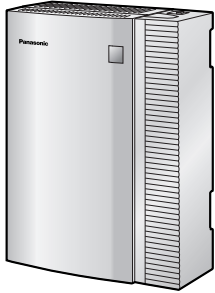


# Panasonic Telephone Systems

Panasonic KX-TDA50, KXTDA50, TDA50



www.voicesonic.com  
Phone: 877-289-2829



## 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: PSMPR Software File Version 4.0000 or later**



SD Logo is  
a trademark.

# System Components

System Components Table

| Category                       | Model No.  | Description  |
|--------------------------------|------------|--|
| <b>Main Unit</b>               | KX-TDA50   | Main Unit  |
| <b>CO Line Cards</b>           | 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)                     |
| <b>Extension Cards</b>         | 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)                 |
|                                | KX-TDA5470 | 4-Channel VoIP Extension Card (IP-EXT4)                  |
| <b>Other Cards</b>             | 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-TDA5192 | 2-Channel Simplified Voice Message Card (SVM2)           |
|                                | KX-TDA5196 | Remote Card (RMT)  |
| <b>Optional SD Memory Card</b> | KX-TDA5920 | SD Memory Card for Software Upgrade to Enhanced Version  |
| <b>Cell Station (CS)</b>       | KX-T0141   | 2-Channel Cell Station Unit for 2.4 GHz Portable Station |
| <b>Proprietary Equipment</b>   | KX-A236    | Additional AC Adaptor                                    |
|                                | KX-T30865  | Doorphone  |

## Compatible Panasonic Proprietary Telephones

The Hybrid IP-PBX supports the following telephones:

- Digital proprietary telephones (e.g., KX-T7600 series)
- Analog proprietary telephones (e.g., KX-T7700 series)
- IP proprietary telephones (e.g., KX-NT136)
- Portable stations (e.g., KX-TD7690)
- DSS consoles (e.g., KX-T7640)

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## Incompatible Panasonic Proprietary Telephones

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

### Notes

- For the equipment (e.g., Add-on Key Module, USB Module, Headset\*<sup>1</sup>) 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".

### List of Abbreviations

- APT → Analog proprietary telephone
- DPT → Digital proprietary telephone
- IP-PT → IP proprietary telephone
- PS → Portable station
- PT → Proprietary telephone
- SLT → Single line telephone

## Important Notice

Prior to connection of this product, please verify that the intended operating environment is supported. Satisfactory performance cannot be guaranteed for the following:

- interoperability and compatibility with all devices and systems connected to this product
- proper operation and compatibility with services provided by telecommunications companies over connected networks

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<sup>1</sup> The KX-T7090 headset can be connected to the KX-T7000, KX-T7200, KX-T7300, KX-T7400 series telephones.

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# 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.

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## **SAVE THESE INSTRUCTIONS**

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## ***Precaution***

### **WARNING**

**DO NOT REMOVE  
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 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 Service Center.
  - 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 SERVICE CENTER.**
- **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.**
- **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.**
- **THE SD MEMORY CARD POSES A CHOKING HAZARD. KEEP THE SD MEMORY CARD OUT OF REACH OF CHILDREN.**

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## 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 Hybrid IP-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 Hybrid IP-PBX has default passwords preset. For security, change these passwords the first time that you program the Hybrid IP-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 "1.1.2 Entering Characters" in the PC Programming Manual.
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 Hybrid IP-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 "2.4.1 Tool—SD memory backup" in the PC Programming Manual.

However, as system passwords can be extracted from backup copies of the system data file, do not allow unauthorized access to these files.

### **Notice for users in California**

**This product contains a CR coin cell lithium battery that contains perchlorate material—special handling may apply. See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)**



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**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 Service Centers for this product are listed in the service center 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  | _____<br>_____<br>_____<br>_____ |
| DEALER'S TEL. NO. | _____                            |

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# 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 Manual

Describes all basic, optional and programmable features of the Hybrid IP-PBX.

### PC Programming Manual

Provides step-by-step instructions for performing system programming using a PC.

### PT Programming Manual

Provides step-by-step instructions for performing system programming using a PT.

### Operating Manual

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

## About the software version of your Hybrid IP-PBX

The contents of this manual apply to Hybrid IP-PBXs with a certain software version, as indicated on the cover of this manual. To confirm the software version of your Hybrid IP-PBX, see "How do I confirm the software version of the PBX or installed cards?" in the FAQ of the PC Programming Manual, or "[190] Main Processing (MPR) Software Version Reference" in the PT Programming Manual.

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- All other trademarks identified herein are the property of their respective owners.
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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 following format:

- US:AAAEQ##TXXXX

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. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the following format:

- US:AAAEQ##TXXXX

The digits represented by ## 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 Service Center 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.

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## 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.

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# **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. It can also be connected to one Hybrid IP-PBX in a network to provide voice mail services for extensions at all Hybrid IP-PBXs. 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.

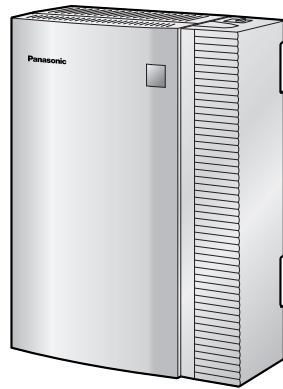
## Simplified Voice Message (SVM) Features

By just installing an optional voice message card in the Hybrid IP-PBX, simple answering machine services can be provided.

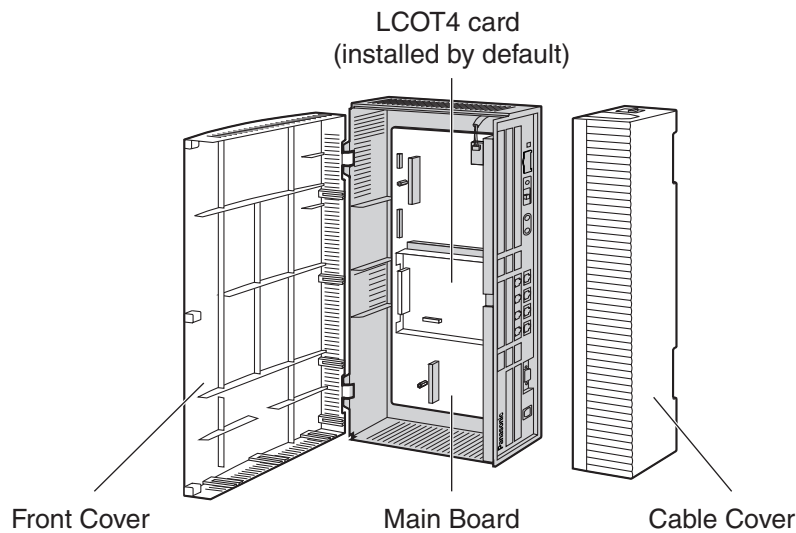
# 1.2 Basic System Construction

## 1.2.1 Main Unit

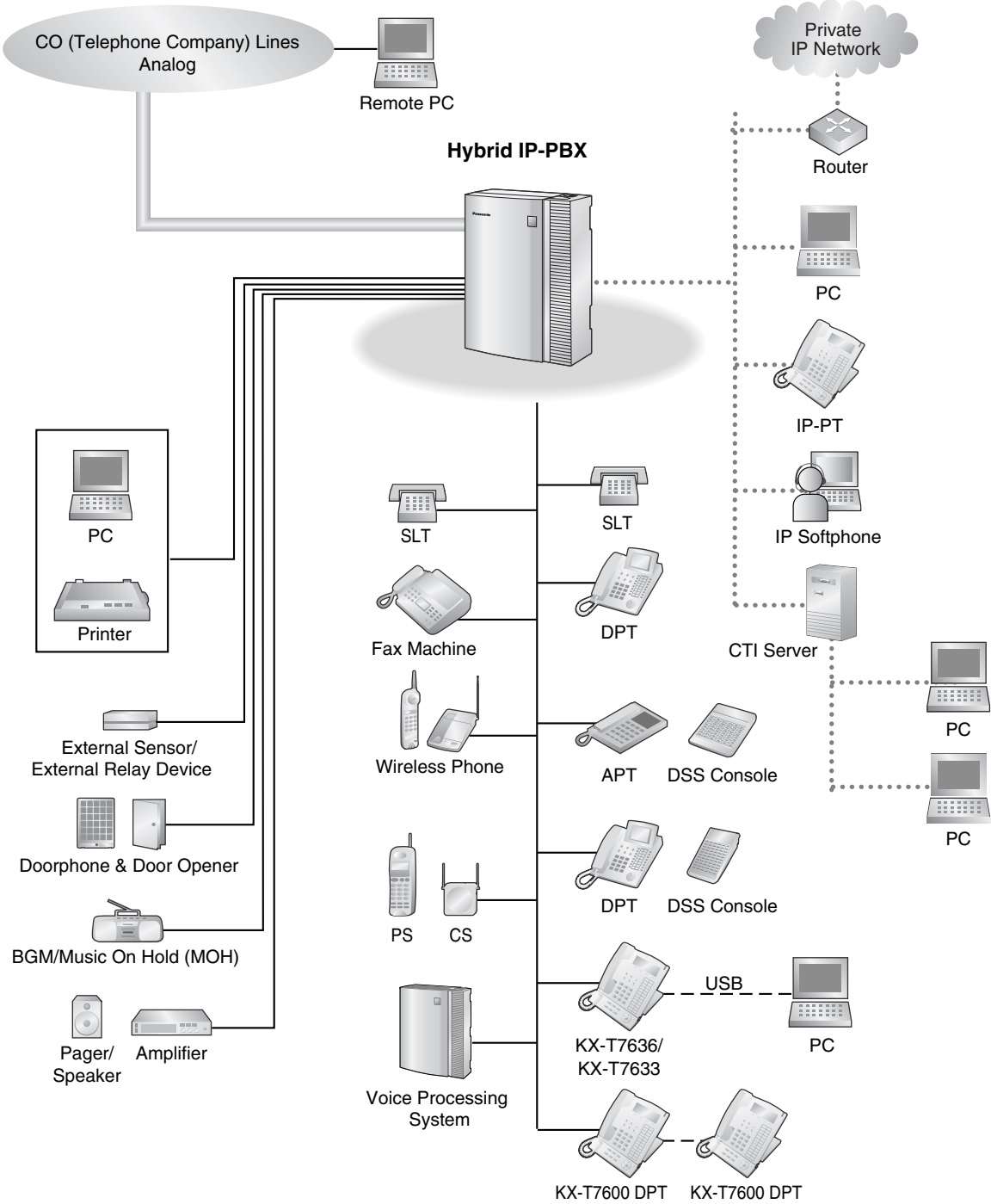
The main unit is equipped with 4 analog CO line ports (one LCOT4 card) and 4 extension ports (Super Hybrid Ports). For system expansion, optional service cards can be installed, and an additional AC adaptor can also be connected.



