNIT
/ PABX

Cable	Maximum Distance
26 AWG:	30 m (98 ft)
24 AWG:	50 m (164 ft)
22 AWG:	60 m (196 ft)
CAT 5:	50 m (164 ft)

TO MAIN UNIT
/ PABX

Master DPT

Slave DPT

TO TEL

To DLC4/DLC8 card
⑱
To a Super Hybrid Port
(for connection of SLT)

To SLT

2.6.4   First Party Call Control CTI Connection

CTI connection between a PC and a KX-T7633/T7636 DPT provides first party call control. The CTI connection is made via a USB interface (version 1.1), and uses the TAPI 2.1 protocol.

A USB Module (KX-T7601) must be connected to the KX-T7633/T7636 DPT.

Note

> The operating system of the PC required for first party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.
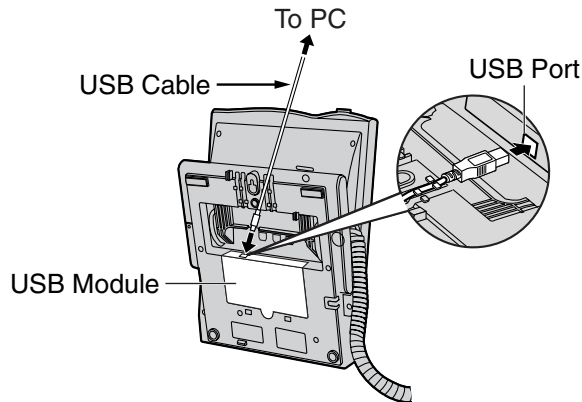
Notes

- Maximum length of the USB cable is 3 m (9 ft 10 in).
- USB Modules must not be connected to DPTs in the Digital XDP connection. In a Digital XDP connection, the PC cannot be used. If a USB module is connected to a slave DPT, the DPT will not work properly.

2.7 Connection of 2.4 GHz Portable Stations

2.7.1 Overview

The following equipment is required to connect the wireless system:

CS: Cell Station (KX-T0141)

This unit determines the area covered by the wireless system. Up to 2 calls can be made at the same time through each CS.

PS: 2.4 GHz Portable Station (KX-TD7680/KX-TD7690)

The KX-TDA50 can support up to 28 PSs. For more details about the PS, refer to the PS Operating Instructions.

CAUTION

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C [104 °F]), low temperature (less than 0 °C [32 °F]), vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high voltage equipment.
- The CS should not be placed on a metal object.
- Systems using 2.4 GHz ISM (Industrial, Scientific and Medical) band may interfere with the KX-TDA wireless system. Examples of such systems are cordless telephones, wireless LAN, Home RF, microwave ovens and other ISM devices. These systems may cause minor noise.
- Keeping some distance between the equipment listed below may prevent interference. (The distance may vary depending on the environment.)

Equipment	Distance
CS and office equipment such as a computer, telex, fax machine, etc.	More than 2 m (6 ft 7 in)
CS and PS	More than 1 m (3 ft 3 in)
Each PS	More than 0.5 m (1 ft 8 in)
Hybrid IP-PBX and CS	More than 2 m (6 ft 7 in)
CS and CS	More than 15 m (49 ft)

Please take into consideration the distance between the CSs when site planning. Please consult a certified dealer for details.
However, the required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct the site survey to determine the appropriate distance.

2.7.2   Procedure Overview

When connecting the wireless system, use extreme care to conduct a site survey. Inadvertent site survey can result in poor service area, frequent noise, and disconnection of calls.

1. Investigate the installation site

Refer to "2.7.3 Site Planning".

    a. Obtain the map of the CS installation site.

    b. Consider the service area demanded by the user on the map.

    c. Plan the locations of each CS, taking account of distance, building materials and etc.

2. Prepare the CS for site survey

Refer to "2.7.4 Before Site Survey".

    a. Assign a CS number to each CS by setting the DIP switches on the back of the CS.

    b. Supply electricity to each CS using an AC adaptor or a battery box.

    c. Install each CS temporarily as planned.

    <u>**Notes**</u>

      • Install at least 2 m (6 ft 7 in) above the floor.

      • Keep the antennas in the upright position.

3. Conduct the site survey

Refer to "2.7.5 Site Survey".

    a. Test the radio signal strength using the PS.
Confirm that the radio signal strength level is "12" near the CS.
Using the KX-TD7680

Press 1, 9, and POWER for more than 2 seconds.
CS No. 1 to 9
Display example:
<< SEARCHING >>
CS NO.1 LEVEL:12
SAVE:0123456789

Using the KX-TD7690

Press 1, 9, and POWER for more than 2 seconds.
CS No. 1 to 9
Display example:
<< SEARCHING >>
CS NO.1 LEVEL:12
SAVE:0123456789
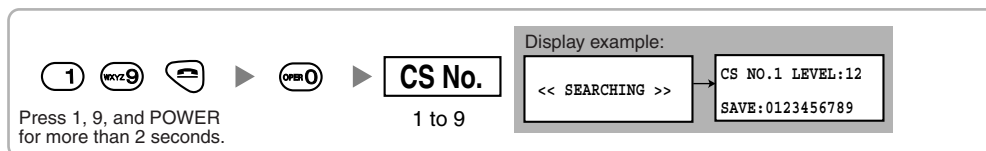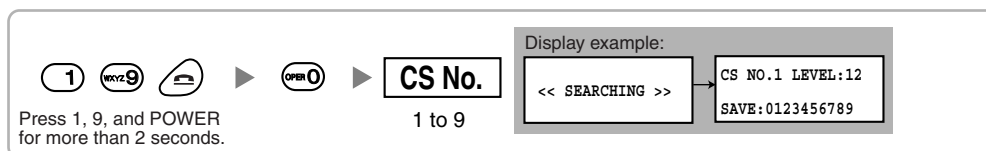
    b. By walking away from the CS with the PS, check the radio signal strength. The radio signal strength weakens as you walk away from the CS.

    c. Map the CS coverage area at radio signal strength levels "3" and "8".

    d. Make sure that adjacent CS coverage areas overlap where the radio signal strength level is "8" by at least 5 m (16 ft).

    e. Make sure that the radio signal strength level is greater than "3" at any location within the service area demanded by the user.

4. Finish the site survey

Refer to "2.7.6 After Site Survey".

a. Return all DIP switches of each CS to the OFF position, and stop supplying power.

b. Turn off the PS.

5. Connect the CS and PS to the Hybrid IP-PBX and test the operation

Refer to "2.7.7 Connecting a Cell Station to the Hybrid IP-PBX".

a. Connect the CSs to the Hybrid IP-PBX.

b. Register the PSs to the Hybrid IP-PBX.

c. Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

6. Mount the CS on the wall

Refer to "2.7.8 Wall Mounting".

a. Assuming everything goes as planned, mount the CS on the wall.

2.7.3   Site Planning

Choosing the best site for the CS requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Read the following information before installing the unit.

Understanding the Radio Waves

Characteristics of Radio Waves

The transmission of radio waves and the CS coverage area depend on the structure and materials of the building.

Office equipment, such as computers and fax machines, can interfere with radio waves. Such equipment may create noise or interfere with the performance of the PS.

The illustration below shows the special transmitting patterns of radio waves.

1. Radio waves are reflected by objects such as those made of metal.

2. Radio waves are diffracted by objects such as metallic columns.

3. Radio waves penetrate objects such as those made of glass.
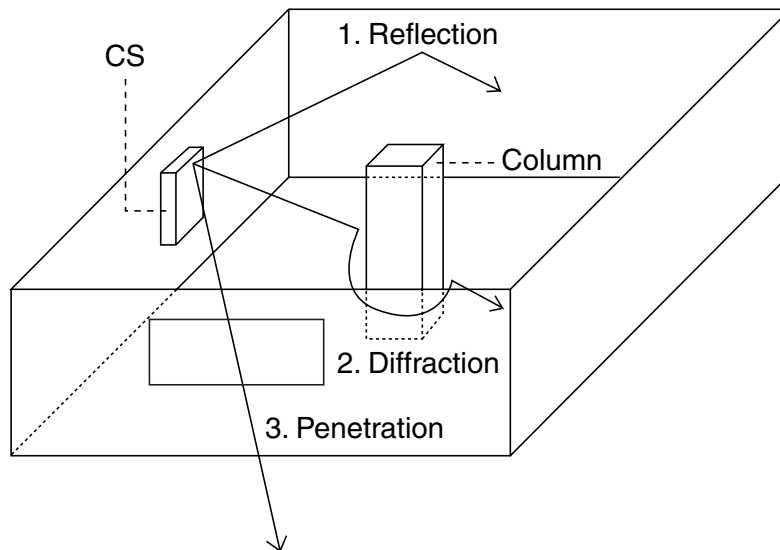
Relationships Between Radio Waves and Building Structure and Materials

*   The CS coverage area is affected more by the building materials and their thickness than the number of obstacles.

*   Radio waves tend to be reflected or diffracted by conductive objects and rarely penetrate them.

*   Radio waves tend to penetrate insulated objects and are rarely reflected by them.

*   Radio waves penetrate thin objects more than thick objects.

*   The table below shows the transmission tendency of radio waves when they reach objects made from various materials.

Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire nets	Radio waves can penetrate them, but tend to be reflected.
	Glass covered with heat-resistant film	Radio waves are weakened considerably when they penetrate windows.
Floor	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Partition	Steel	Radio waves are reflected and rarely penetrate them.
	Plywood, Glass	Radio waves usually penetrate them.
Column	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves tend to be reflected or diffracted.
	Metal	Radio waves tend to be reflected or diffracted.
Cabinet	Steel	Radio waves are usually reflected or diffracted, and rarely penetrate them.
	Wood	Radio waves can penetrate them, but they are weakened.

CS Coverage Area

The example below shows the size of the coverage area of 1 CS if it is installed where there is no obstacle.

Note

Radio signal strength levels are measured during the site survey (refer to "2.7.5 Site Survey").
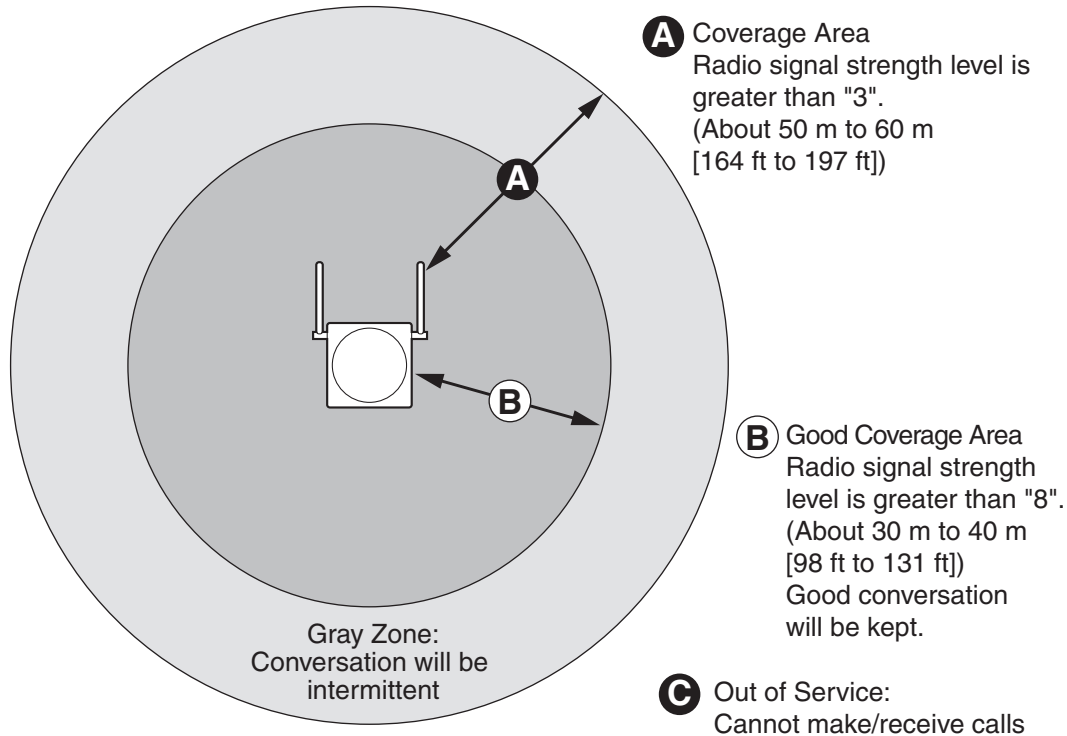
Ⓐ Coverage Area
Radio signal strength level is greater than "3".
(About 50 m to 60 m [164 ft to 197 ft])

Ⓑ Good Coverage Area
Radio signal strength level is greater than "8".
(About 30 m to 40 m [98 ft to 131 ft])
Good conversation will be kept.

Gray Zone: Conversation will be intermittent

Ⓒ Out of Service:
Cannot make/receive calls

Radio Signal Strength Levels

Level: 00	Out of range
Level: 01 to 02	Receives noise easily or disconnects
Level: 03 to 07	May receive noise
Level: 08 to 10	Good
Level: 11 to 12	Better

Site Survey Preparation

1. Obtain the map and investigate the installation site.

   a. Check the obstacles (e.g., shelves, columns, and partitions).

   b. Check the materials of the structures (e.g., metal, concrete, and plywood).

   c. Check the layout and dimensions of the room, corridor, etc.

   d. Write down the above information to the map.

2. Examine the service area demanded by the user on the map, referring to the following example.

   a. Draw the coverage area around a CS. Extend the coverage area to 30 to 60 meters (98 to 197 feet) in one direction, depending on the materials of the building structures and obstacles in the installation site. Note that a CS cannot be installed outside a building.

   b. If one CS cannot cover the entire service area, install additional CSs as required. Overlap the coverage areas of adjacent CSs.
   Where CS coverage areas overlap, the PS will start call handover to the next CS if the signal from

one CS becomes weak. However, if a PS moves away from a CS and there are no CSs available for handover, the PS may go out of range and the call could be lost.

If the signal from the CS fades, due to the structure of the building, there may be some handover delay. The user will hear a range warning before handover in this case. This also applies in the case of interference from 2.4 GHz apparatus.

Example: Installing in a Room Separated by Walls

Things to take note of:

- The room is separated by walls.
- The room is surrounded by concrete walls.

CS installation plan:

- The coverage area of each CS will not extend as far as when there is no obstacle, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.

150 m (492 ft)

70 m (230 ft)

CS no. 1

CS no. 2

CS no. 5

CS no. 3

CS no. 4
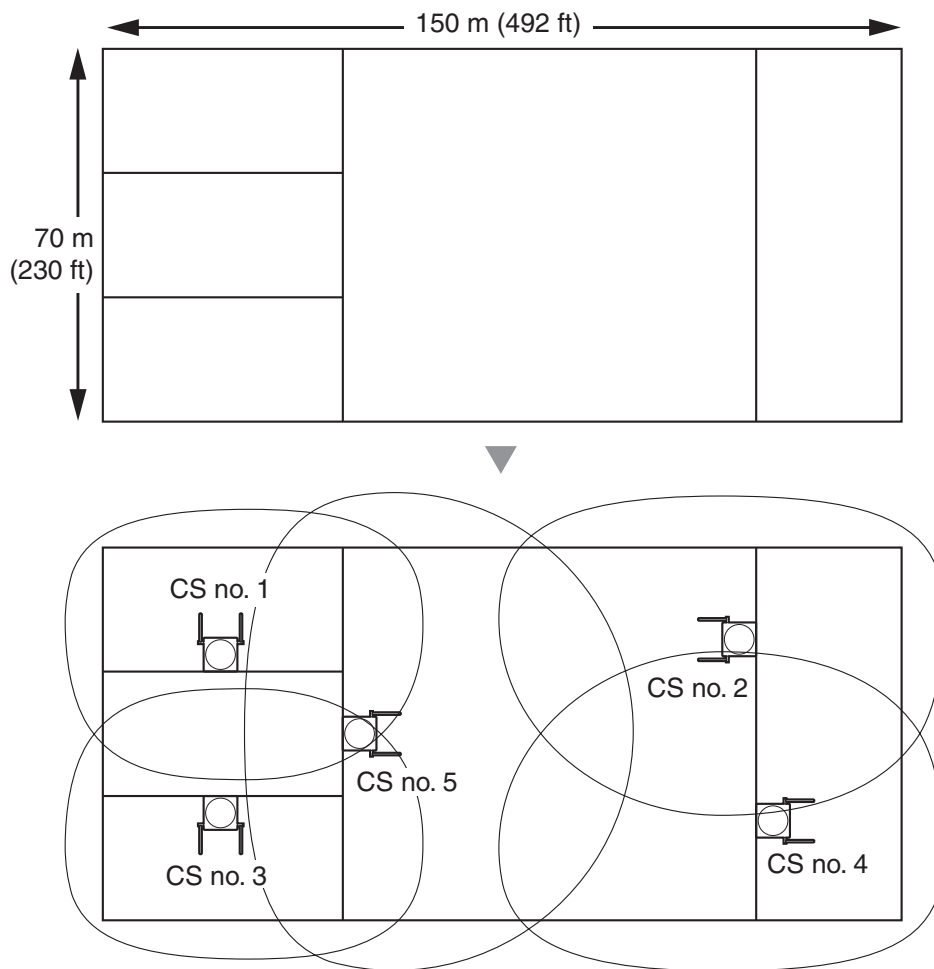
2.7.4   Before Site Survey

Setting and Installing the CS Temporarily for Site Survey

1. Switch the Radio Signal Test switch from OFF to ON.
2. Set the CS number switches as desired.
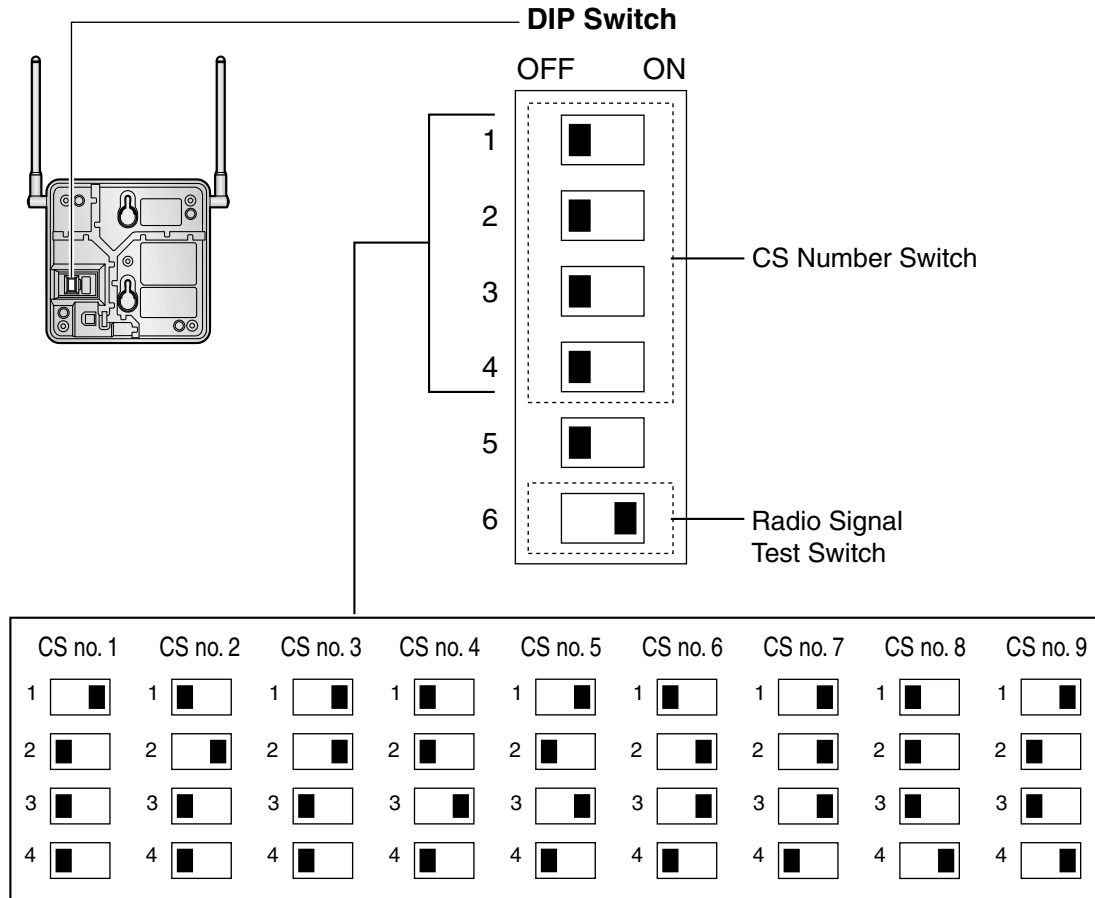
Notes

- To see the radio signal strength of more than 1 CS, a CS number must be set for each CS.
- If more than 1 CS is in Radio Signal Test mode, each CS must have a unique CS number.

3. After setting the DIP switch, connect an AC adaptor or battery box to the CS using a power supply adaptor.

Note

The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.

Telephone Cord

Power Supply Adaptor
(PSZZ1TDA0142)

Modular

To AC Adaptor (KX-A11/KX-TCA1)/
Battery Box (PSZZTD142CE)
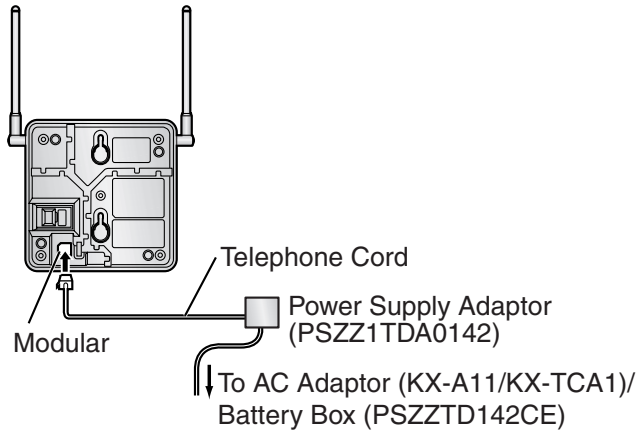
4. Install the CS temporarily for the site survey. Install the CS at least 2 m (6 ft 7 in) above the floor, keeping the antennas in the upright position.

2.7.5   Site Survey

The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS. After installing the CSs temporarily, set the PS to the Radio Signal Test mode and measure each CS coverage area. Then, record the results on the map of the installation site.

Testing the Radio Signal Strength

Note

> The display language for the site survey is only in English.

1. Enter the Radio Signal Test mode.

Using the KX-TD7680
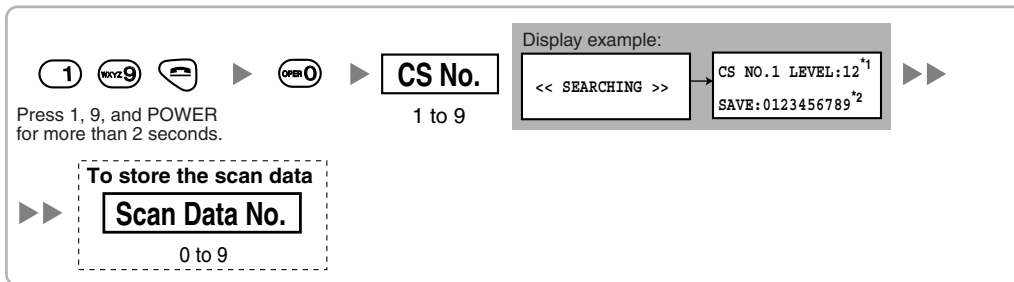
Using the KX-TD7690
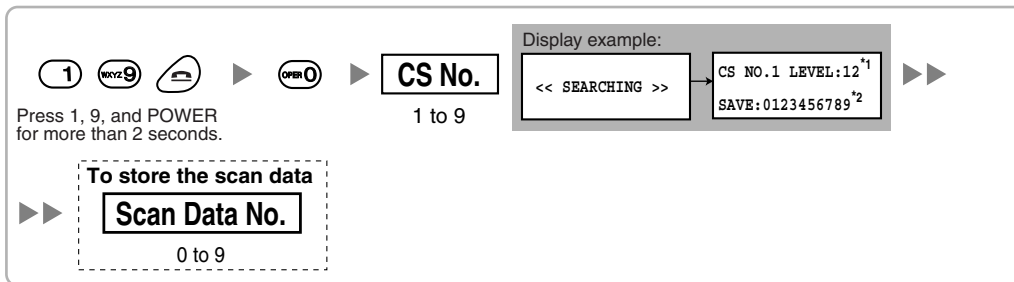
Notes

> *1: CS number and radio signal strength level.

> *2: Scan data (test result) number. Empty memory space will be indicated by a number; stored memory space will be indicated by a "-".

2. Measure the radio signal strength by moving to and away from the CS.

  a. Move to the CS until the point the radio signal strength level becomes "12".

  b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.

  c. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "3". Draw the area on the map.
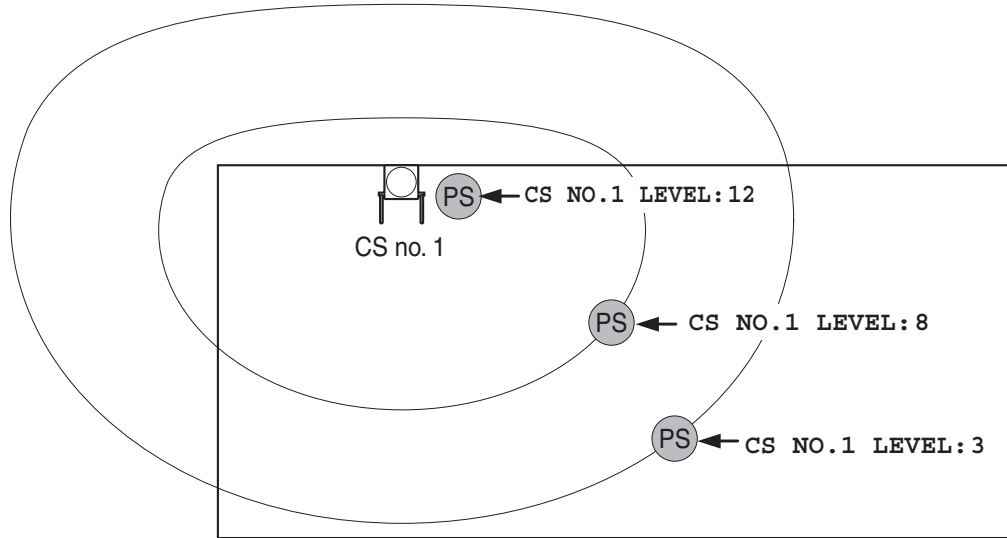
CS no. 1

PS ← CS NO.1 LEVEL:12

PS ← CS NO.1 LEVEL:8

PS ← CS NO.1 LEVEL:3

Radio Signal Strength Levels

Level: 00		Out of range
Level: 01 to 02		Receives noise easily or disconnects
Level: 03 to 07		May receive noise
Level: 08 to 10		Good
Level: 11 to 12		Better

3. Repeat the steps 1 and 2 for other CSs, and relocate the CSs when necessary.

  a. Overlap adjacent CS coverage areas where the radio signal strength level is "8" by 5 to 10 meters (16 to 33 feet).

CS no. 1   CS no. 2

5 m to 10 m
(16 ft to 33 ft)
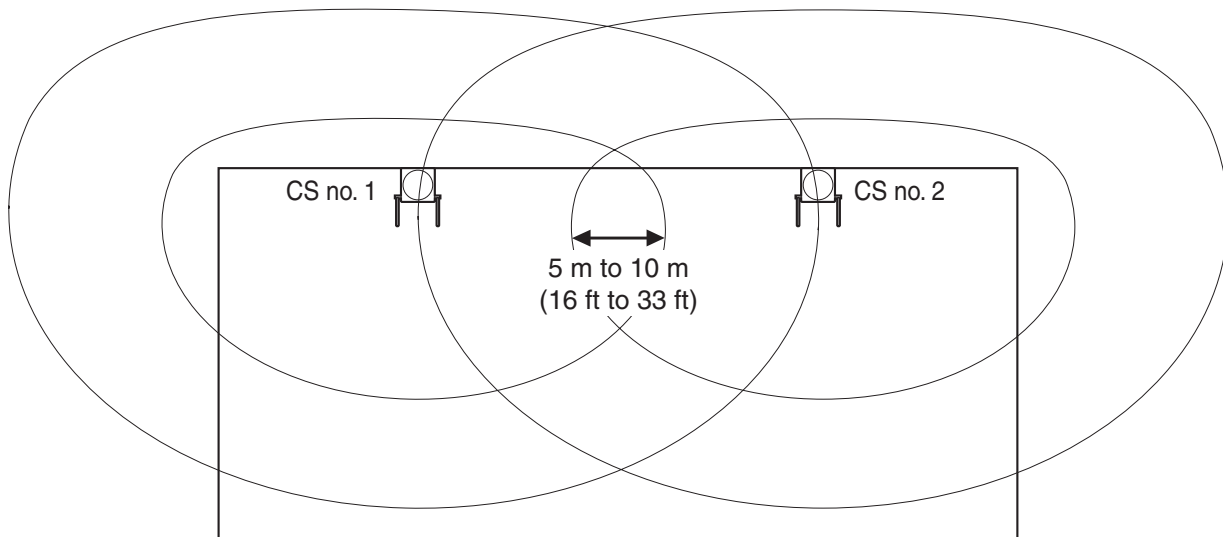
b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.
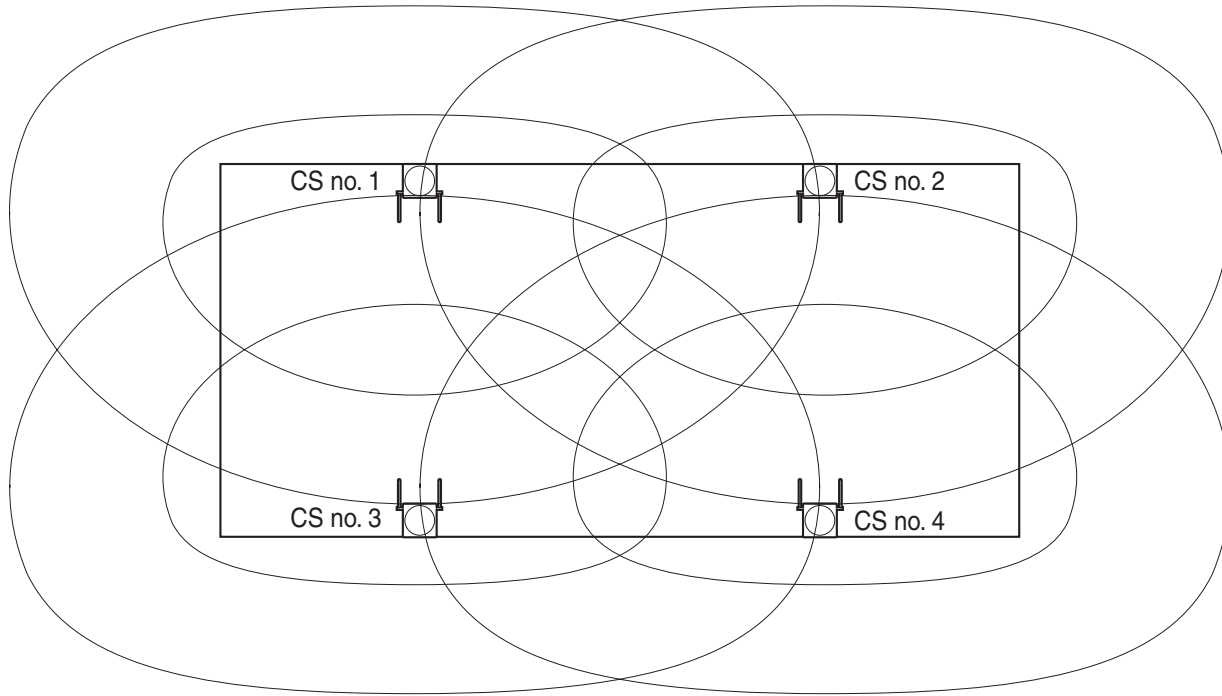
c. Make sure that the radio signal strength level is greater than "3" at any location in the service area demanded by the user.