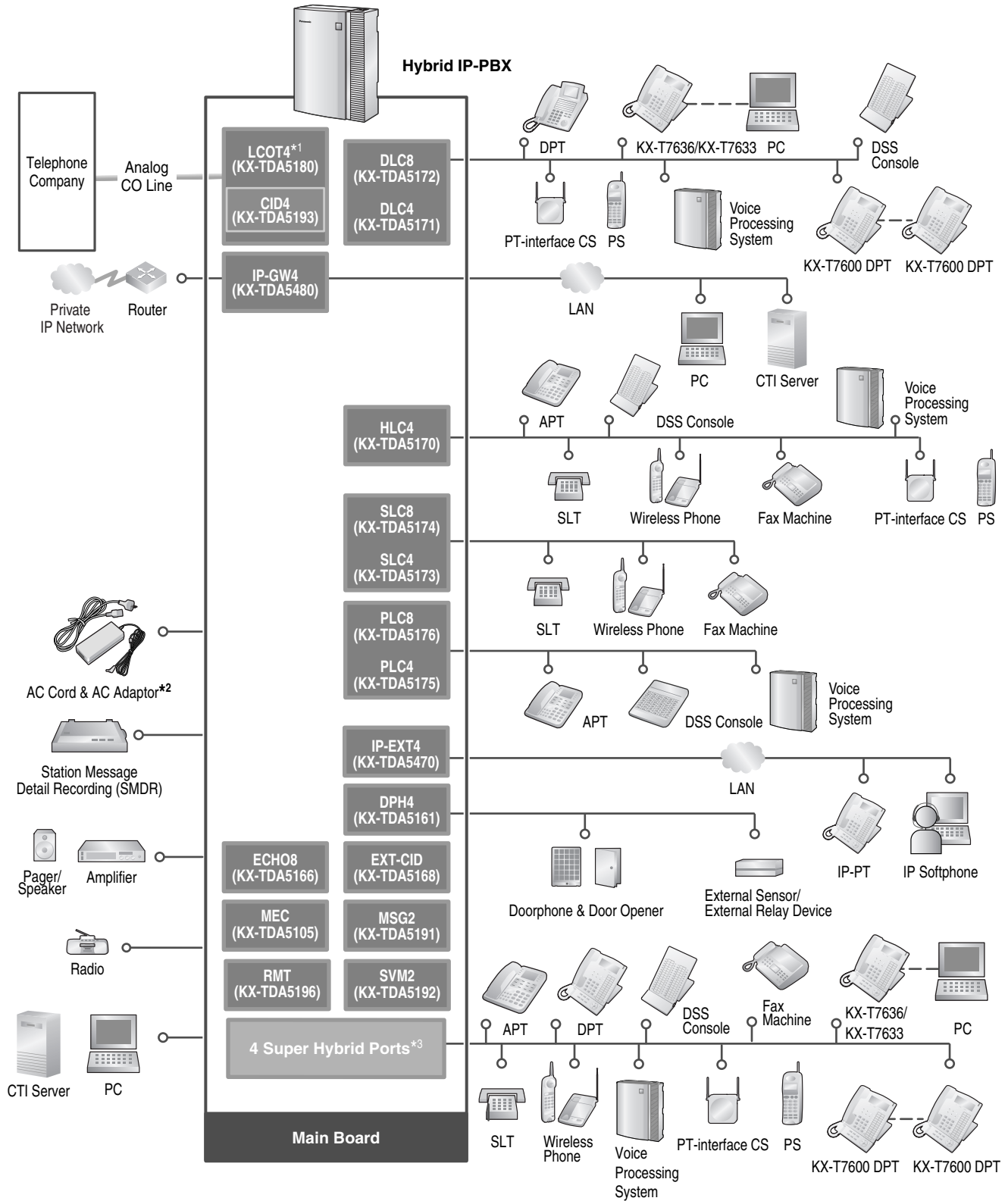
### Construction of Main Unit



# 1.2.2 System Connection Diagram



## 1.2 Basic System Construction



\*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 Optional Equipment

### 1.3.1 Optional Equipment

| Model No.  | Model Name   | Description   | Maximum Quantity |
|------------|--|---|------------------|
| KX-TDA5105 | Memory Expansion Card (MEC)                        | Memory expansion card to increase system data 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 <sup>2</sup>   |
| KX-TDA5191 | 2-Channel Message Card (MSG2)                      | 2-channel message card.   | 2                |
| KX-TDA5192 | 2-Channel Simplified Voice Message Card (SVM2)     | 2-channel simplified voice message card for Simplified Voice Message feature.   | 2                |

### 1.3 Optional Equipment

| Model No.  | Model Name  | Description   | Maximum Quantity |
|------------|---|---|------------------|
| 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                |
| KX-TDA5196 | Remote Card (RMT)                                       | Analog modem card for remote communication with the Hybrid IP-PBX. ITU-T V.90 support.  | 1                |
| KX-TDA5470 | 4-Channel VoIP Extension Card (IP-EXT4)                 | 4-channel VoIP extension card. Compliant with Panasonic proprietary protocol, and ITU-T G.729a and G.711 CODEC methods.   | 1                |
| KX-TDA5480 | 4-Channel VoIP Gateway Card (IP-GW4)                    | 4-channel VoIP gateway card. This card also enables CTI communication and system programming via a LAN. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a, G.723.1, and G.711 CODEC methods. CSTA Phase 3 protocol compatible. | 1                |
| KX-TDA5920 | SD Memory Card for Software Upgrade to Enhanced Version | Optional SD Memory Card to use enhanced features. For more details, refer to the SD Memory Card Installation/Upgrade Guide.   | 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

|  |  |   |
|--|--|---|
| <b>Switching</b>                       |  | Non-blocking  |
| <b>AC Adaptor</b>                      | <b>AC Input</b>                            | <ul style="list-style-type: none"> <li>Panasonic PSLP1244: 100 V AC to 240 V AC; 1.5 A; 50 Hz/60 Hz</li> <li>Panasonic PSLP1434: 110 V AC to 240 V AC; 1.35 A; 50 Hz/60 Hz</li> </ul> |
|  | <b>DC Output</b>                           | 40 V; 1.38 A (55.2 W)   |
| <b>DC Input</b>                        |  | <ul style="list-style-type: none"> <li>DC IN 1: 40 V; 1.38 A (55.2 W)</li> <li>DC IN 2: 40 V; 1.38 A (55.2 W)</li> </ul>  |
| <b>Maximum Power Failure Tolerance</b> |  | 300 ms  |
| <b>Memory Backup Duration</b>          |  | 7 years   |
| <b>Dialing</b>                         | <b>CO Line</b>                             | Dial Pulse (DP) 10 pps, 20 pps<br>Tone (DTMF) Dialing   |
|  | <b>Extension</b>                           | Dial Pulse (DP) 10 pps, 20 pps<br>Tone (DTMF) Dialing   |
| <b>Connectors</b>                      | <b>CO Line</b>                             | RJ11 (2 wire) × each CO ports   |
|  | <b>Extension</b>                           | RJ11 (4 wire) × each extension ports  |
|  | <b>Paging Output</b>                       | 1 conductor jack  |
|  | <b>External MOH (Music on Hold) Output</b> | 1 conductor jack  |
| <b>Mode Conversion</b>                 |  | DP-DTMF, DTMF-DP  |
| <b>Ring Frequency</b>                  |  | 20 Hz/25 Hz (selectable)  |
| <b>Central Office Loop Limit</b>       |  | 1600 Ω maximum  |
| <b>Operating Environment</b>           | <b>Temperature</b>                         | 0 °C to 40 °C (32 °F to 104 °F)   |
|  | <b>Humidity</b>                            | 10 % to 90 % (non-condensing)   |
| <b>Conference Call CO Line</b>         |  | From 10 × 3-party conference call to 4 × 8-party conference call  |
| <b>Music on Hold</b>                   |  | 1 port (Level Control: -11 dB to +11 dB in 1 dB steps)<br>Selectable Tone/External Music Source port  |
| <b>Paging</b>                          | <b>Internal</b>                            | Level Control: -15 dB to +6 dB in 3 dB steps  |
|  | <b>External</b>                            | 1 port (Volume Control: -15 dB to +15 dB in 1 dB steps)   |
| <b>Serial Interface Port</b>           | <b>RS-232C</b>                             | 1 (maximum 115.2 kbps)  |
|  | <b>USB</b>                                 | 1   |

## 1.4 Specifications

---

|                                    |  |   |
|------------------------------------|--|---|
| <b>Extension Connection Cable</b>  | SLT  | 1-pair wire (T, R)                                    |
|                                    | DPT  | 1-pair wire (D1, D2) or<br>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)                                  |
| <b>Dimension</b>                   | 275 mm (W) × 376 mm (H) × 117 mm (D)<br>(10-4/5 in × 14-4/5 in × 4-3/5 in) |   |
| <b>Weight (when fully mounted)</b> | Under 3.5 kg (7.72 lb)   |   |

## 1.4.2 Characteristics

|   |  |
|---|--|
| <b>Terminal Equipment Loop Limit</b>                    | <ul style="list-style-type: none"> <li>• PT: KX-T7600 series DPT: 90 <math>\Omega</math>; all other DPTs/APTs: 40 <math>\Omega</math></li> <li>• SLT: 600 <math>\Omega</math> including set</li> <li>• Doorphone: 20 <math>\Omega</math></li> <li>• PT-interface CS: 65 <math>\Omega</math></li> </ul> |
| <b>Minimum Leakage Resistance</b>                       | 15 000 $\Omega$ minimum  |
| <b>Maximum Number of Extension Instruments per Line</b> | <ol style="list-style-type: none"> <li>1 for PT or SLT</li> <li>2 by Parallel or eXtra Device Port connection of a PT and an SLT</li> <li>3 by Digital eXtra Device Port connection of 2 DPTs and an SLT</li> </ol>  |
| <b>Ring Voltage</b>                                     | 75 Vrms at 20 Hz/25 Hz depending on the Ringing Load   |
| <b>Central Office Loop Limit</b>                        | 1600 $\Omega$ maximum  |
| <b>Hookswitch Flash Timing Range</b>                    | 24 ms to 2032 ms   |
| <b>Door Opener Current Limit</b>                        | 24 V DC/30 V AC, 1 A maximum   |
| <b>External Relay Current Limit</b>                     | 24 V DC/30 V AC, 1 A maximum   |
| <b>External Sensor Current Limit</b>                    | 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 (KX-TDA5161)". The Hybrid IP-PBX detects input from the sensor when the signal is under 100 $\Omega$ .                                   |
| <b>Paging Terminal Impedance</b>                        | 600 $\Omega$   |
| <b>MOH Terminal Impedance</b>                           | 10 000 $\Omega$  |

## 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. Depending on the type and total number of items of equipment to be connected, the MEC card may be required. To determine whether or not the MEC card is necessary, refer to "MEC Card Calculation".

| Terminal Equipment Type                         | Without Additional AC Adaptor | With Additional AC Adaptor |
|---|-------------------------------|----------------------------|
| SLT   | 24*1                          | 24*1                       |
| KX-T7600 series DPT/KX-T7600 series DSS console | Total 24                      | Total 48                   |
| KX-T7600 series DPT                             | 24                            | 48                         |
| KX-T7600 series DSS console                     | 4                             | 4                          |
| Other DPT/Other DSS console and APT             | Total 4                       | Total 24                   |
| Other DPT                                       | 4                             | 24                         |
| Other DSS console                               | 4                             | 4                          |
| APT   | 4                             | 24                         |
| IP-PT   | 4                             | 4                          |
| DSS console                                     | 4                             | 4                          |
| VPS   | 4 ports (1 VPS)*2             | 4 ports (1 VPS)*2          |
| SLT, PT, DSS console, and VPS                   | 28                            | 56                         |
| CS  | 4                             | 8                          |
| PS  | 28                            | 28                         |
| Doorphone                                       | 4                             | 4                          |
| Door Opener/External Relay                      | 4                             | 4                          |
| External Sensor                                 | 4                             | 4                          |

\*1 This number includes all ports of SLC cards, regardless of whether an SLT is connected or not.

\*2 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/KX-T7600 series DSS console | 1          |
|                                    | Other DPT/Other DSS console                     | 1          |
|                                    | APT   | 1          |
|                                    | IP-PT   | 1          |
| Pre-installed 4 Super Hybrid Ports |   | 4          |
| Extension Card* <sup>1</sup>       | SLC4  | 4          |
|                                    | SLC8  | 8          |
|                                    | HLC4  | 0          |
|                                    | PLC4  | 0          |
|                                    | PLC8  | 0          |
| CS (1 unit)                        |   | 0          |
| VPS (1 port)                       |   | 1          |

\*<sup>1</sup> 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 the 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 "2.2.11 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.

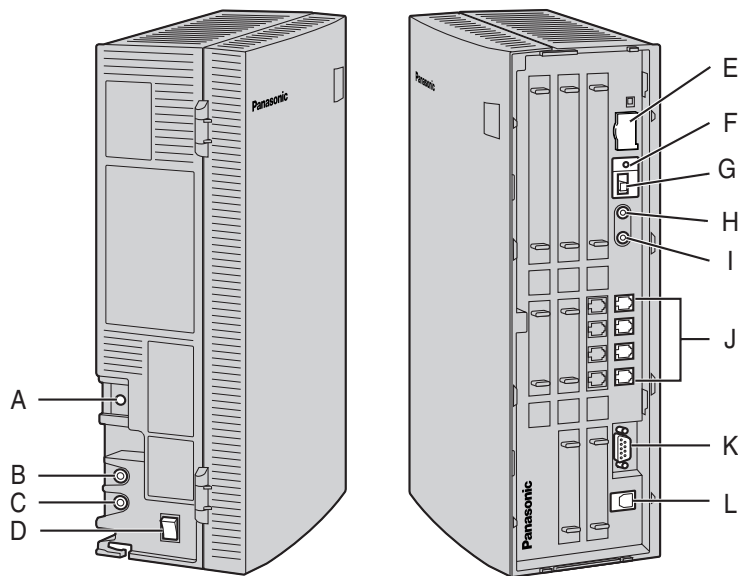
## 2.2 Installation of the Hybrid IP-PBX

### 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

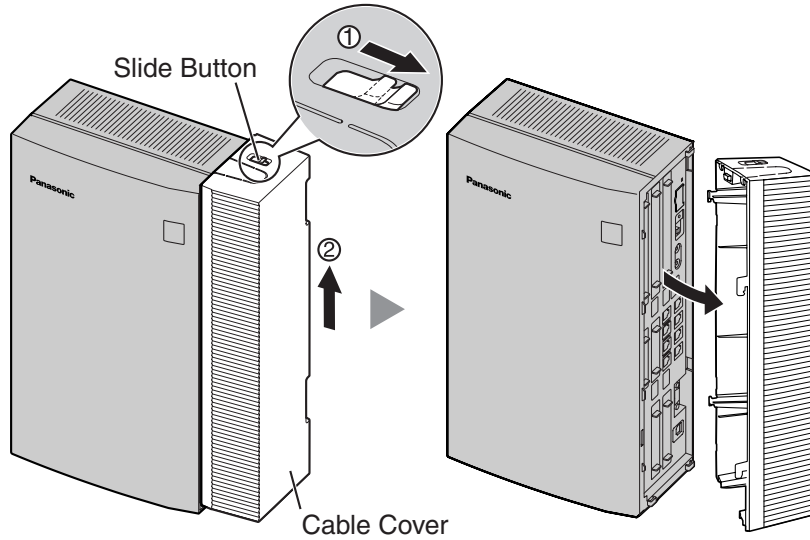


- A.** Ground Terminal
- B.** DC IN 2
- C.** DC IN 1
- D.** Power Switch
- E.** SD Memory Card Slot Cover
- F.** Reset Button
- G.** System Initialize Switch
- H.** MOH port
- I.** Pager port
- J.** Super Hybrid Ports
- K.** RS-232C port
- L.** USB port

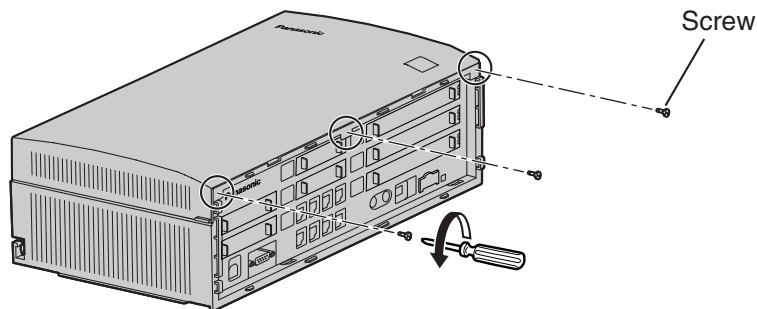
## 2.2.3 Opening/Closing the Covers

### Opening the Covers

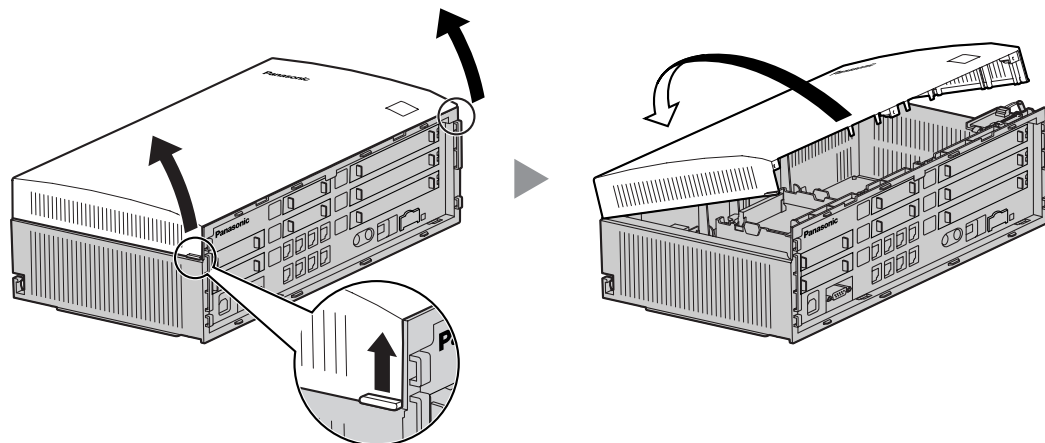
1. Pull the side button to the right and, holding it, slide the cable cover upwards. Then turn the cable cover slightly to remove it.



2. Remove the three screws.



3. Holding the protrusions on both sides of the front cover, swing the cover open.

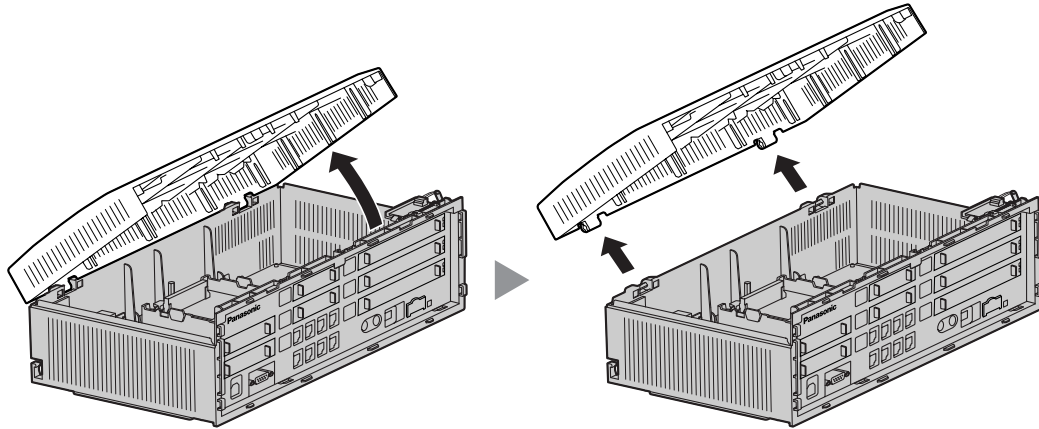


## Removing/Attaching the Front Cover

If you prefer, you can remove the front cover.