Referring to the Stored Scan Data
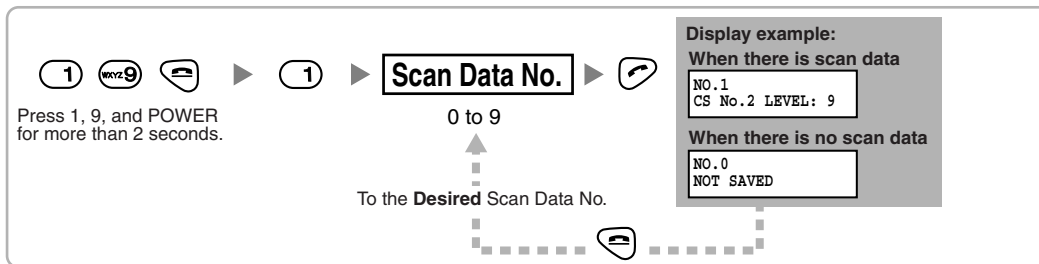
Using the KX-TD7680
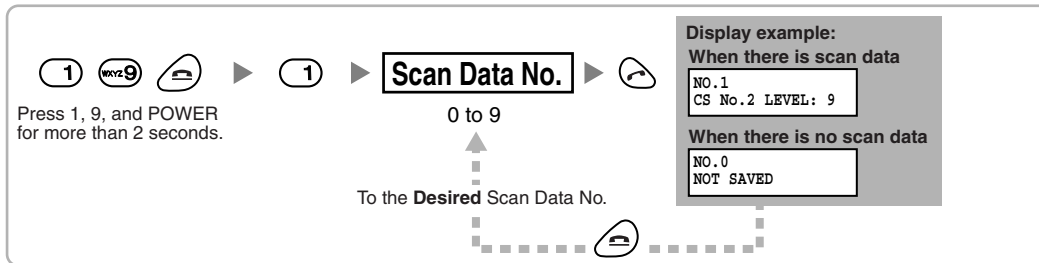
Using the KX-TD7690

Deleting the Stored Scan Data

Using the KX-TD7680

① ⑨(WXYZ9) 📟 ▶ ②(ABC2) ▶ | **Scan Data No.** | ▶ 📞 ▶ 📞

Press 1, 9, and POWER
for more than 2 seconds.

0 to 9, or # for all data

To the **Desired** Scan Data No.

Using the KX-TD7690

① ⑨(WXYZ9) 📟 ▶ ②(ABC2) ▶ | **Scan Data No.** | ▶ 📞 ▶ 📞

Press 1, 9, and POWER
for more than 2 seconds.

0 to 9, or # for all data

To the **Desired** Scan Data No.
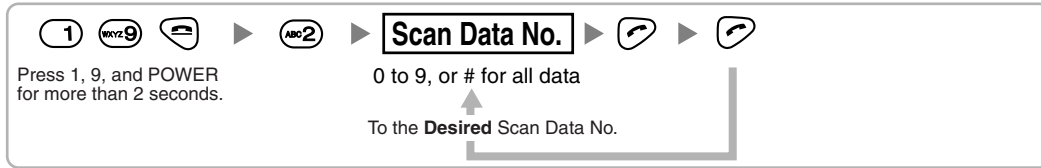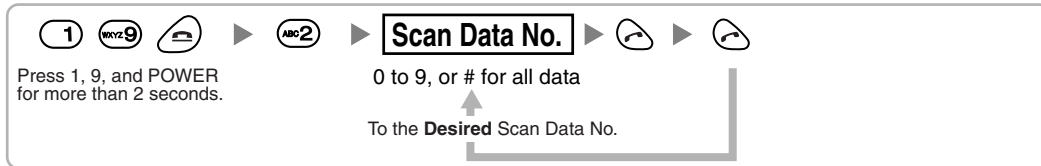
2.7.6 After Site Survey

After obtaining the proper measurement results, exit the Radio Signal Test mode before connecting the CS to the Hybrid IP-PBX.

1. Keep pressing POWER button on the PS until the PS is turned OFF.
2. Disconnect the AC adaptor or battery box from the CS and stop supplying electricity.
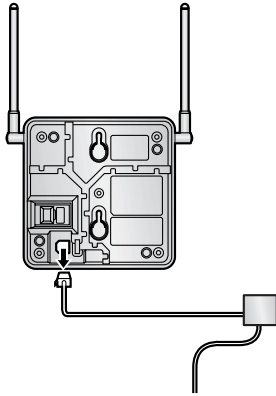
3. Switch all DIP switches on the CS from ON to OFF.
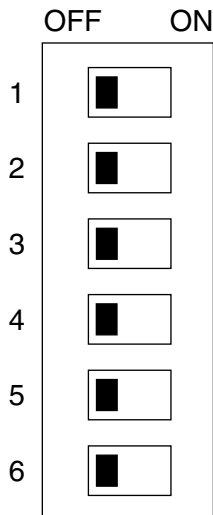
2.7.7 Connecting a Cell Station to the Hybrid IP-PBX

Refer to the following example to connect a CS to the Hybrid IP-PBX.

Super Hybrid Port

Cable	Maximum Distance
26 AWG:	222 m (728 ft)
24 AWG:	347 m (1138 ft)
22 AWG:	500 m (1640 ft)
CAT 5:	347 m (1138 ft)
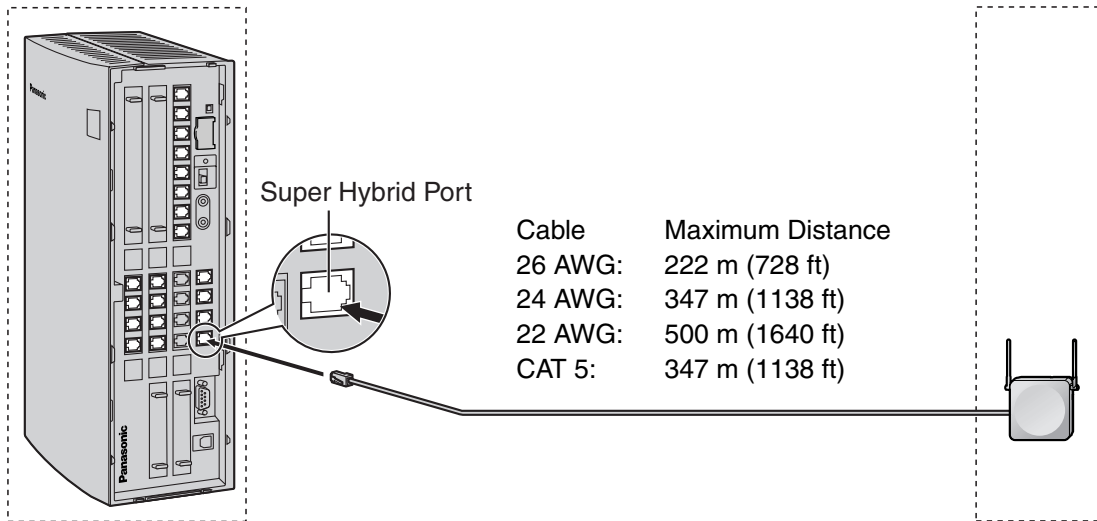
A Super Hybrid Port,
or HLC4/DLC4/DLC8 card
(RJ11)

CS (RJ11)

Signal Name	Pin No.
D1	1
	2
	3
D2	4

Pin No.	Signal Name
1	D1
2	
3	
4	D2

Accessories and User-supplied Items for the CS

    Accessories (included): Screws × 2, Washers × 2

    User-supplied (not included): RJ11 connector

<u>**Note**</u>

    For details about HLC4 card, DLC4 card or DLC8 card, refer to "2.4.1 HLC4 Card", "2.4.2 DLC4 Card" or "2.4.5 DLC8 Card".

Connecting the CS

1. Connect the cable from a Super Hybrid Port or the HLC4/DLC4/DLC8 card to the CS.

Modular
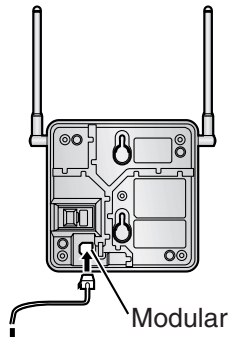
To a Super Hybrid Port,
or HLC4/DLC4/DLC8 card

2. Pass the cable through the groove of the CS (in any direction depending on your preference).

TO MAIN UNIT
/ PABX
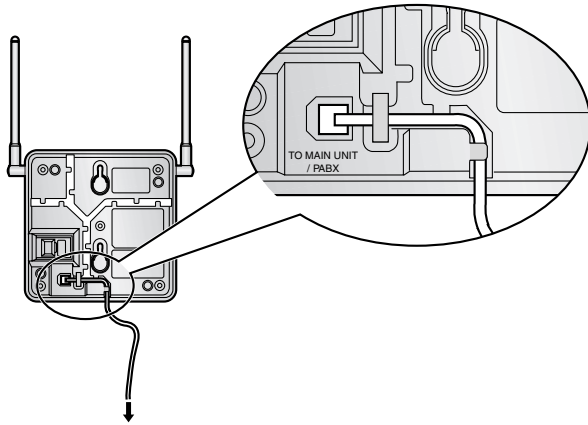
To a Super Hybrid Port,
or HLC4/DLC4/DLC8 card

Registering the PS

The PS must be registered to the Hybrid IP-PBX before it can be used. Programming of both the PS and Hybrid IP-PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required for the Hybrid IP-PBX system programming.

Note

> For details about system programming using a PT, refer to "2.3.2 PT Programming" and "3.3 PT Programming" in the Feature Guide.

Entering the System Programming Mode

PT (Administrator Level)

| PROGRAM/ PAUSE | ▶ ✳ ▶ # ▶ | System Password for Administrator— for PT Programming ◆ = 1234 | ▶ | Programming No. 3 digits |

PS (Using the KX-TD7680)

Press POWER for 2 seconds. ▶ FUNC ▶ Select "PS PROGRAM". ▶ ▶ Select "SYSTEM SET". ▶ ▶▶

If required

▶▶ System Lock Password (4 digits) ▶ ▶ System Setting Menu

PS (Using the KX-TD7690)

Press POWER for 2 seconds. ▶ MENU S1 ▶ Select "PS PROGRAM". ▶ SEL S1 ▶ Select "SYSTEM SETTING". ▶ SEL S1 ▶▶

If required

▶▶ System Lock Password (4 digits) ▶ ENTR S1 ▶ System Setting Menu
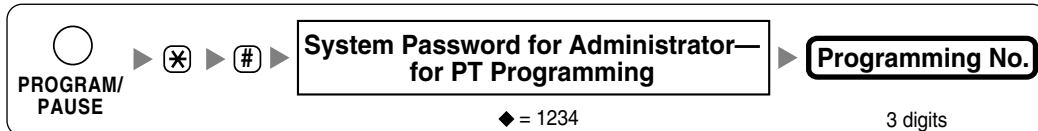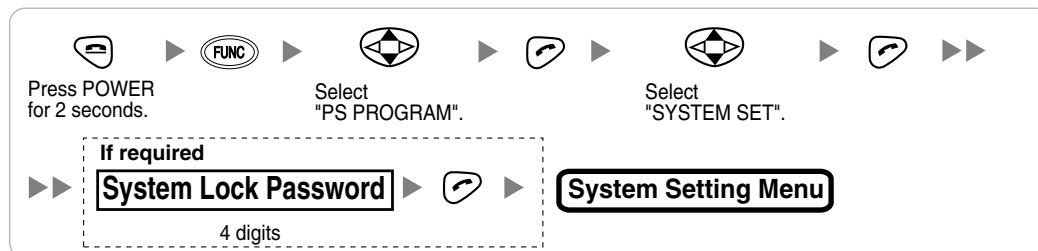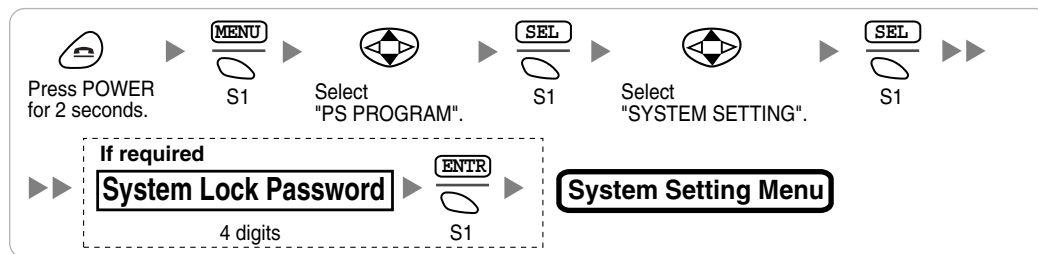
Note

> ◆ means default value throughout this section.

PS Registration

[690] ▶ (ENTER) ▶ | PS No. | ▶ | Extn. No. | ▶ (ENTER) ▶ [To the PS operation below] ▶ [END]

ENTER   001 to 028   1 to 4 digits   ENTER
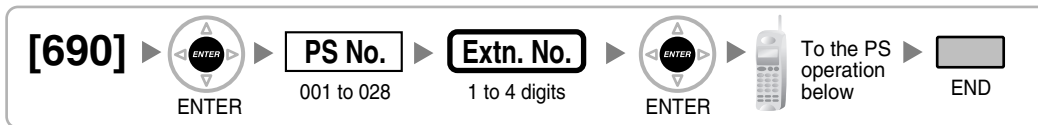
When the PS has not been registered yet

When registering the PS for the first time, it is possible to select the desired language for the display. (You do not need to enter the PS system programming mode when registering for the first time.)

Using the KX-TD7680

▶ [PS] ▶ Press POWER for 2 seconds. ▶ [F2] Press S2 repeatedly to select the desired language. ▶ [F3] Press S3 for 2 seconds. C.Tone ▶

Using the KX-TD7690

▶ [PS] ▶ Press POWER for 2 seconds. ▶ F2 Press S2 repeatedly to select the desired language. ▶ F3 Press S3 for 2 seconds. C.Tone ▶
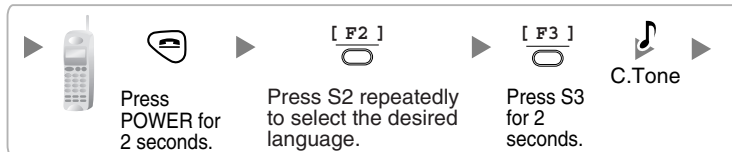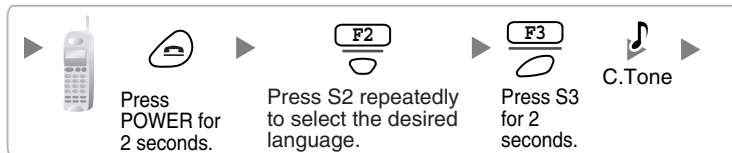
When the PS has already been registered to another Hybrid IP-PBX

One PS can be registered to a maximum of 4 different Hybrid IP-PBXs.

Using the KX-TD7680

▶ [PS] Select "REGISTRATION". ▶ (call) ▶ Choose "SYSTEM 1–4". ▶ (call) C.Tone ▶

Using the KX-TD7690

▶ [PS] Select "REGISTRATION". ▶ SEL S1 ▶ Choose "SYSTEM 1–4". ▶ SEL S1 C.Tone ▶
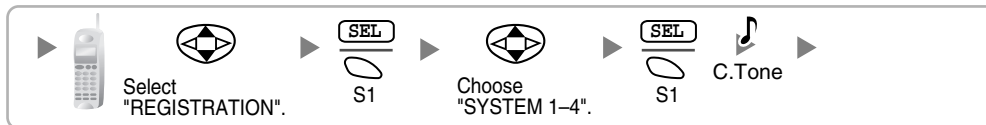
Setting the System Lock

When a system lock has been set, the system lock password will be required for PS system setting.

Using the KX-TD7680

Select "SYSTEM LOCK". ▶ (call) ▶ Choose "Enable/Disable". ▶▶

▶▶ (call) ⟶ | System Lock Password | ▶ (call) ▶ | System Lock Password | ▶▶
ENABLE   4 digits   4 digits
DISABLE

▶▶ (call) C.Tone
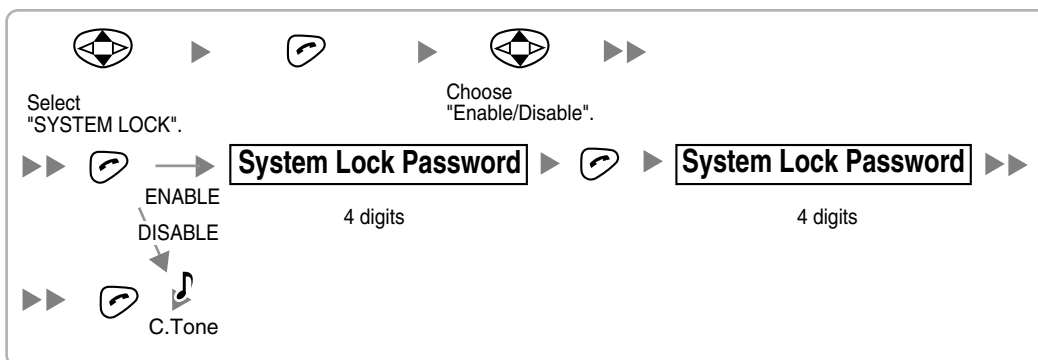
Using the KX-TD7690
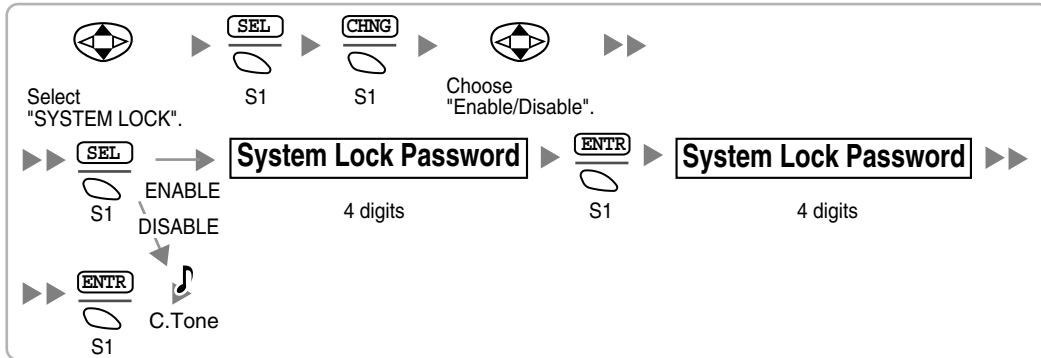
Setting the Personal Identification Number (PIN) for PS Registration

To prevent registering the PS to a wrong Hybrid IP-PBX, a PIN for PS registration can be set to the Hybrid IP-PBX. Before registering the PS to the Hybrid IP-PBX, register the PIN set to the Hybrid IP-PBX into the PS. By doing so, the PS will only be registered to the Hybrid IP-PBX with the matching PIN.

Notes

- By default, the PIN for PS registration is "1234" for both the Hybrid IP-PBX and PS. Therefore, the PS can be registered to the Hybrid IP-PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the Hybrid IP-PBX. Therefore, even when there is more than 1 Hybrid IP-PBX with the same PIN near the PS, the PS will not be linked to a different Hybrid IP-PBX during normal operation after registration.

Setting the PIN for Hybrid IP-PBX
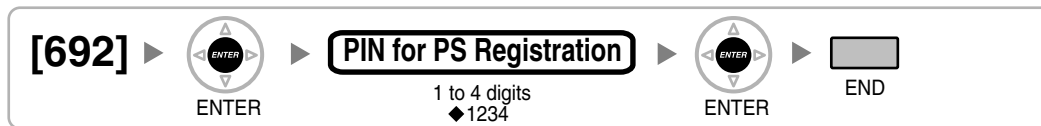
Setting the PIN for PS

Using the KX-TD7680
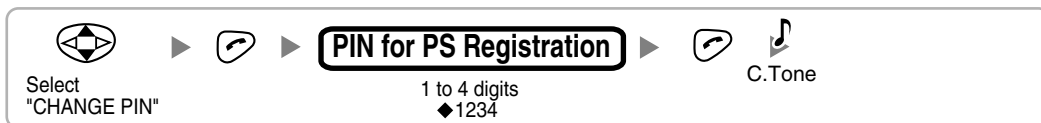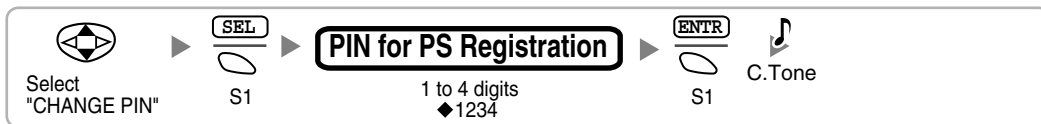
Using the KX-TD7690

PS Termination

Confirm the following before canceling the PS registration:

- PS is turned on.
- PS is within the range.
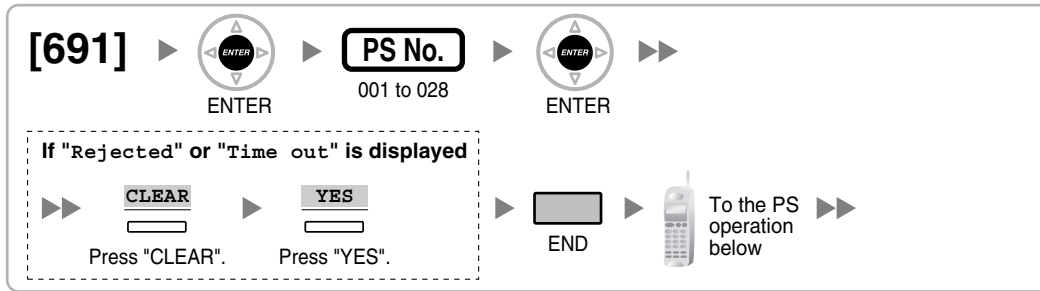
If the registration information is still stored in the PS

Using the KX-TD7680
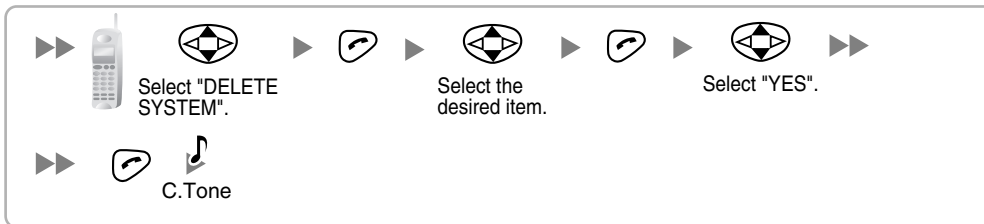
Using the KX-TD7690
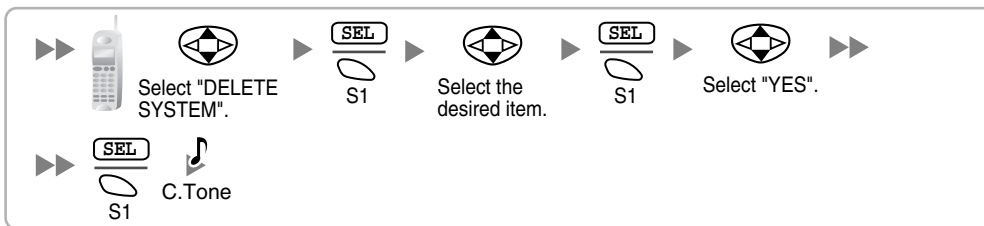
Testing the Operation

Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

2.7.8   Wall Mounting

1.   Place the reference for wall mounting (on the following page) on the wall to mark the 2 screw positions.

2.   Install the 2 screws and washers (included) into the wall.

Notes

- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3.   Hook the CS on the screw heads.
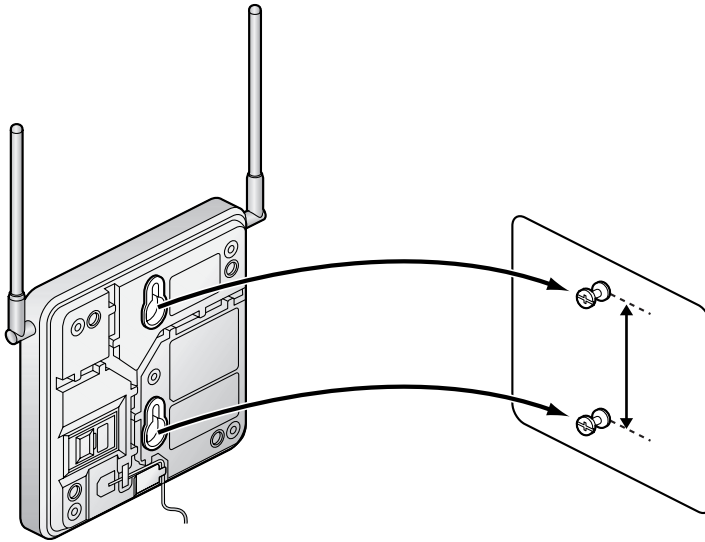
Reference for Wall Mounting
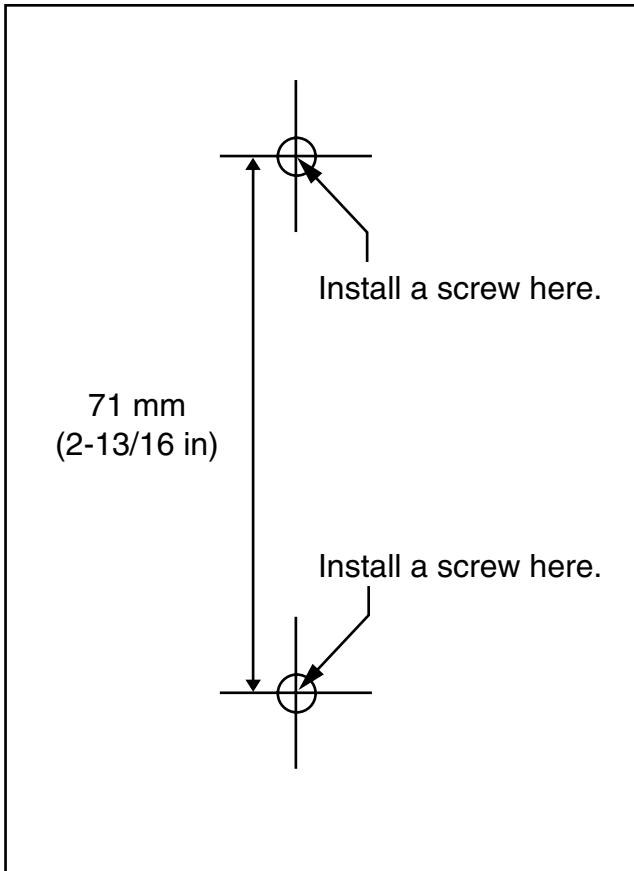
Please copy this page and use as a reference for wall mounting.

Install a screw here.

71 mm
(2-13/16 in)

Install a screw here.

Note

Make sure to set the print size to correspond with the size of this page. If the dimension of the paper output still deviates slightly from the measurement indicated here, use the measurement indicated here.

2.8 Connection of Doorphones, Door Openers, External Sensors, and External Relays

2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

A maximum of 4 doorphones (KX-T30865), 4 door openers or external relays, and 4 external sensors can be connected to the Hybrid IP-PBX.

Note

Doorphones, door openers, external sensors, and external relays are user-supplied.

Maximum Cabling Distance

Cable	Maximum Distance
26 AWG:	70 m (230 ft)
24 AWG:	113 m (371 ft)
22 AWG:	180 m (590 ft)
CAT 5:	113 m (371 ft)

Doorphone

Door Opener

External Sensor/
External Relay Device
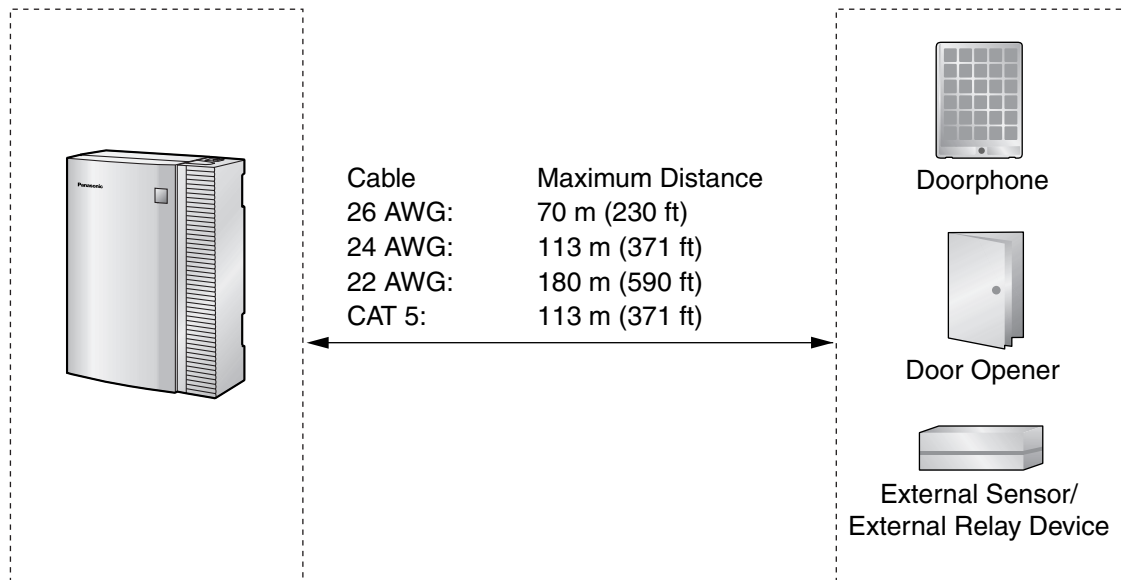
Installing the Doorphone (KX-T30865)

1. Loosen the screw to separate the doorphone into 2 halves.
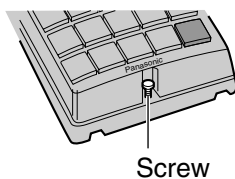
Screw

2. Pass the wires through the hole in the base cover, and attach the base cover to a wall using 2 screws.

Screw

To terminal box
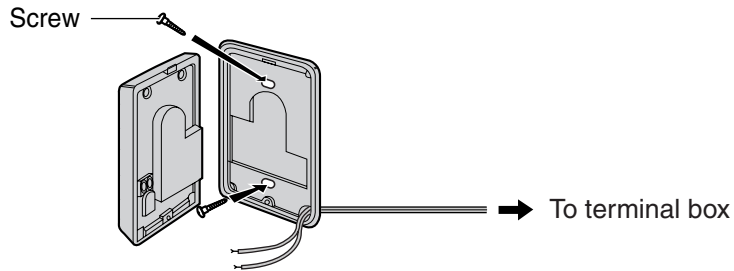
Note

Two kinds of screws are included with KX-T30865. Please choose the appropriate kind for your wall type.

: when a doorphone plate has been fixed to the wall

: when you wish to install the doorphone directly to the wall

3. Connect the wires to the screws located in the front cover.

To terminal box

4. Re-attach the 2 halves and re-insert the screw.

Connection of Doorphones

1. Connect DPH4 Card to the terminal boxes using telephone line cords.
    Refer to "2.5.1 DPH4 Card" for pin assignments.