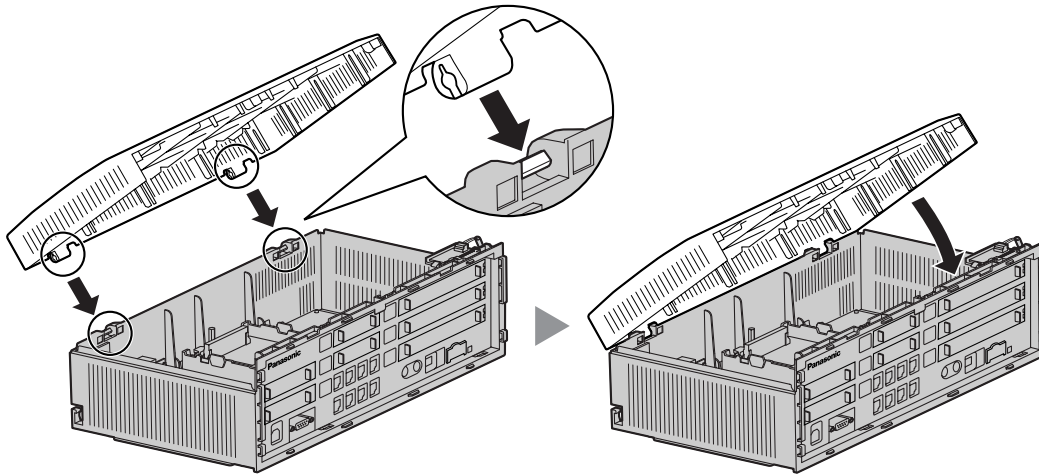
### Removing the Front Cover

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.



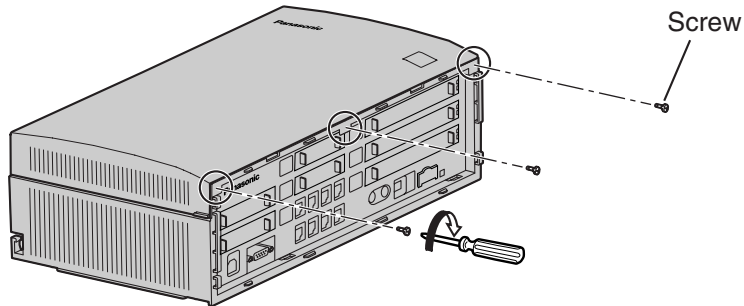
### Attaching the Front Cover

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

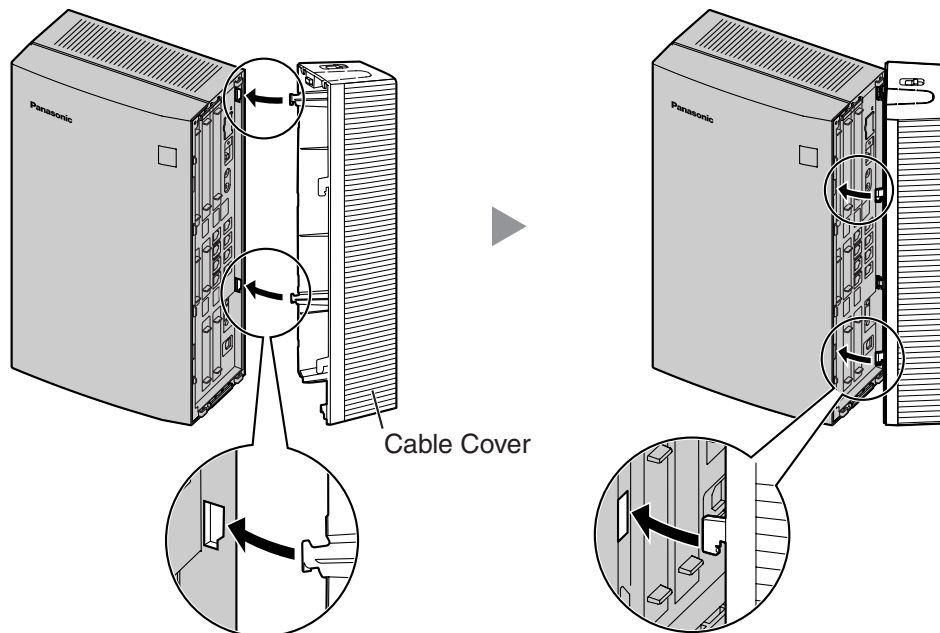


## Closing the Covers

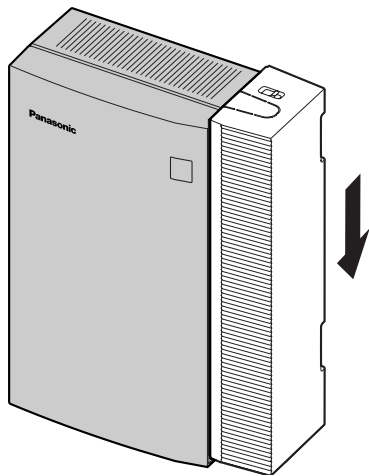
1. Close the front cover, then tighten the three screws.



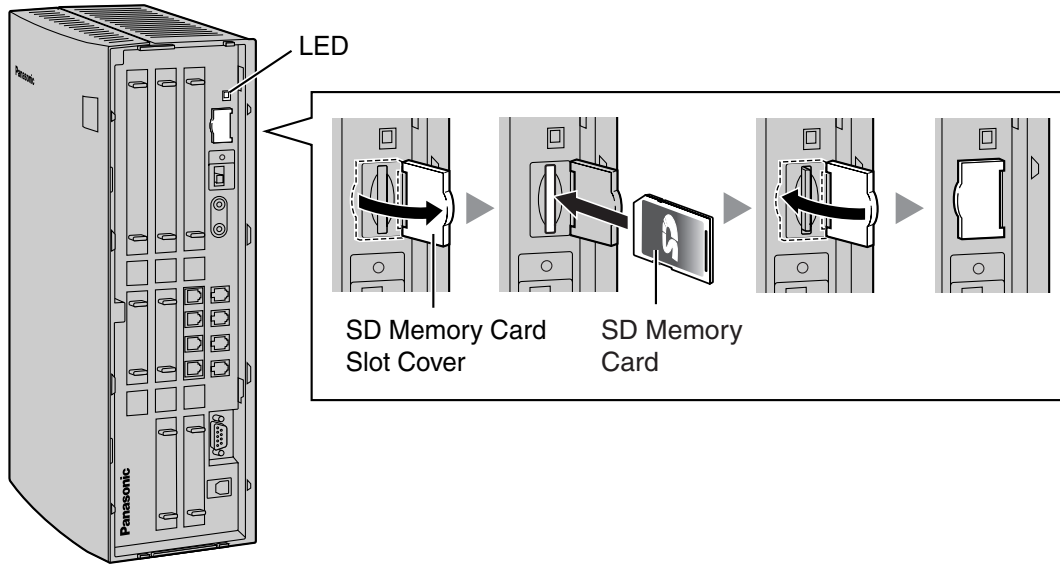
2. Attach the rear hooks on the cable cover to the main unit, then swing the cable cover closed so that the front hooks fit in place.



3. Slide the cable cover down until it locks.



## 2.2.4 Installation of the SD Memory Card

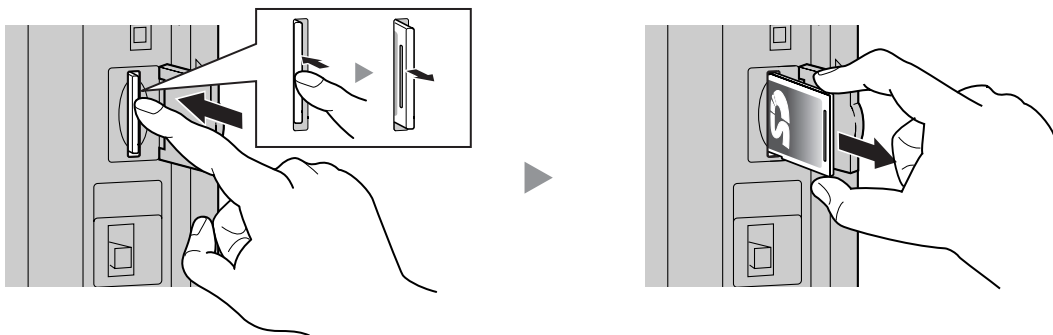


### CAUTION

- 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 startup.
- 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.
- To prevent data leakage, render the SD Memory Card physically unusable before disposal.

### Note

If you need to remove the SD Memory Card:



### LED Indications

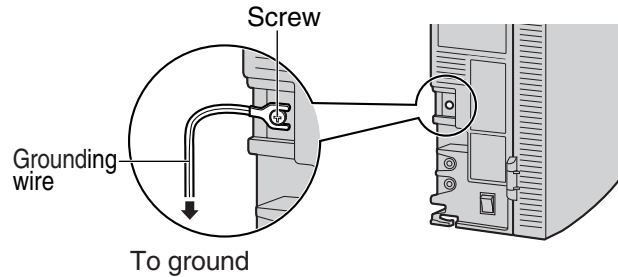
| Indication | Color | Description   |
|------------|-------|---|
| SD ACCESS  | Green | SD memory card status <ul style="list-style-type: none"> <li>• ON: Accessing</li> </ul> |

## 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<sup>2</sup> or 18 AWG.

- Be sure to comply with applicable local regulations (e.g., laws, 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.