2. Connect the wires of doorphones 1 and 3 to the red and green screws on the terminal box.

3. Connect the wires of doorphones 2 and 4 to the yellow and black screws on the terminal box.

To DPH4 card

Telephone Line Cord

Terminal Box

Yellow

Red

Black

Green

Doorphone 3

Doorphone 4

Telephone Line Cord

Yellow

Red

Black

Green

Doorphone 1

Doorphone 2
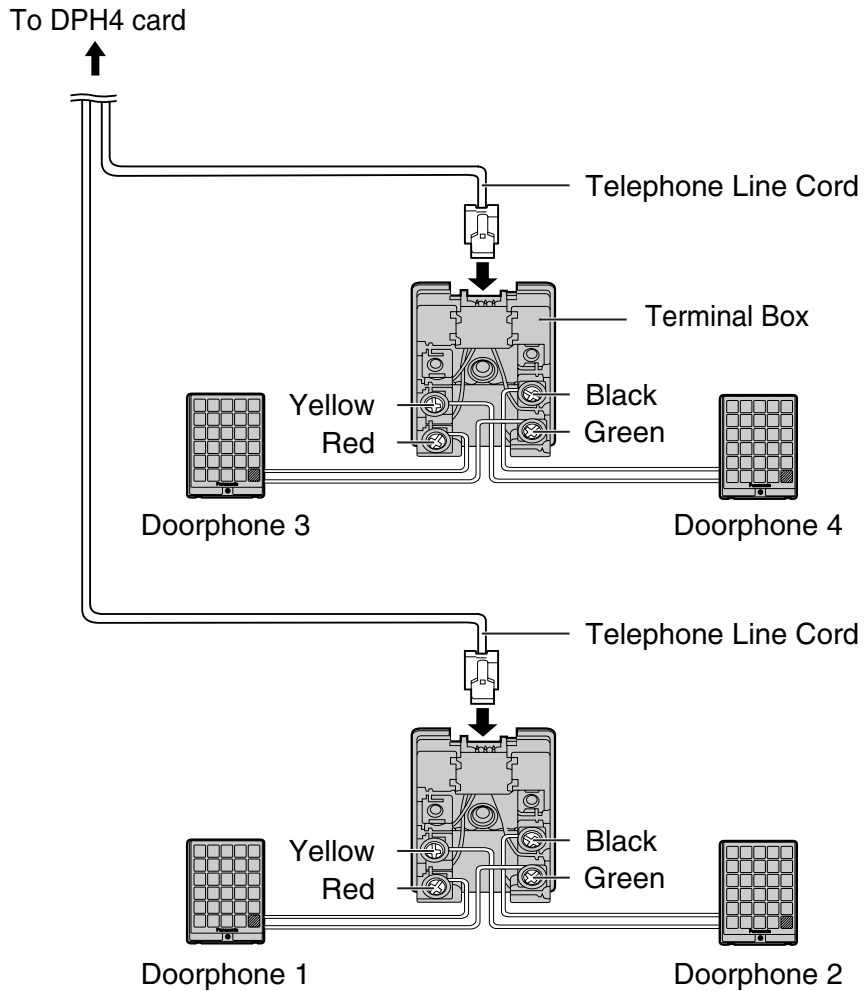
Connection of Door Openers, External Sensors, and External Relays

Use 8-pin and 10-pin terminal blocks (included with the card) for connection.

1. While pressing down on the hole at the top of the terminal block using a screwdriver, insert the wire into the side hole as shown below. Repeat this procedure for other door openers, external sensors, and external relays.
Refer to "2.5.1 DPH4 Card" for pin assignments.
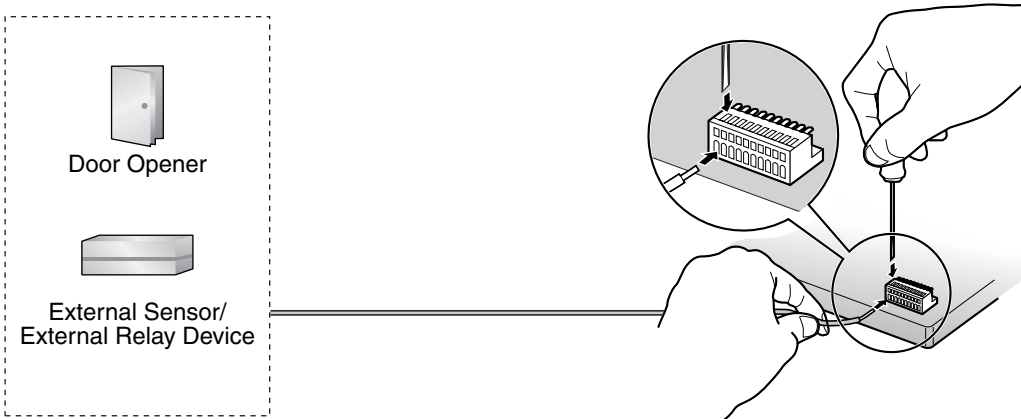
2. Attach the terminal blocks to the connectors of the DPH4 card in the Hybrid IP-PBX.

To door openers/external relays

To external sensors
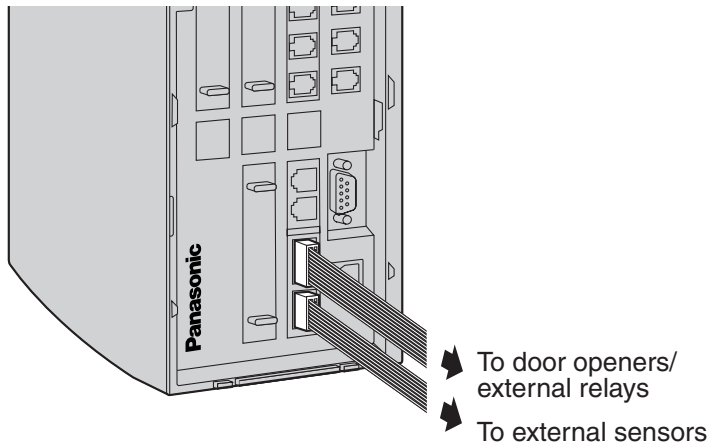
2.9   Connection of Peripherals

2.9.1   Connection of Peripherals
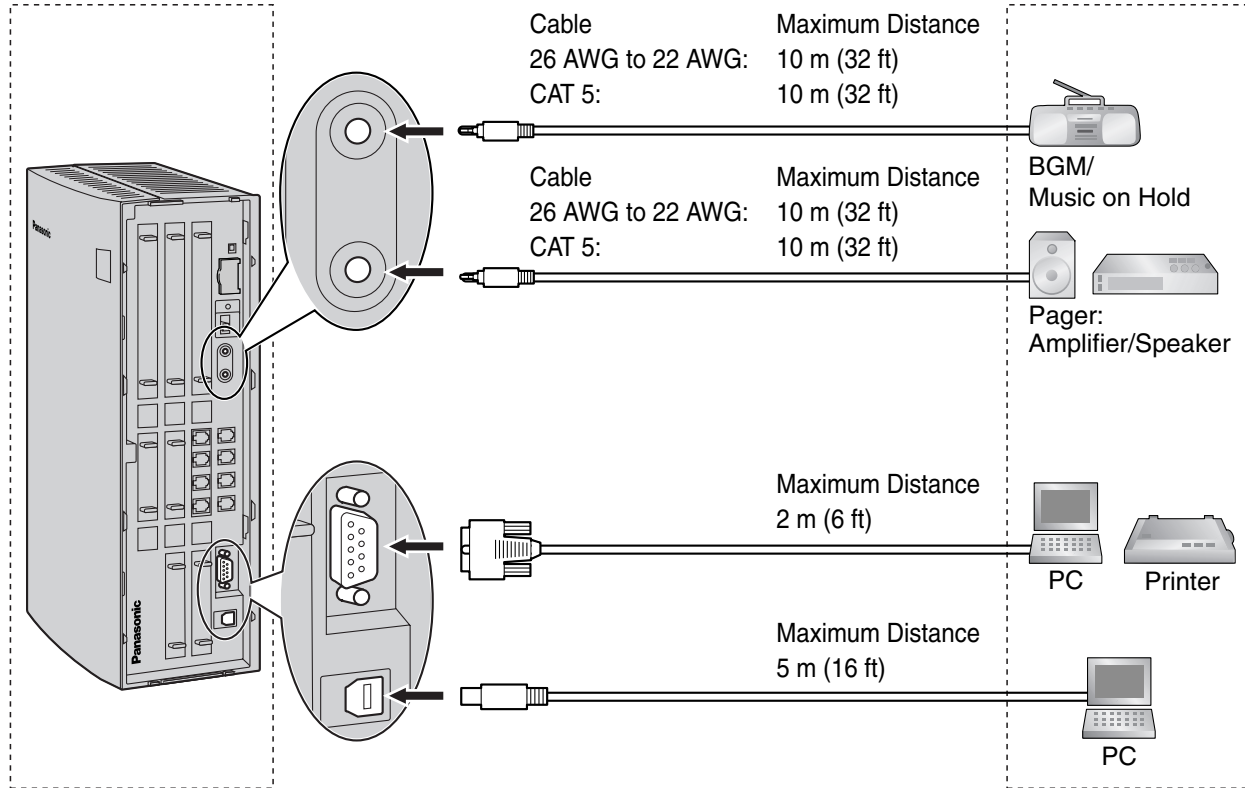
BGM/MOH

The Hybrid IP-PBX provides Background Music and Music on Hold. Only 1 external music source (e.g., a user-supplied radio) can be connected to the Hybrid IP-PBX.

CAUTION

- Wiring should be done carefully to prevent undue force being exerted on the plug. Otherwise, music may be intermittent.
- An External Music Jack is a SELV port and should only be connected to an approved SELV device.

Note

When the Hybrid IP-PBX and external music sources are not connected to the same ground, hum noise may be induced into Background Music and Music on Hold.

Pager

Only one paging device (user-supplied) can be connected to the Hybrid IP-PBX.

CAUTION

An External Paging Jack is a SELV port and should only be connected to an approved SELV device.
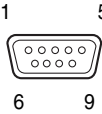
PC/Printer (via RS-232C)

The Hybrid IP-PBX is equipped with an RS-232C interface. This interface provides communication between the Hybrid IP-PBX and the user-supplied devices such as PC or line printers. The RS-232C port is used for system programming, SMDR, diagnostics and external system database storage (save/load) functions. When using special accessories such as cable, the user should use those specified in this installation manual to comply with the limits for a Class B digital device pursuant to the FCC Rules.

Note

Use an RS-232C cross cable for connection between the Hybrid IP-PBX and PC.

Pin Assignments

	No.	Signal Name	Function	Circuit Type	
				EIA	CCITT
1 5 / 6 9	2	RD (RXD)	Receive Data	BB	104
	3	SD (TXD)	Transmit Data	BA	103
	4	ER (DTR)	Data Terminal Ready	CD	108.2
	5	SG	Signal Ground	AB	102
	6	DR (DSR)	Data Set Ready	CC	107
	7	RS (RTS)	Request To Send	CA	105
	8	CS (CTS)	Clear To Send	CB	106

Connection Charts

For connecting a printer/PC with a 9-pin RS-232C connector

Hybrid IP-PBX   Printer/PC

Circuit Type (EIA)	Signal Name	Pin No.		Pin No.	Signal Name	Circuit Type (EIA)
BB	RD (RXD)	2		2	RD (RXD)	BB
BA	SD (TXD)	3		3	SD (TXD)	BA
CD	ER (DTR)	4		4	ER (DTR)	CD
AB	SG	5		5	SG	AB
CC	DR (DSR)	6		6	DR (DSR)	CC
CA	RS (RTS)	7		7	RS (RTS)	CA
CB	CS (CTS)	8		8	CS (CTS)	CB
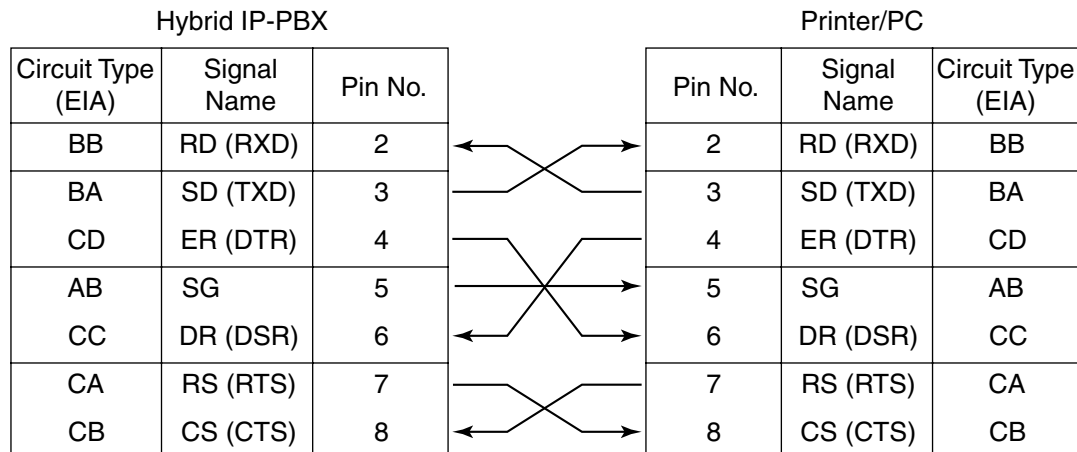
For connecting a printer/PC with a 25-pin RS-232C connector

Hybrid IP-PBX					Printer/PC		
Circuit Type (EIA)	Signal Name	Pin No.			Pin No.	Signal Name	Circuit Type (EIA)
BB	RD (RXD)	2			1	FG	AA
BA	SD (TXD)	3			3	RD (RXD)	BB
CD	ER (DTR)	4			2	SD (TXD)	BA
AB	SG	5			20	ER (DTR)	CD
CC	DR (DSR)	6			7	SG	AB
CA	RS (RTS)	7			5	CS (CTS)	CB
CB	CS (CTS)	8			6	DR (DSR)	CC
					4	RS (RTS)	CF
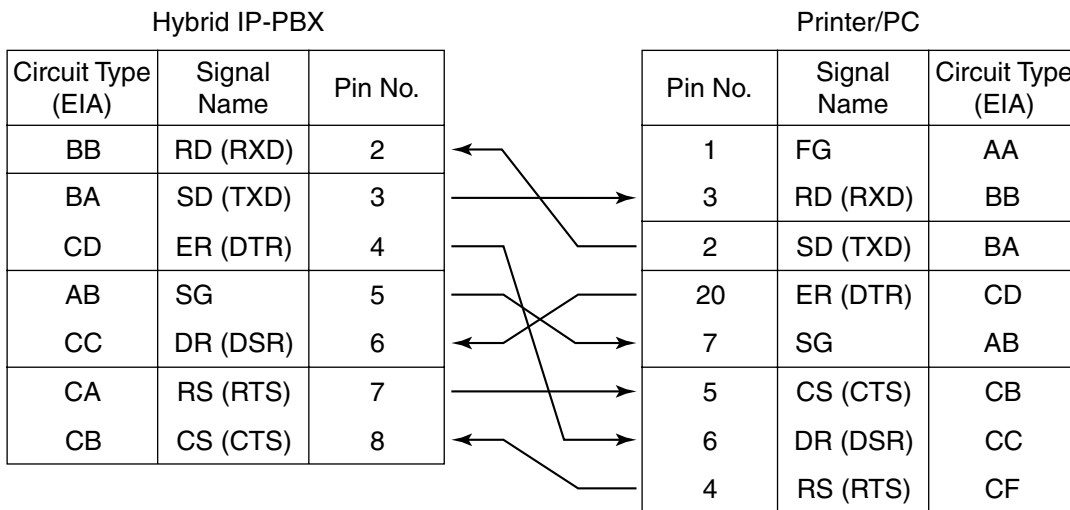
RS-232C Signals

- **Receive Data (RXD):**…(input)
  Conveys signals from the printer or the PC.

- **Transmit Data (TXD):**…(output)
  Conveys signals from the unit to the printer or the PC. A "Mark" condition is held unless data or BREAK signals are being transmitted.