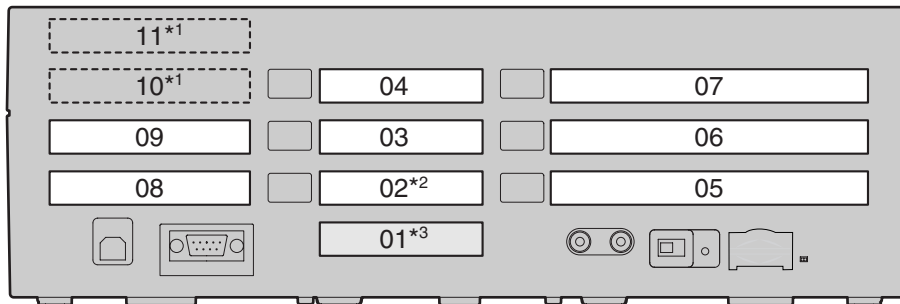
### **Test Procedure**

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 <sup>*1</sup> | ✓           | ✓  | ✓  |    |    |    |    |    |    |    |
| HLC4    | 1 <sup>*2</sup> | ✓           | ✓  | ✓  |    |    |    |    |    |    |    |
| DLC4    |                 | ✓           | ✓  | ✓  |    |    |    |    |    |    |    |
| SLC4    |                 | ✓           | ✓  | ✓  |    |    |    |    |    |    |    |
| PLC4    |                 | ✓           | ✓  | ✓  |    |    |    |    |    |    |    |
| IP-GW4  | 1               |             |    |    | ✓  | ✓  | ✓  |    |    |    |    |
| IP-EXT4 | 1               |             |    |    | ✓  | ✓  | ✓  |    |    |    |    |
| DLC8    | 2 <sup>*3</sup> |             |    |    | ✓  | ✓  | ✓  |    |    |    |    |
| SLC8    |                 |             |    |    | ✓  | ✓  | ✓  |    |    |    |    |
| PLC8    |                 |             |    |    | ✓  | ✓  | ✓  |    |    |    |    |
| DPH4    | 1               |             |    |    |    |    |    | ✓  | ✓  |    |    |
| ECHO8   | 1               |             |    |    |    |    |    | ✓  | ✓  | ✓  | ✓  |
| EXT-CID | 1               |             |    |    |    |    |    | ✓  | ✓  | ✓  | ✓  |
| MSG2    | 2               |             |    |    |    |    |    | ✓  | ✓  | ✓  | ✓  |

## 2.2 Installation of the Hybrid IP-PBX

| Card |     | Slot Number |    |    |    |    |    |    |    |    |    |
|------|-----|-------------|----|----|----|----|----|----|----|----|----|
| Type | Max | 02          | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 |
| SVM2 | 2   |             |    |    |    |    |    | ✓  | ✓  | ✓  | ✓  |

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

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

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

### **CAUTION**

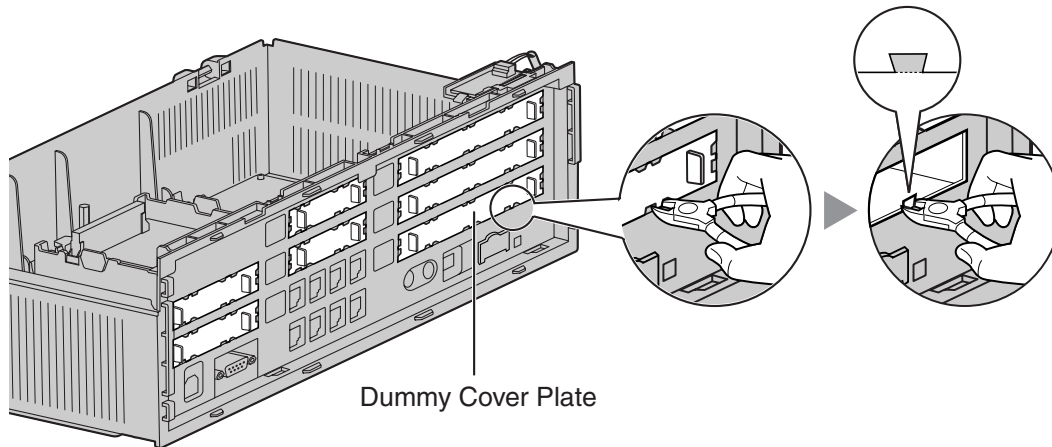
To protect the main board from static electricity, do not touch parts on the main board or on the optional service cards. To discharge static electricity, touch ground or wear a grounding strap.

### **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 Optional Equipment".
- 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

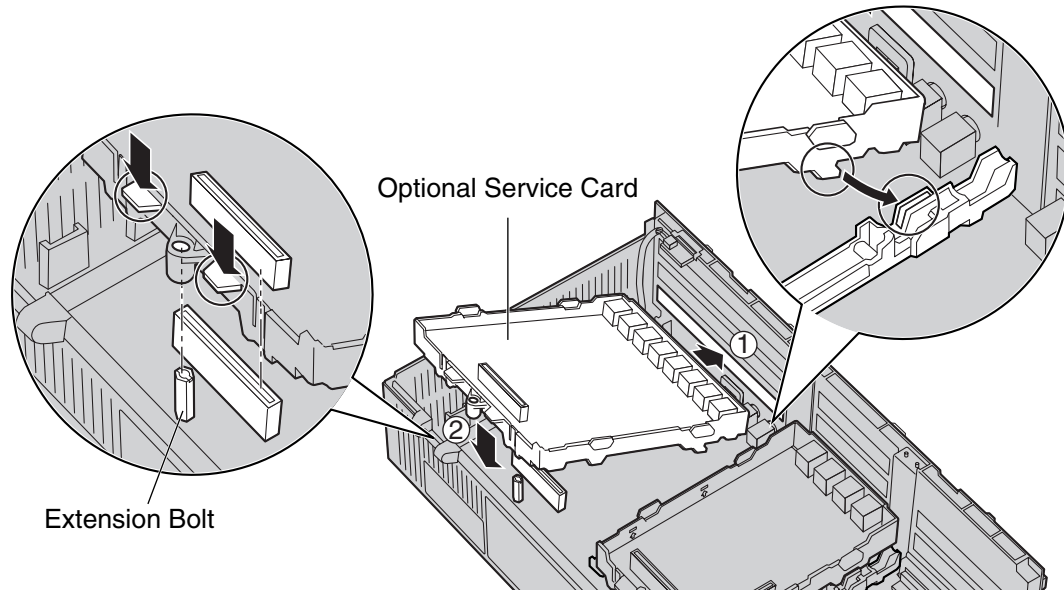
1. Before installing the optional service cards, cut and remove the appropriate dummy cover plates from the main unit.



### **CAUTION**

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

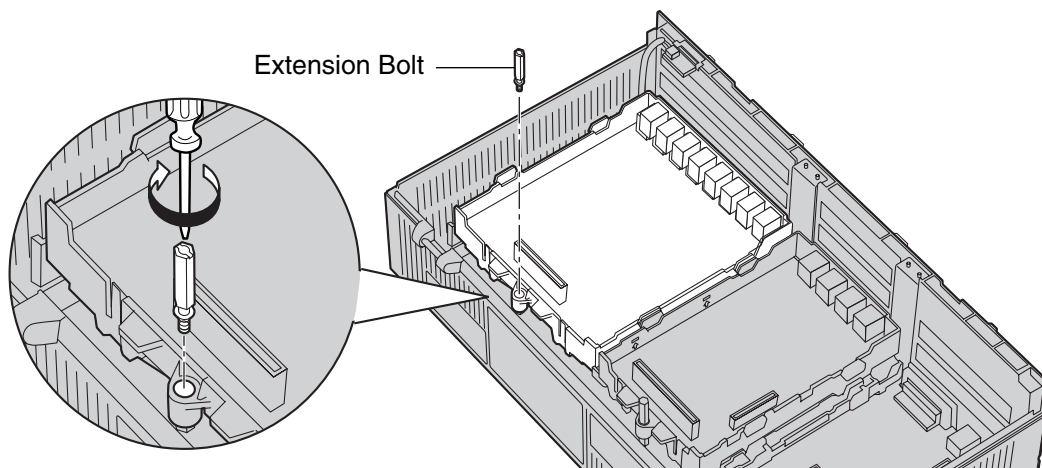
- Position the card in the open slot, making sure that the tabs on the both sides of the card fit into place. Then, holding the card firmly in place, lower the rear end so that the hole of the card fits over the extension bolt.



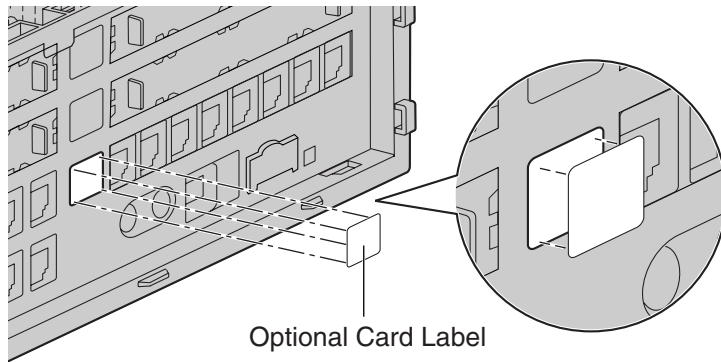
### CAUTION

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.

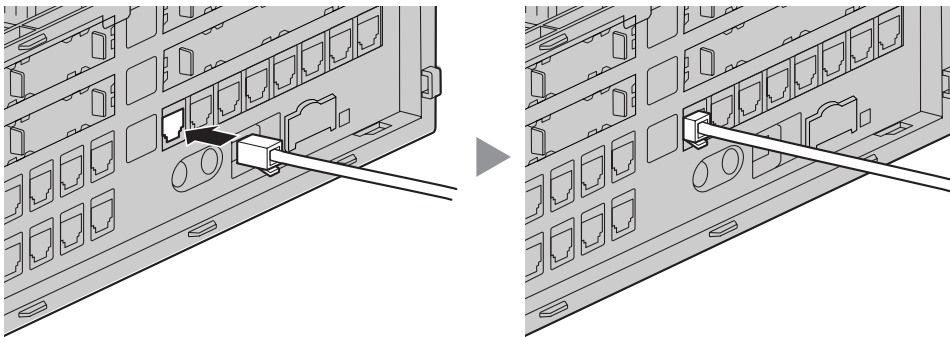
- Insert the new extension bolt (included with the card) into the hole on the card, and tighten it to secure the card.