- **Data Terminal Ready (DTR):**…(output)
  This signal line is turned ON by the unit to indicate that it is ON LINE. Circuit ER (DTR) ON does not indicate that communication has been established with the printer or the PC. It is switched OFF when the unit is OFF LINE.

- **Signal Ground (SG)**
  Connects to the DC ground of the unit for all interface signals.

- **Data Set Ready (DSR):**…(input)
  An ON condition of circuit DR (DSR) indicates the printer or the PC is ready. Circuit DR (DSR) ON does not indicate that communication has been established with the printer or the PC.

- **Request To Send (RTS):**…(output)
  This lead is held ON whenever DR (DSR) is ON.

- **Clear To Send (CTS):**…(input)
  An ON condition of circuit CS (CTS) indicates that the printer or the PC is ready to receive data from the unit. The unit does not attempt to transfer data or receive data when circuit CS (CTS) is OFF.

- **Frame Ground (FG)**
  Connects to the unit frame and the earth ground conductor of the AC power cord.

PC/CTI Server (via USB version 1.1)

The Hybrid IP-PBX is equipped with a USB interface. This interface provides communication between the Hybrid IP-PBX and a PC or a CTI server.

The PC is used for system programming, diagnostics and external system database storage (save/load) functions.

The CTI server is used for connecting PCs on a LAN to provide third party call control CTI. The CTI connection uses the CSTA Phase 3 or TAPI 2.1 protocol.

Note

The operating system of the PC or CTI server required for third party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.

Pin Assignments

	No.	Signal Name
2 1 3 4	1	VBUS
	2	USB D-
	3	USB D+
	4	GND

2.10   Power Failure Connections

2.10.1   Power Failure Connections

When the power supply to the Hybrid IP-PBX fails, power failure transfer (PFT) will switch from the current connection to the Power Failure Connection. Refer to "2.4.1 Power Failure Transfer" in the Feature Guide for further information.

Note

If DC power is provided by backup batteries, the Hybrid IP-PBX will remain fully operational and the connection will not switch to the Power Failure Connection.

Using Analog CO Line Card and Super Hybrid Ports

In the event of power failure, SLTs connected to Ports 1 and 2 of the Super Hybrid Ports (on the Main Board) are automatically connected to PFT ports 1 and 2 of the first LCOT4 card (installed in the least slot number).

Note

Even when the power returns, the conversation established during power failure will be maintained.

2.11 Starting the Hybrid IP-PBX

2.11.1 Starting the Hybrid IP-PBX

CAUTION

- SD Memory Card must be inserted in the SD Memory Card slot of the main board before start up.
- Before touching the System Initialize Switch, discharge static electricity by touching ground or wearing a grounding strap.
- Once you have started the Hybrid IP-PBX and if you unplug the Hybrid IP-PBX, do not perform the following procedures to start the Hybrid IP-PBX again. Otherwise, your programmed data is cleared. To restart the Hybrid IP-PBX, refer to "4.1.4 Using the Reset Button".
- The Hybrid IP-PBX will continue to be powered even if the power switch is turned "OFF".
- The power supply cord is used as the main disconnect device. Ensure that the AC outlet is located near the equipment and is easily accessible.

1. Set the System Initialize Switch to the "SYSTEM INITIALIZE" position.
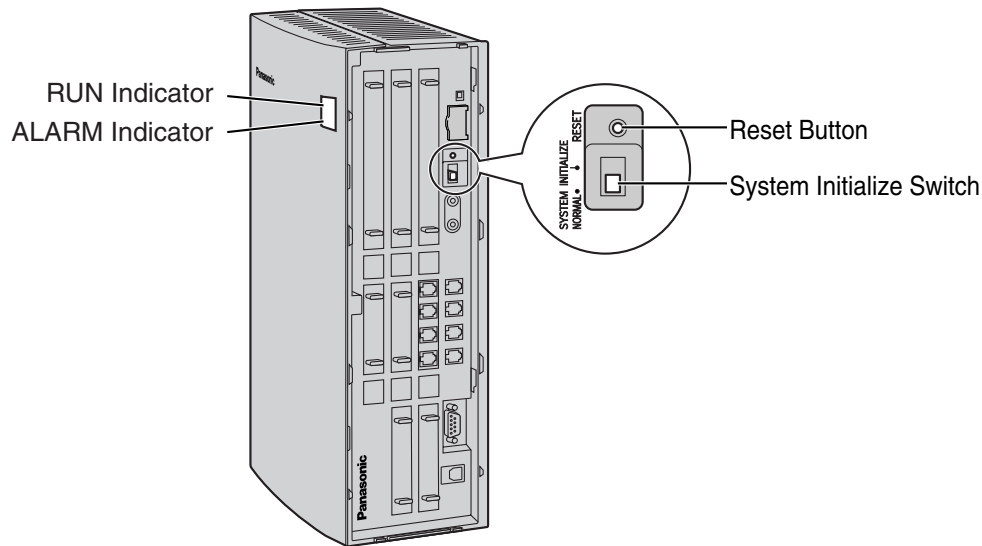
2. Plug the DC connector of the AC adaptor into DC IN 1.
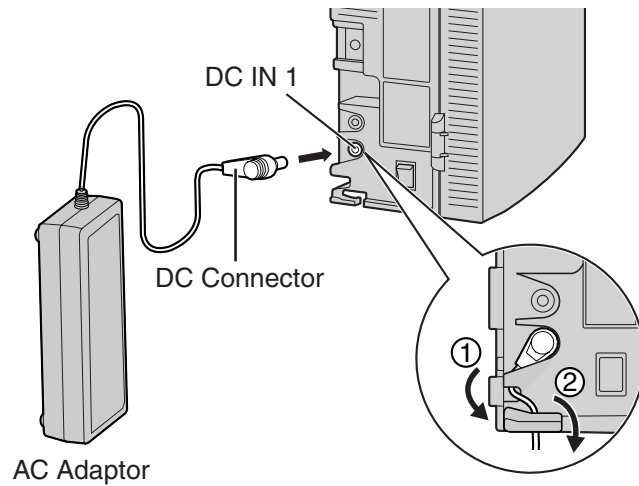
Notes

- The AC adaptor supplied with the Hybrid IP-PBX must be connected to DC IN 1. If an AC adaptor is connected only to DC IN 2, the Hybrid IP-PBX will not start.
- If you need to connect an additional AC adaptor, plug the DC connector of the additional AC adaptor into DC IN 2.
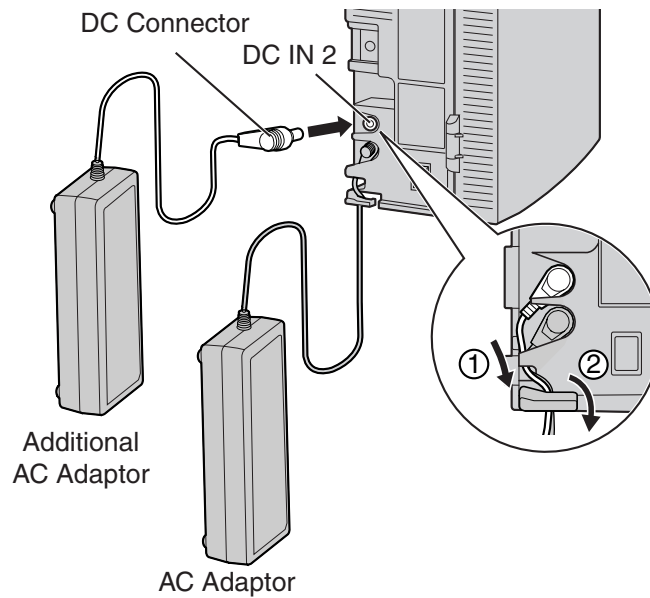
3. Plug the AC cord into the AC adaptor, and then plug the other end into an AC outlet.

AC Adaptor

①

AC Cord

To AC outlet ←
②
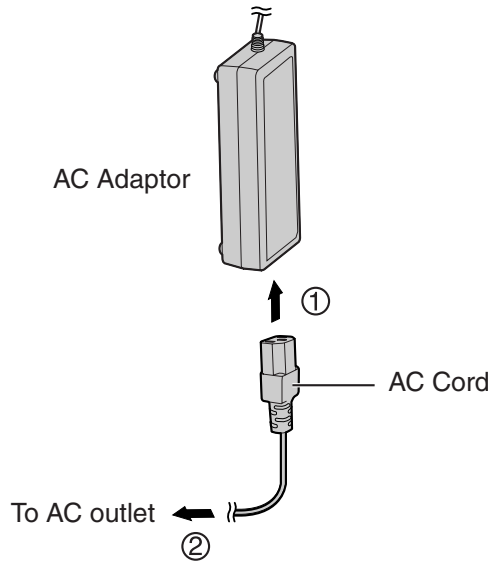
4. Turn on the power switch. The RUN indicator will flash.

Power Switch
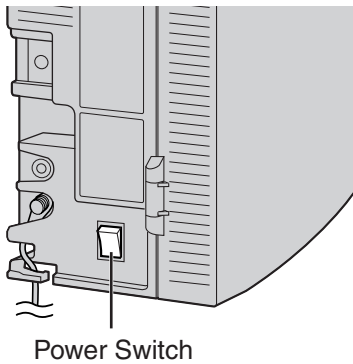
<u>Notes</u>

- For safety reasons, follow the procedures as indicated when turning on the Hybrid IP-PBX.
- For safety reasons, do not stretch, bend, or pinch the AC cord and the DC cable of the AC adaptor.

5. While the RUN indicator is flashing, return the System Initialize Switch to the "NORMAL" position. Depending on the configuration, initialization takes about 1 min to 3 min. If successfully executed, the RUN indicator will stop flashing and be kept lit.

All data will be cleared, and the Hybrid IP-PBX as well as all optional service cards (except for the IP-GW4 card) will be initialized to the default values. The DPTs should show the time as 01:00.
The data of the IP-GW4 card will not be initialized.

<u>Note</u>

Use the same types of AC adaptor and AC cord that are supplied with the Hybrid IP-PBX only.

LED Indications

Indication	Color	Description
RUN	Green	PBX status indication • OFF: Power off (includes normal reset) • ON: Power on and running (on-line) • Flashing (60 times per minute): Starting up • Flashing (120 times per minute): Starting up or resetting with: • the System Initialize Switch in "SYSTEM INITIALIZE" position • the SD Memory Card not inserted
ALARM	Red	Alarm detection status indication • OFF: Normal • ON: Alarm (CPU stop, alarm for each card) • Flashing: Alarm (MPR file error in restarting)

Confirming the CO Line Connection

After initialization, program the Hybrid IP-PBX and establish CO line connection, and then use a PT to confirm it.

To confirm, dial [✳] [3] [7] + CO line number (3 digits) or press an S-CO button. You will hear a dial tone if CO line is available and connected.

Turning off the Hybrid IP-PBX

For safety reasons, make sure to turn off the power switch before unplugging the Hybrid IP-PBX. To unplug, follow the reverse steps to plug it in.

Section 3

Guide for the Hybrid IP-PBX PC Programming Software

This section explains the installation and structure of the Hybrid IP-PBX PC Programming Software.

3.1 Overview

3.1.1 Overview

KX-TDA50 Maintenance Console is designed to serve as an overall system programming reference for the Hybrid IP-PBX. To program and administer the Hybrid IP-PBX by PC, you need to install the KX-TDA50 Maintenance Console onto the PC.
This manual describes overview and installation of the KX-TDA50 Maintenance Console only.

KX-TDA50 Maintenance Console[1]

Menu Bar

Program Menu

---
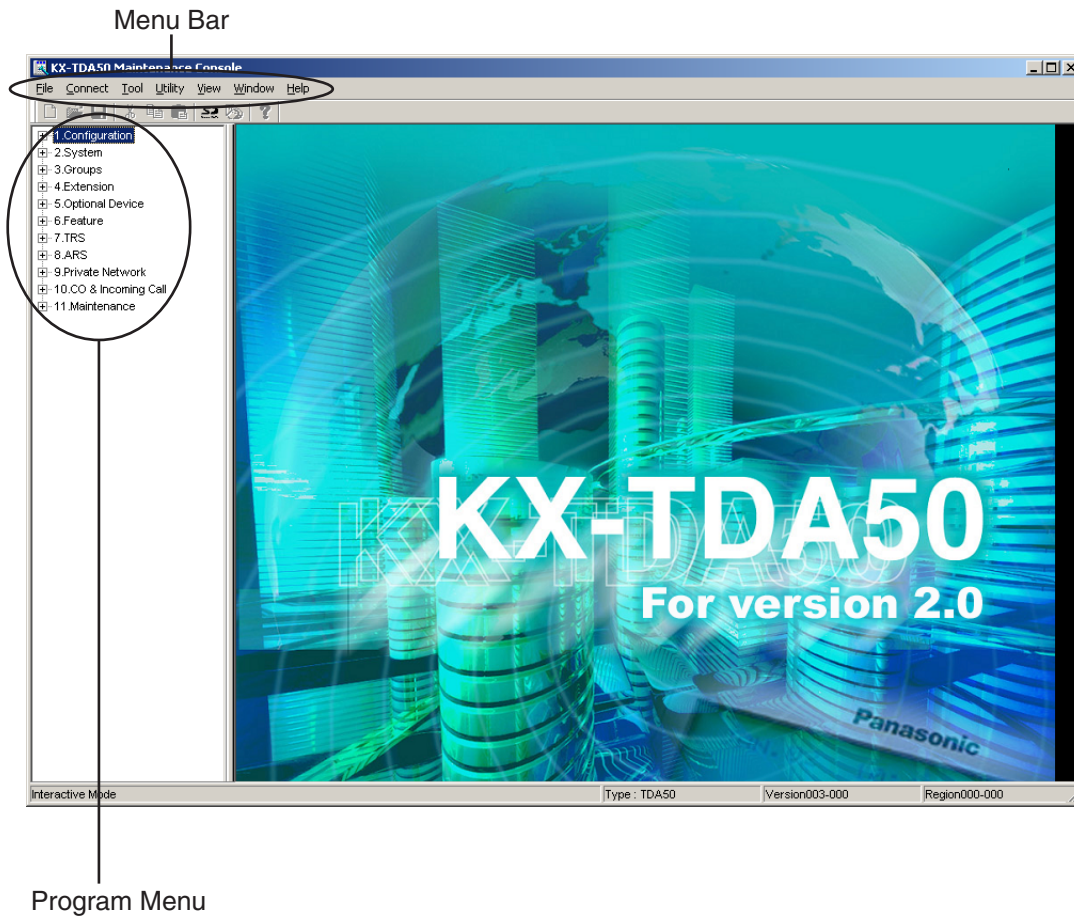
[1]   The contents and design of the software are subject to change without notice.

3.2   Connection

3.2.1   Connection

Serial Interface Connection
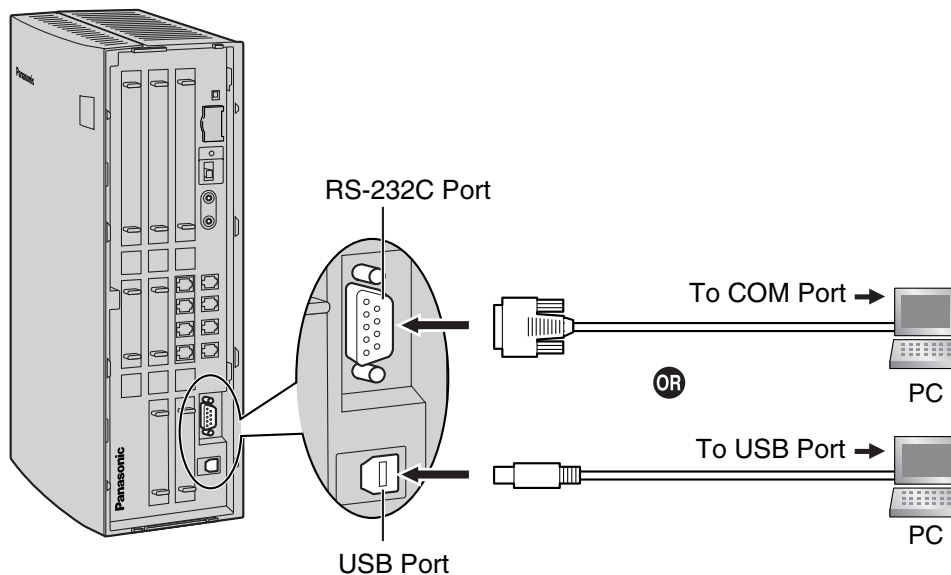
Note

    For pin assignments and maximum cabling distance, refer to "2.9.1 Connection of Peripherals".

External Modem Connection
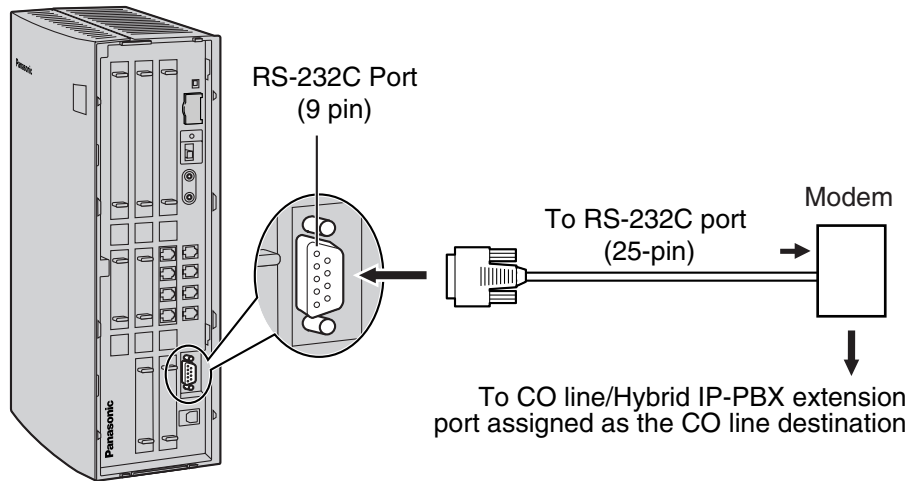
Hybrid IP-PBX

Signal Name	Pin No.
RD (RXD)	2
SD (TXD)	3
ER (DTR)	4
DR (DSR)	6

External Modem

Pin No.	Signal Name
2	SD (TXD)
3	RD (RXD)
6	DR (DSR)
20	ER (DTR)

After connecting the Hybrid IP-PBX and the external modem, set the power switch of the external modem to "ON", then the external modem will be initialized with the default values.

The following AT command settings may be required for the modem:

- The Data Terminal Ready (DTR) signal should be ignored.
- The Data Terminal Equipment (DTE)/Modem flow control should be turned off.
- The data compression should be disabled.
- Error Correction is not necessary.

Notes

- Use an RS-232C straight cable for connection between the Hybrid IP-PBX and external modem.
- An AT command (for initialization, enabling automatic answer, etc.) can only be programmed by KX-TDA50 Maintenance Console. "AT&F0Q0E0V1S0=1X0&D0" is stored as the default value.
- For more information about the AT command, refer to the external modem's instructions.

3.3 Installation of the Hybrid IP-PBX PC Programming Software

3.3.1 Installing and Starting the KX-TDA50 Maintenance Console

System Requirements

Operating System

- Microsoft® Windows® 98 SE, Windows Me, Windows 2000, or Windows XP

Hardware

- CPU: Intel® Pentium® 133 MHz or better microprocessor
- RAM: at least 64 megabytes (MB) of free RAM (128 MB recommended)
- HDD: at least 100 MB of hard disc space

Password Security

Warning to the Administrator or Installer regarding the system password

1. Please provide all system passwords to the customer.

2. To avoid unauthorized access and possible abuse of the PBX, keep the passwords secret, and inform the customer of the importance of the passwords, and the possible dangers if they become known to others.

3. The PBX has default passwords preset. For security, change these passwords the first time that you program the PBX.

4. Change the passwords periodically.

5. It is strongly recommended that passwords of 10 numbers or characters be used for maximum protection against unauthorized access. For a list of numbers and characters that can be used in system passwords, refer to "3.1.3 Entering Characters" in the Feature Guide.

6. If a system password is forgotten, it can be found by loading a backup of the system data into a PC, and checking the password using the KX-TDA50 Maintenance Console software. If you do not have a backup of the system data, you must reset the PBX to its factory defaults and reprogram it. Therefore, we strongly recommend maintaining a backup of the system data. For more information on how to back up the system data, refer to the on-line help of the Maintenance Console. However, as system passwords can be extracted from backup copies of the system data file, do not allow unauthorized access to these files.

Installing the KX-TDA50 Maintenance Console

Notes

- Make sure to install and use the KX-TDA50 Maintenance Console for MPR version 2.0.
- To install or uninstall the software into Windows 2000 Professional or Windows XP Professional, the user must be grouped either of "Administrators" or "Power Users".
- When the Hybrid IP-PBX is first connected to the PC via USB, a wizard should appear and ask you to select the appropriate USB driver. Browse for and select the KX-TDA USB driver, which is copied to the local drive during installation.

1. Copy the KX-TDA50 Maintenance Console setup file to a local drive on the PC. (Its icon is shown here, on the left.)
2. Double-click the setup file to run the installer.
3. Follow the on-screen instructions provided by the installation wizard.

Starting the KX-TDA50 Maintenance Console and Assigning the Basic Items (Quick Setup)

When you start the KX-TDA50 Maintenance Console with the Installer Level Programmer Code and connect to the Hybrid IP-PBX for the first time after initialization (with the factory default setting), Quick Setup will launch automatically. During Quick Setup, you will setup the following basic items:

- Date and Time of the Hybrid IP-PBX. The date and time set on the PC will be used.
- System Password for installer for PC programming.
- Operator extension numbers. Operator extensions for all time modes (day/lunch/break/night) can be assigned.
- Flexible Numbering type to pattern 1 or pattern 2. If pattern 1 (with ✳) is selected, "✳" must prefix all feature numbers (except access numbers) when an extension user wants to use a feature.
- Operator call and Idle Line Access/ARS numbers (0 or 9). The feature numbers for operator call and Idle Line Access/ARS can be selected.
- Remote Maintenance Dial Number. Enter the complete telephone number of the Hybrid IP-PBX (including the country code). When necessary, this number will be used to access the Hybrid IP-PBX from a remote location for maintenance purposes.

1. Connect the PC to the Hybrid IP-PBX with a USB cable.

2. Start the "**KX-TDA50 Maintenance Console**" from the Start menu.
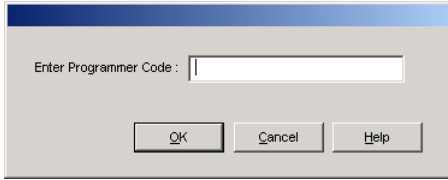
3. Type the Installer Level Programmer Code (**INSTALLER**), then click [OK].

The Programmer Code authorizes different programming levels, and the Quick Setup is only available when you start the KX-TDA50 Maintenance Console with the Installer Level Programmer Code.

Note

There are 2 other Programmer Codes with limited authorization: Administrator Level (**ADMIN**), and User Level (**USER**).

4. Click "**Connect**" → "**USB**" from the menu bar.
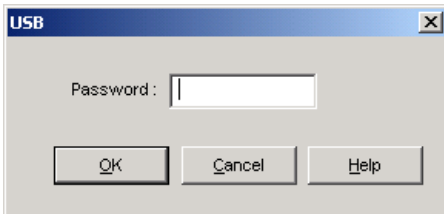
5. Type the system password for installer (default: **1234**), then click [OK] to log-in.
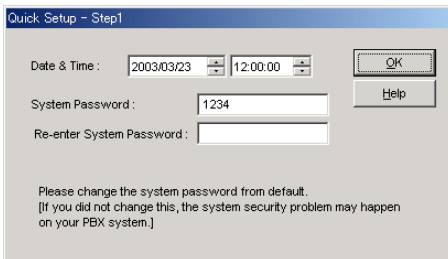
6. Follow the instructions of the wizard and assign the basic items (Quick Setup).
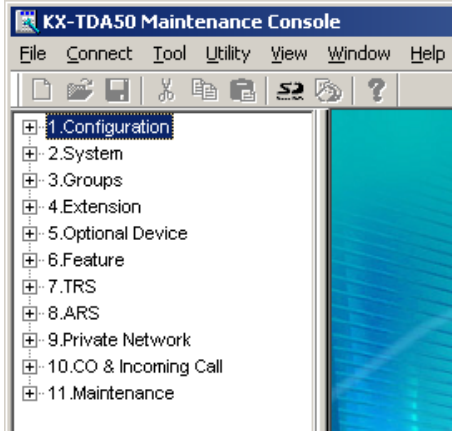
7. The program menu appears. You may now begin programming the Hybrid IP-PBX.

Notes

- During long programming sessions, it is highly recommended that you periodically save the system data to the SD Memory Card. If the Hybrid IP-PBX suffers a sudden power failure or if the system is reset for some reason and all system data is lost, it can be restored from the SD Memory Card. To save the system data to the SD Memory Card, either click the "**SD Memory Backup**" icon, or exit KX-TDA50 Maintenance Console and click "Yes" to save when prompted.
- When programming Hybrid IP-PBX data which can be displayed on a proprietary telephone (PT) (extension names, group names, System Speed Dialing names, etc.), it is possible to enter characters which cannot be displayed on a KX-T7600 series PT.
  Characters which can be displayed on a KX-T7600 series PT are shown below in the white cells.

	00	01	02	03	04	05	06	07	08	09	0a	0b	0c	0d	0e	0f
00																
10																
20		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	€		‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ		Ž	
90		'	'	"	"	•	–	—	~	™	š	›	œ		ž	Ÿ
a0		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯
b0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
c0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
d0	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
e0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
f0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

- The PC will not perform any shutdown operation, or enter the power-saving system standby mode while the KX-TDA50 Maintenance Console is connected to the Hybrid IP-PBX. To perform either of the operations above, first close the connection to the Hybrid IP-PBX.

CAUTION

Do not remove the SD Memory Card while power is supplied to the Hybrid IP-PBX. Doing so may cause the Hybrid IP-PBX to fail to start when you try to restart the system.

Section 4

Troubleshooting

This section provides information on the Hybrid IP-PBX and telephone troubleshooting.

4.1 Troubleshooting
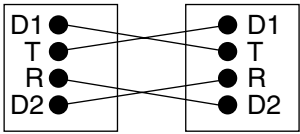
4.1.1 Installation

PROBLEM	PROBABLE CAUSE	SOLUTION
Extension does not operate.	Bad extension card.	• Exchange the card for a known working one.
	Bad connection between the Hybrid IP-PBX and telephone.	• Take the telephone and plug it into the same extension port using a short telephone cord. If the telephone works, then the connection between the Hybrid IP-PBX and the telephone must be repaired.
	A telephone with an A-A1 relay is connected.	• Use a 2-wire cord. • Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position.
	Bad telephone.	• Take the telephone and plug it into another extension port that is working. If the telephone does not work, replace the telephone.
	The number of terminal equipment exceeds the capacity of the Hybrid IP-PBX with the supplied AC adaptor only.	• Connect an additional AC adaptor.
The Hybrid IP-PBX does not operate properly.		• Press the Reset Button (refer to "4.1.4 Using the Reset Button"). • Turn off the power switch, and then turn it back on. • Turn off the power switch, and then unplug the Hybrid IP-PBX. After 5 minutes, plug the Hybrid IP-PBX back in and turn the power switch back on.
Noise on external paging.	Induced noise on the wire between the Hybrid IP-PBX and the amplifier.	• Use a shielded cable as the connection wire between the Hybrid IP-PBX and amplifier. A short shielded cable is recommended.
Distorted external music.	Excessive input level from external music source.	• Decrease the output level of the external music source by using the volume control on the music source.
Alternate Calling—Ring/Voice and Live Call Screening (LCS) do not function as set when using a Wireless Phone (KX-T7880/KX-T7885/KX-TD7894/KX-TD7895).	Voice-calling mode and Hands-free mode with LCS are not available with Wireless Phones.	• Switch the calling mode to ring-calling. • Set the LCS mode to "Private".
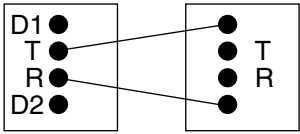
PROBLEM	PROBABLE CAUSE	SOLUTION
The ALARM indicator on the front of the cabinet turns on red.	A major system error occurs in the Hybrid IP-PBX.	• See the error log using the KX-TDA50 Maintenance Console (refer to "4.1.5 Troubleshooting by Error Log").

4.1.2   Connection
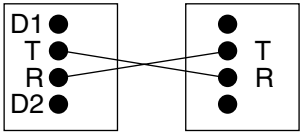
Connection between the Hybrid IP-PBX and a PT:

Can you dial an extension? — No →

CAUSE	SOLUTION
The T/R is connected to the D1/D2. D1 ● ─╳─ ● D1 T ● ─ ● T R ● ─ ● R D2 ● ─╳─ ● D2 Hybrid IP-PBX Extension	Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for D1/D2).

Connection between the Hybrid IP-PBX and an SLT:

CAUSE	SOLUTION
The T/R is connected to the D1/D2. D1 ● T ● ─ ● T R ● ─ ● R D2 ● Hybrid IP-PBX Extension	Use the correct cord (the inner 2 wires are for T/R). • If a telephone equipped with an A-A1 relay is connected to the Hybrid IP-PBX, set the A-A1 relay switch of the telephone to "OFF".

Connection between the Hybrid IP-PBX and an SLT that is polarity-sensitive:

CAUSE	SOLUTION
The "T" is connected to the "R". D1 ● T ● ─╳─ ● T R ● ─╳─ ● R D2 ● Hybrid IP-PBX Extension	Reverse the connections of the T/R.
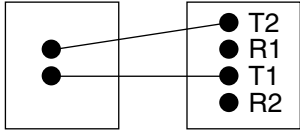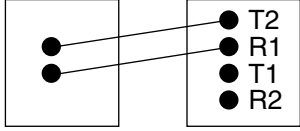
Yes

(Continued on the next page.)

Connection between the central office and the Hybrid IP-PBX:

(Continued from the previous page.)

↓

Can you dial out on a CO line? → **No** →
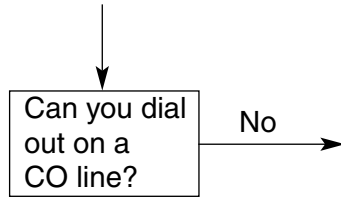
CAUSE	SOLUTION
CO line is connected to the T2/T1. CO line Hybrid IP-PBX CO line is connected to the T2/R1. CO line Hybrid IP-PBX	Reconnect the CO line to the T1/R1 or T2/R2 of the telephone jack using 2-conductor wiring.

4.1.3   Operation

PROBLEM	PROBABLE CAUSE	SOLUTION
• When using the speakerphone on an APT, nothing is audible. • When using the speakerphone/monitor mode with a DPT, nothing is audible.	• The HANDSET/HEADSET selector is set to the "HEADSET" position. • The "HEADSET" mode is selected by Personal Programming, "Handset/Headset Selection".	• When the headset is not used, set the HANDSET/HEADSET selector to the "HANDSET" position. • When the headset is not used, select the "HANDSET" mode by Personal Programming.
• The PT does not ring.	• The ringer volume is off.	• Turn on the ringer volume.
• During a power failure, extensions connected to ports 1 and 2 of super hybrid ports do not operate.	• A DPT or APT is connected to the extension port. • The dialing mode (tone or pulse) is incorrect.	• Disconnect the DPT or APT and connect an SLT. • Set the Tone/Pulse switch to the other position.
• Originating an outside call, call transfer, or conference cannot be performed.	• The corresponding CO button does not exist on the PT.	• Program the CO button. Refer to "1.18.2 Flexible Buttons" in the Feature Guide.
• Cannot register the PS.	• Wrong Personal Identification Number (PIN) is registered to the PS. • CS is not connected properly.	• Register the PIN set to the Hybrid IP-PBX into the PS. • Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits. • Switch all DIP switches off.
• PS becomes out of range. • Cannot make calls using the PS.	• CS is not working. • Location of CS is not good. • Access system of the PS is not properly set.	• Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits. • Switch all DIP switches off. • Locate the CS properly (refer to "2.7.5 Site Survey"). • Change the access system setting of the PS to the appropriate system or automatic.