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



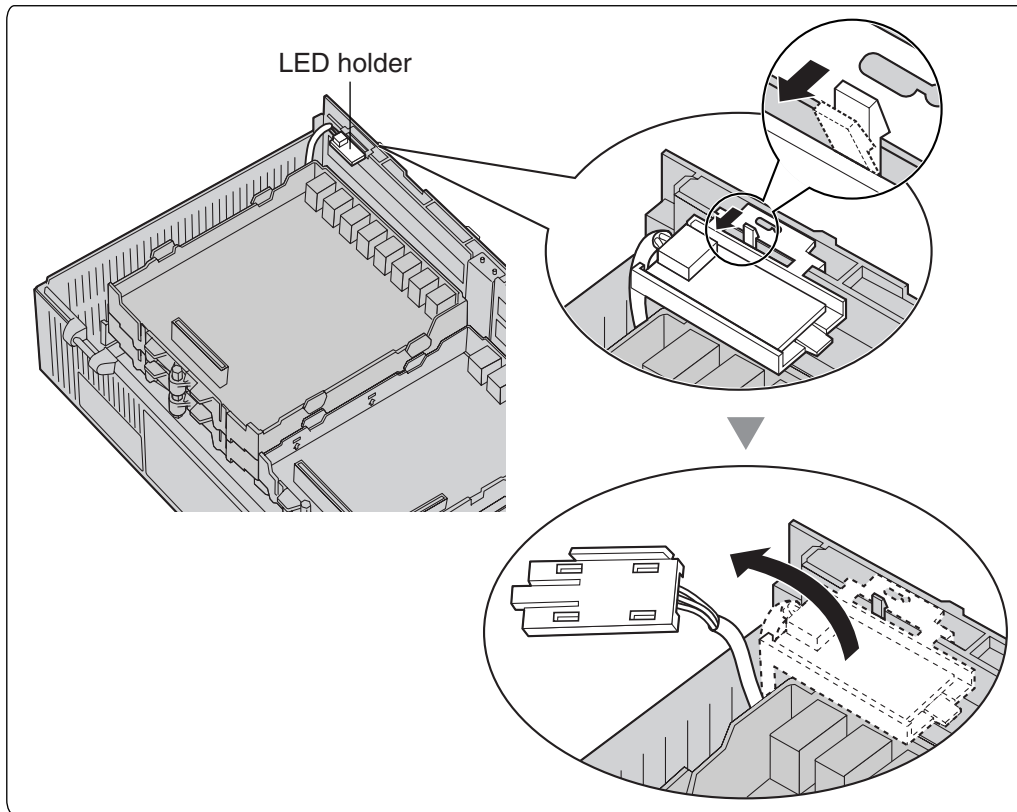
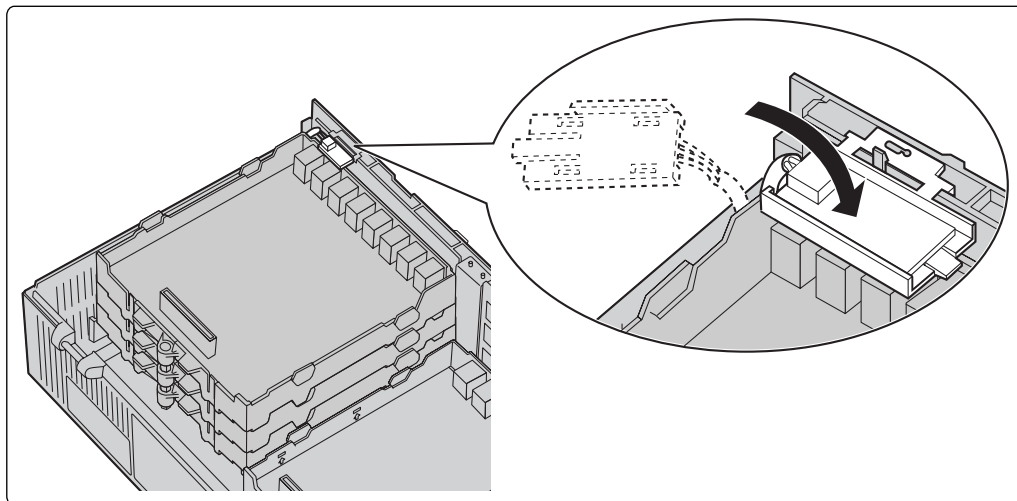
5. Connect a cable to an appropriate port of the card.  
For details about pin assignments, refer to the appropriate section in "2.3 Information about the CO Line Cards" and "2.4 Information about the Extension Cards".



**Note**

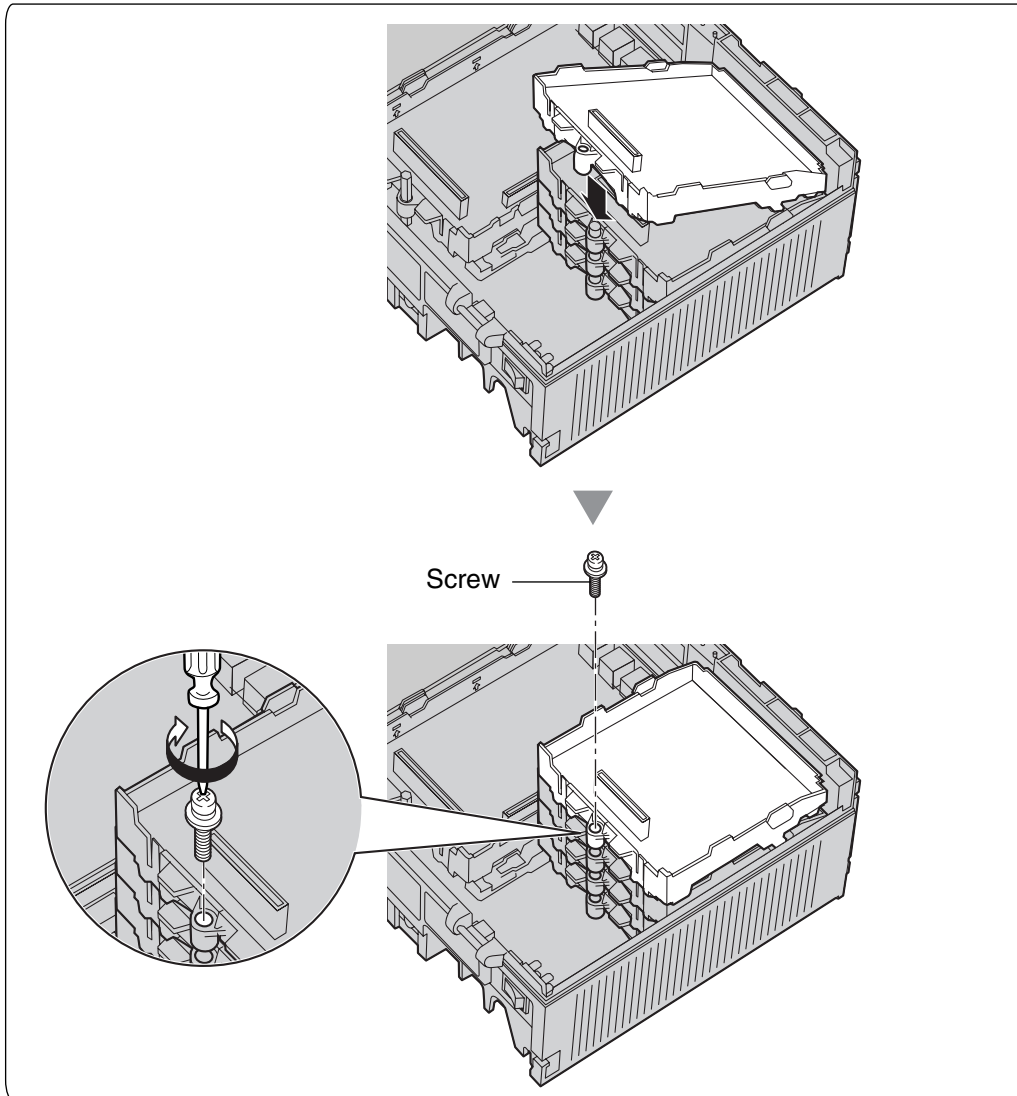
Make sure to connect cables after installing the card in the Hybrid IP-PBX, not before.

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****To attach the LED holder**

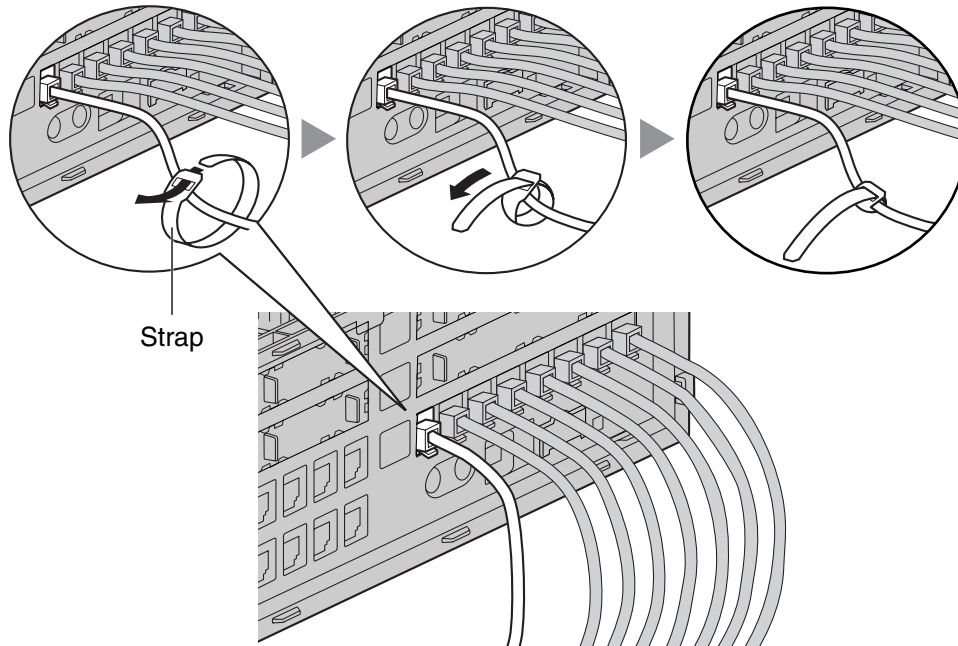
## 2.2 Installation of the Hybrid IP-PBX

- B.** When installing a card in Slot 11, tighten the card using the screw included with the card, instead of the extension bolt.

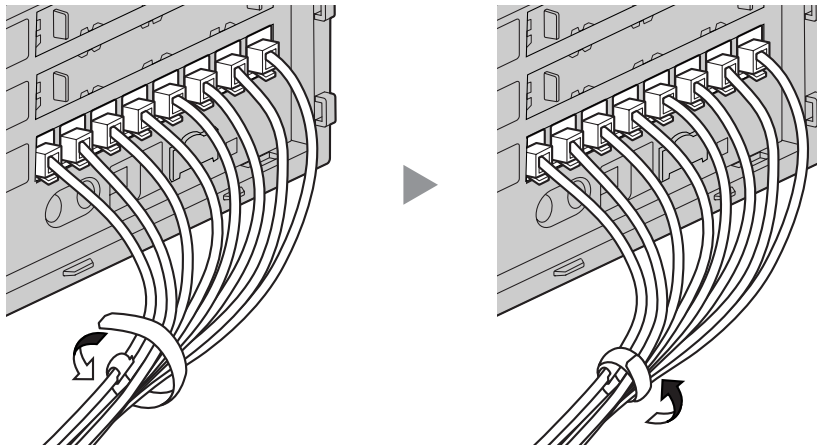


## Cable Handling

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



2. Bind all the connected cables together using the strap.

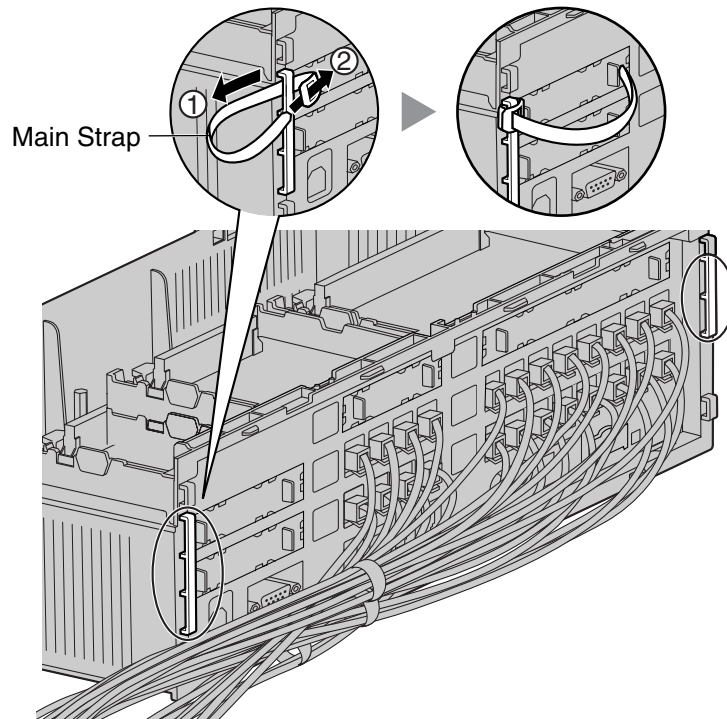


3. Repeat the procedure for other cards.

## 2.2 Installation of the Hybrid IP-PBX

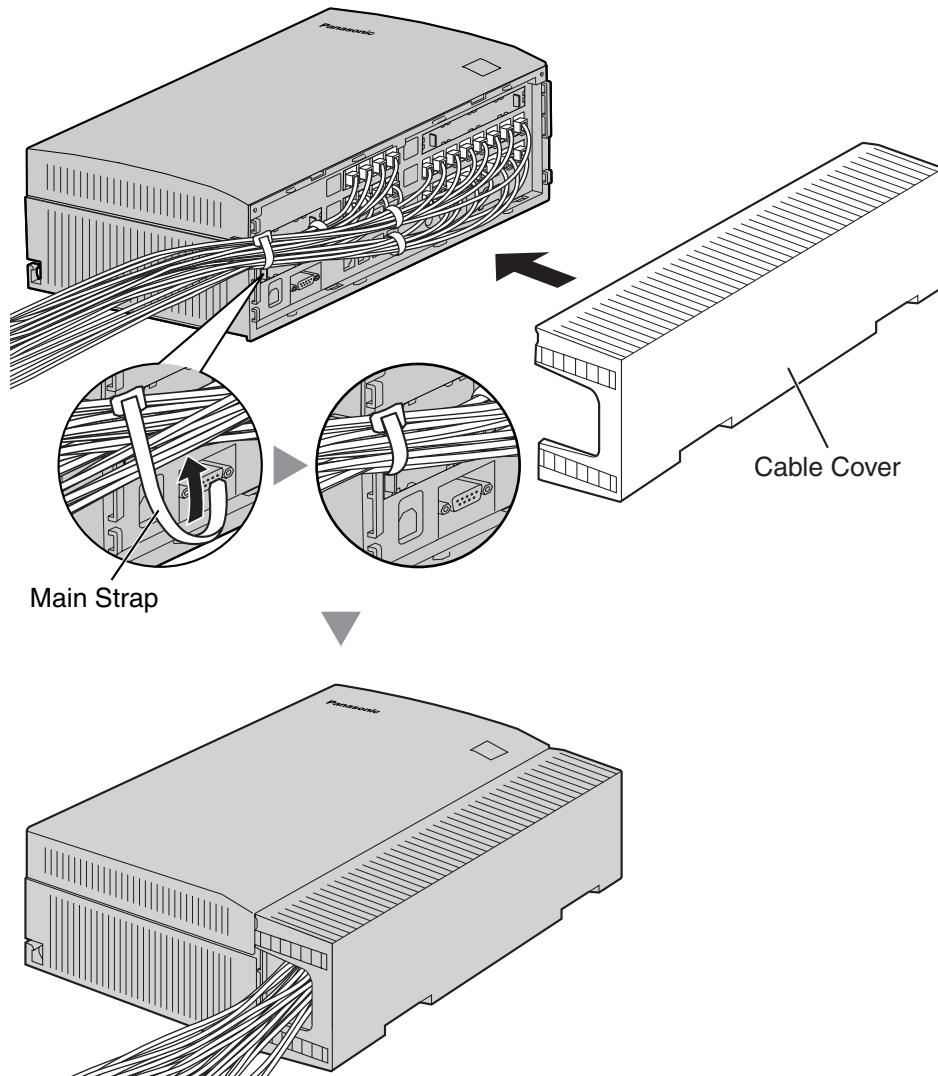
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4. Attach the main strap (included with the Hybrid IP-PBX) to any of the 5 rails depending on your preference.



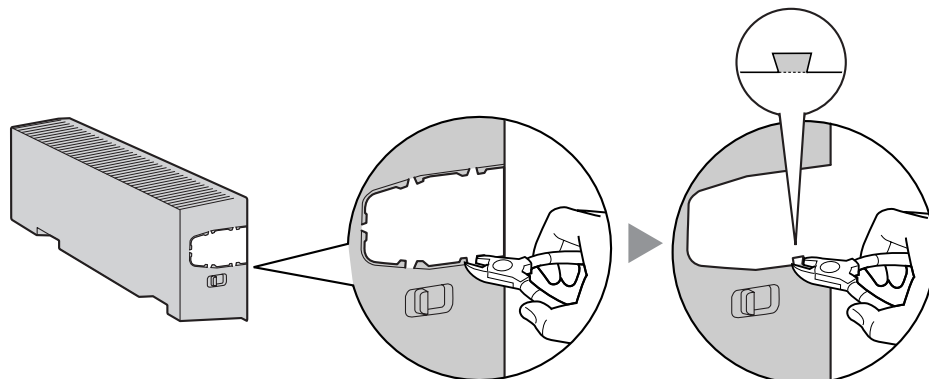


5. Bind all the connected cables together using the main strap, and then close the cable cover. For how to close the cable cover, refer to "2.2.3 Opening/Closing the Covers".



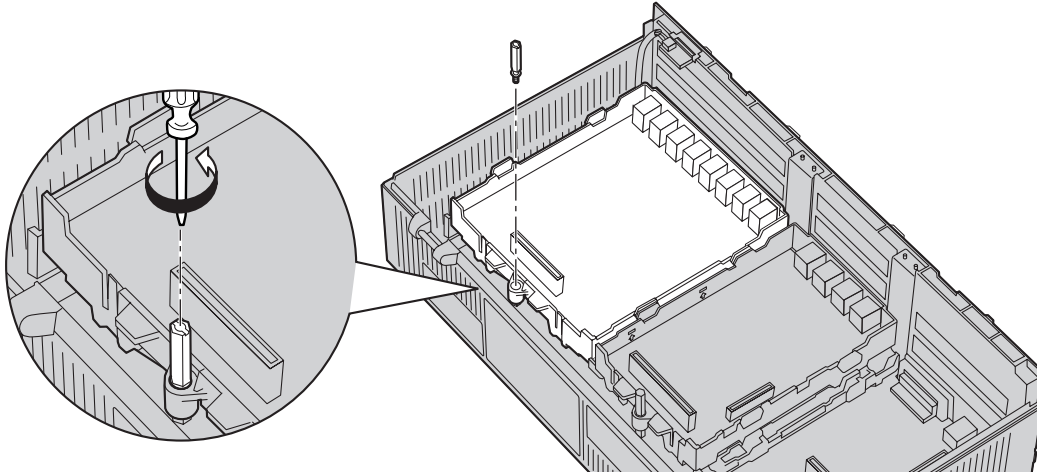
#### **Notes**

- 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.