PROBLEM	PROBABLE CAUSE	SOLUTION
• Noise is frequent while using the PS. • Conversations disconnect while using the PS.	• Call handover is not working while using the PS. • PS is out of CS coverage area.	• Locate the CS properly (refer to "2.7.5 Site Survey").
• PS stays out of service when the CS status is changed from Out of Service to In Service.	• It may take about 10 s for CS to start up after the status has been changed to In Service.	• Wait until the CS starts up.

4.1.4 Using the Reset Button

If the Hybrid IP-PBX does not operate properly, use the Reset Button. Before using the Reset Button, try the system feature again to confirm whether there definitely is a problem or not.

CAUTION

In order to avoid possible corruption of data on the SD Memory Card, please ensure that the "SD ACCESS" LED is off before pressing the Reset Button.

Notes

- When the System Initialize Switch is set to the "NORMAL" position, pressing the Reset Button causes the following:
  – Camp-on is cleared.
  – Calls on hold are terminated.
  – Calls on exclusive hold are terminated.
  – Calls in progress are terminated.
  – Call park is cleared.

  Other data stored in memory, except the above, are not cleared.

- Be aware that pressing the Reset Button with the System Initialize Switch in the "SYSTEM INITIALIZE" position clears all data stored in the Hybrid IP-PBX. Do not perform this operation unless you intend to delete all data from the Hybrid IP-PBX.

Operation

If the Hybrid IP-PBX does not operate properly:

1. Set the System Initialize Switch to the "NORMAL" position.
2. Press the Reset Button.
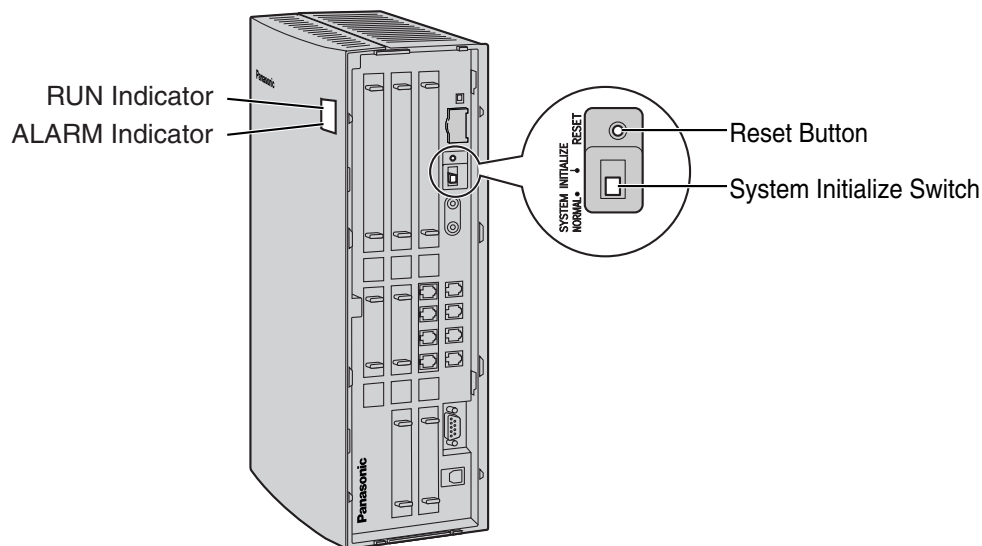
4.1.5 Troubleshooting by Error Log

When a major system error occurs in the Hybrid IP-PBX, the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.

Error Log Display Format

Below is the display format of the error log. To see the error log using the KX-TDA50 Maintenance Console, refer to the on-line help of the KX-TDA50 Maintenance Console.

Example: KX-TDA50 Maintenance Console
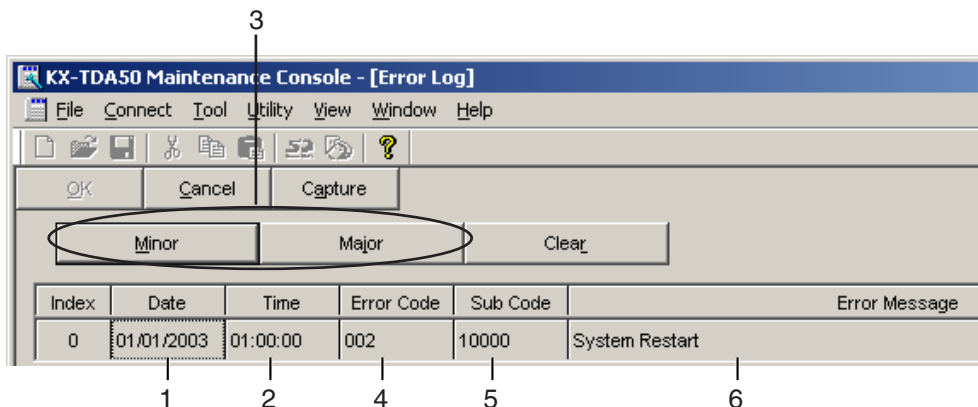
Example: Station Message Detail Recording (SMDR)

```
04/01/01 10:37AM  MJ  ALM #000 10000  MPR WDT overflow
04/01/01 11:07AM  MN ALM #010 10000  AC power down
04/01/01 03:55PM  MN ALM #392 10401  Clock master card selected
```

Description

	Item	Description
1	Date	Date of the error detection
2	Time	Time of the error detection
3	Level	Major Alarm (MJ ALM): Errors that affect the whole system operation, or result in system failure Minor Alarm (MN ALM): Errors that affect certain part of system operation
4	Error Code	Three-digit error code

	Item	Description

5	Sub Code	Five-digit sub code (1XXYY)
		
		1: Cabinet number
		
		XX: Slot number
		
		    00 to 11 (00: MPR; 01: Super Hybrid Ports; 02 to 11: Slots for optional service cards)
		
		YY: Physical port number (01 to 16)
		
		    For optional service cards that are installed in Slots 08 to 11, sub slot number + port number will be displayed.
		
		    Sub slot 1: 11 to 14
		
		Note
		
		    When there is no parameter for slot and physical port number, XX and YY will be displayed as "00".
		    Example: Sub code for MPR = 10000

6	Error Message	Error description

List of Errors and Solutions

The tables below list the errors and their solutions.

When an error whose error code is indicated with "*" occurs in the Hybrid IP-PBX, the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.

When the error conditions indicated by the error codes "021", "091", "092", and "510" are recovered, the ALARM indicator will turn off automatically, indicating successful troubleshooting. When other errors are logged, the ALARM indicator will turn off only when the log for major or minor errors is cleared from the KX-TDA50 Maintenance Console.

In other words, the ALARM indicator will turn off under the following conditions:
- **When the errors "021", "091", "092", and "510" are logged:** when the error conditions are recovered
- **When other errors are logged:** when the log for major or minor errors is cleared from the KX-TDA50 Maintenance Console

Optional Service Card Initial Self Diagnosis

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
212	Echo canceller access error	• Optional service card malfunction: ECHO	• See if the corresponding optional service card is installed properly
216	MSG card DSP error	• Optional service card malfunction: MSG	• Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card
217	MSG card data error	• Optional service card malfunction: MSG • Erroneous recording of messages	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Re-record the messages • Replace the corresponding optional service card

System Start-up and On-line Operation

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
000*	MPR WDT overflow	• Main Board (MPR) malfunction	• Press the Reset Button • Reprogram the Hybrid IP-PBX
001	SDRAM bit error	• Erroneous processing of Main Board (MPR) software • Software error due to external factors	• Replace the Hybrid IP-PBX

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
002	System Reset	• Reset Button is pressed • Power failure • Main Board malfunction • Erroneous processing of Main Board software • Software error due to external factors	• Ignore if not frequent • Press the Reset Button • Reprogram the Hybrid IP-PBX • Replace the Hybrid IP-PBX
010	AC power down	• AC power down • Bad connection or breaking of AC cord	• Check the power supply system • See if the AC cord is connected properly • Check the AC cord • Replace the AC cord (be sure to turn off the Hybrid IP-PBX when replacing)
011	DC power down	• AC power down • Power supply circuit (Main Board) malfunction • Detection of over current (short circuit on optional service cards)	• Check the power supply system • See if the AC cord is connected properly • Check the AC cord • Replace the AC cord (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the Hybrid IP-PBX • Remove the optional service cards and restart the Hybrid IP-PBX
012*	MPR RAM battery low	• Battery out • Main Board (MPR) malfunction	• Replace the Hybrid IP-PBX
013	Additional AC power down	• Additional AC power down • Bad connection or breaking of additional AC cord	• Check the power supply system • See if the additional AC cord is connected properly • Check the additional AC cord • Replace the additional AC cord (be sure to turn off the Hybrid IP-PBX when replacing)
019	Additional AC power on	• Additional AC power on • Bad connection or breaking of additional AC cord	• Check the power supply system • See if the additional AC cord is connected properly • Check the additional AC cord • Replace the additional AC cord (be sure to turn off the Hybrid IP-PBX when replacing)

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
020*	SD file access error	• SD Memory Card malfunction • Bad connection of SD Memory Card • Main Board malfunction	• Press the Reset Button • Reprogram the Hybrid IP-PBX • Replace the SD Memory Card • Replace the Hybrid IP-PBX
021*	SD Memory Card disconnected	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • Main Board malfunction	
022	Not enough free space on SD card	• Not enough memory space available to save the system data, or to upload system files from the KX-TDA50 Maintenance Console	• Delete the files whose file names start with "$" from SD Memory Card **Note** Do not delete the "PSMPR" file; it is the program file of the Main Board (MPR).
023	System data file version error	• Old system files on SD Memory Card • Defective system files on SD Memory Card	• Restore the backup files • Re-install the software
024	System initialization file version error		
025	Card initialization file version error		
026	LCD file version error		
027	System data file checksum error		
028	System initialization file checksum error		
029	Card initialization file checksum error		
030	LCD file checksum error		

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
031*	System data file not found	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • Main Board malfunction	• Press the Reset Button • Reprogram the Hybrid IP-PBX • Replace the SD Memory Card • Replace the Hybrid IP-PBX
032*	System initialization file not found		
033*	Card initialization file not found		
034*	LCD file not found		
035	System data file access error		
036*	System initialization file access error		
037*	Card initialization file access error		
038*	LCD file access error		
039*	SD file access error		
041*	Expansion Memory Card Failure	• MEC card is not properly connected	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Replace the corresponding optional service card
090	Over Card Limitation	• Too many optional service cards installed	• Reduce the number of optional service cards
091*	PT connection over	• Too many PTs connected	• Reduce the number of PTs
092*	CS connection over	• Too many CSs connected	• Reduce the number of CSs
234	DPLL clock failure	• Optional service card malfunction: DLC, IP-GW • Main Board malfunction	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card • Replace the Hybrid IP-PBX
251	MSG DSP failure	• Optional service card malfunction: MSG	• See if the corresponding optional service card is installed properly • Replace the corresponding optional service card

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
305*	Data Link failure	• Data link between the CS and Hybrid IP-PBX failed • Data link between the network and IP-GW card failed	• Check the connection between the CS and Hybrid IP-PBX • Check the connection between the network and IP-GW card
307	LAN No Carrier	• IP-GW card not connected to the LAN	• Check the connection between the LAN and IP-GW card
308	IP-GW LAN Loop back Error	• Detection of IP-GW LAN Loop back Test error	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the Installation Manual for IP-GW card)
309	IP-GW Core Data Link Error	• Detection of IP-GW Core data Link error	• Press the Reset Button • Collect the log data of IP-GW (refer to the Installation Manual for IP-GW card)
310*	Port Link Failure	• Voice Processing System malfunction • Ports defective on optional service card: DLC	• Check the Voice Processing System • See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
320	IP-GW H.323 Dummy Call Test Error	• Detection of IP-GW H.323 Dummy Call Test error	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the Installation Manual for IP-GW card)
321	IP-GW Gatekeeper Error	• Detection of Gatekeeper access error	• Check the IP address setting of Gatekeeper • Check whether the Gatekeeper is connected to the network and work properly • Check the route to the Gatekeeper
322	IP-GW Gatekeeper Registration Error	• Gatekeeper Registration is failed	• Check the Gatekeeper setting
323	IP-GW SDRAM Failure	• Detection of IP-GW SDRAM error	• Replace the corresponding optional service card
324	IP-GW DPRAM Failure	• Detection of IP-GW DPRAM error	• Replace the corresponding optional service card
325	IP-GW LAN Chip Failure	• Detection of IP-GW LAN Chip failure	• Replace the corresponding optional service card • Collect the log data of IP-GW (refer to the Installation Manual for IP-GW card)
326	IP-GW Stop	• IP-GW is stopped from remote maintenance PC	• This information is logged when IP-GW is stopped from remote maintenance PC

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
370	IP-GW Rebooted by Maintenance Console	• IP-GW is rebooted from a remote maintenance PC	• This information is logged when IP-GW is rebooted from a remote maintenance PC
371	IP-GW Rebooted	• Optional service card malfunction: IP-GW	• Check whether the software version of the IP-GW card is correct • Replace the corresponding optional service card
372	NDSS message over IPGW notification - caused by IPGW Tx resource limitation	• Optional service card malfunction: IP-GW	• Ignore if not frequent • Change the IP-GW card status to Out of Service, and then back to In Service
373	NDSS message over IPGW notification - caused by IPGW Rx resource limitation		
374	NDSS message over IPGW notification - caused by shortage of IPGW resource		
375	NDSS message over IPGW notification - caused by Network side	• Network malfunction	• Ignore if not frequent • Consult your network administrator
391	Data Link established	• Connection with PC Phone/ PC Console or Voice Processing System (DPT Integration) established or restored	• This information is logged when connection with PC Phone/PC Console or Voice Processing System (DPT Integration) is established, and does not indicate an error condition that needs to be solved. However, if this is logged frequently (with "305 Data Link failure"), check the connection as it may not be done properly.
392	Clock master card selected	• Clock master card has been changed to the one indicated by the sub code	• Check if the proper card is selected as the new clock master card
393	LAN Carrier detected	• IP-GW card connected to the LAN	• This information is logged when synchronization of LAN is established
394	IP-GW Core Data Link established	• IP-GW Core Data Link established	• This information is logged when IP-GW Core Data Link is recovered

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
395	IP-GW Gatekeeper Error Cleared	• Connection to the Gatekeeper is recovered	• This information is logged when connection to the Gatekeeper is recovered
396	IP-GW Run	• IP-GW is started from remote maintenance PC	• This information is logged when IP-GW is started from remote maintenance PC
510*	SMDR disconnect	• RS-232C cable not connected • Breaking of RS-232C cable • Printer (terminal equipment) malfunction	• Check the RS-232C cable • Check the terminal equipment

Section 5

Appendix

5.1 Revision History

5.1.1 MPR Version 1.1

New Options

- System Components Table

    – KX-TDA5105   Memory Expansion Card (MEC)

Changed Contents

- 1.4.3 System Capacity

5.1.2   MPR Version 2.0

New Options

- System Components Table

    – KX-TDA5920   SD Memory Card for Software Upgrade to Enhanced Version

Changed Contents

- 1.4.3 System Capacity
- 2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

Index

Index

Install a
screen here.

Install a
screen here.

130 mm (5-1/8 in)

120 mm (4-3/4 in)

250 mm (9-13/16 in)

240 mm (9-7/16 in)

Reference for Wall Mounting

<u>Note</u>

Make sure to set the print size to correspond
with the size of this page. If the dimensions of
the paper output still deviate slightly from the
measurements indicated here, use the
measurements indicated here.

Install a screw here.

65 mm (2-9/16 in)

PSQX3100WA KK0104EK3055