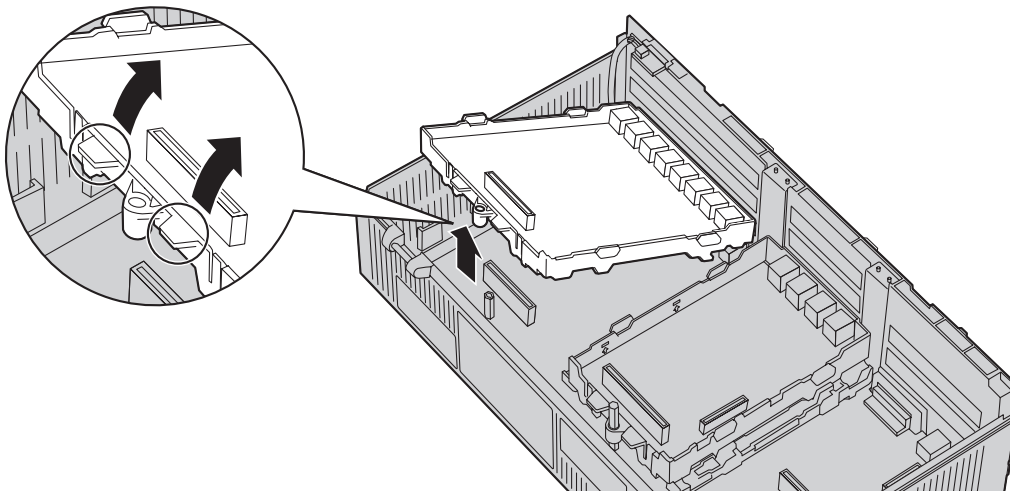


## Removing the Optional Service Cards

1. Loosen the extension bolt.



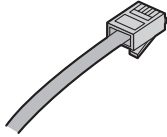
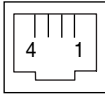
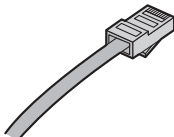
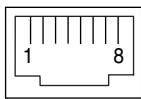
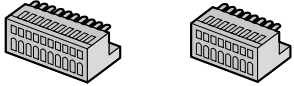
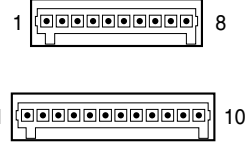
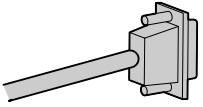
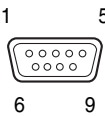
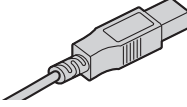

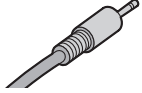

2. Holding the protrusions of the card, pull the card in the direction of the arrows.



### **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.

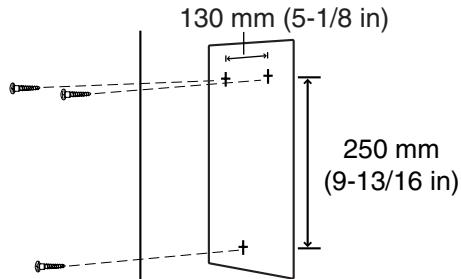
## 2.2.7 Types of Connectors

| Connector Type   | Pin Number  | Used for  |
|--|---|---|
| RJ11<br><br>(Twisted pair cable)                      |    | <ul style="list-style-type: none"> <li>DPH4 (KX-TDA5161)</li> <li>HLC4 (KX-TDA5170)</li> <li>DLC4 (KX-TDA5171)</li> <li>DLC8 (KX-TDA5172)</li> <li>SLC4 (KX-TDA5173)</li> <li>SLC8 (KX-TDA5174)</li> <li>PLC4 (KX-TDA5175)</li> <li>PLC8 (KX-TDA5176)</li> <li>LCOT4 (KX-TDA5180)</li> <li>Super Hybrid Ports (Main Board)</li> </ul> |
| RJ45<br><br>(Twisted pair cable)                      |    | <ul style="list-style-type: none"> <li>IP-EXT4 (KX-TDA5470)</li> <li>IP-GW4 (KX-TDA5480)</li> </ul>   |
| 10-pin Terminal Block      8-pin Terminal Block<br> |  | <ul style="list-style-type: none"> <li>DPH4 (KX-TDA5161)</li> </ul>   |
| RS-232C<br>   |  | <ul style="list-style-type: none"> <li>Main Board</li> </ul>  |
| USB<br>   |  | <ul style="list-style-type: none"> <li>Main Board</li> </ul>  |
| Mini Plug<br>                                       |  | <ul style="list-style-type: none"> <li>Main Board (Pager port, MOH port)</li> </ul>   |

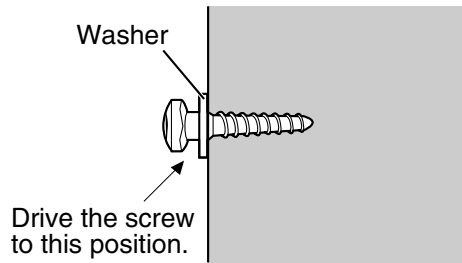
## 2.2.8 Wall Mounting (KX-TDA50)

### 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.



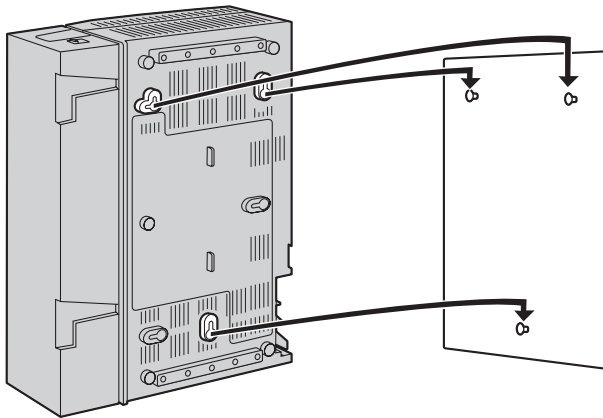
2. Install the screws and washers (included) in the wall.



#### 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 main unit on the screw heads.



#### Notes

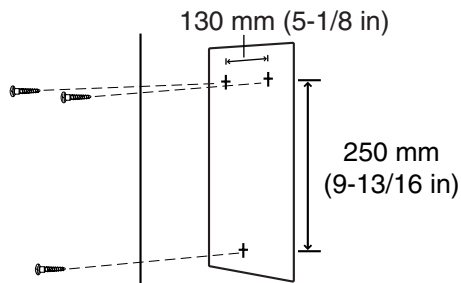
- Do not block the openings of the cabinet. Leave at least 20 cm (8 in) of space above and 10 cm (4 in) to the sides of the Hybrid IP-PBX for ventilation.
- Make sure that the surface behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.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

## Mounting on Concrete or Mortar Wall

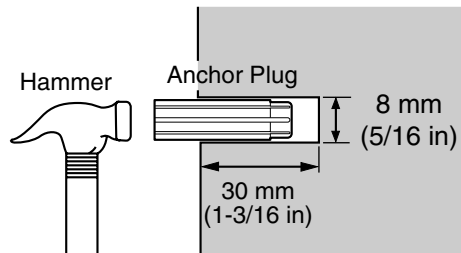
### CAUTION

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

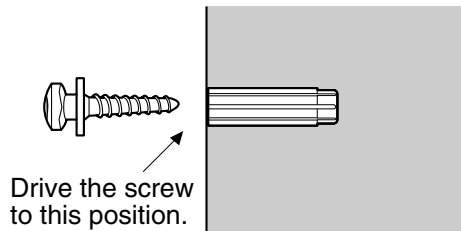
1. Place the reference for wall mounting (on the last page of this manual) on the wall to mark the three screw positions.



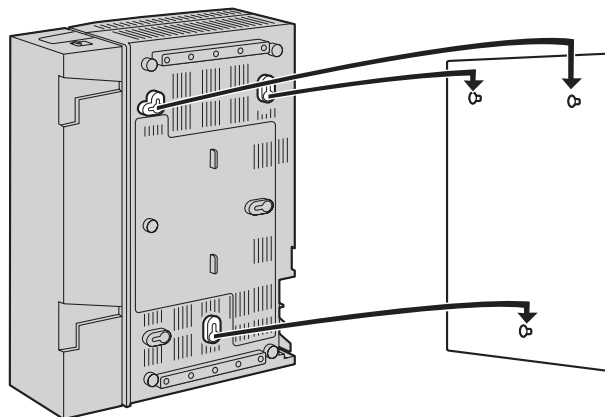
2. Install three anchor plugs (user-supplied) in the wall.



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



4. Hook the main unit on the screw heads.



## 2.2 Installation of the Hybrid IP-PBX

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### **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 surface 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.

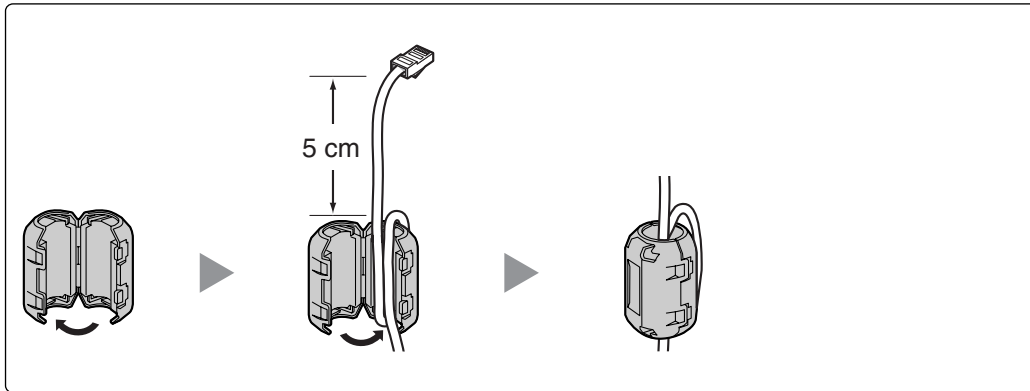
## 2.2.9 Attaching a Ferrite Core

A ferrite core must be attached when an RJ45 connector is connected to the IP-EXT4 card.

### Attaching to an RJ45 Connector

#### For the IP-EXT4 Card

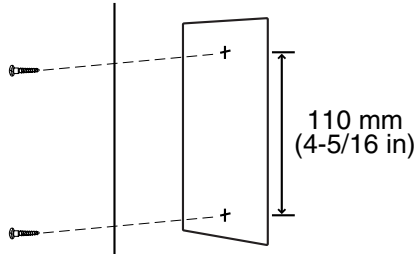
Wrap the cable once around the ferrite core, then close the case of the ferrite core. Attach the ferrite core 5 cm away from the connector. The ferrite core is included with the card.



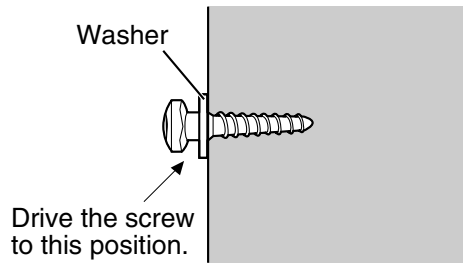
## 2.2.10 Wall Mounting (AC Adaptor)

### Mounting on Wooden Wall

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



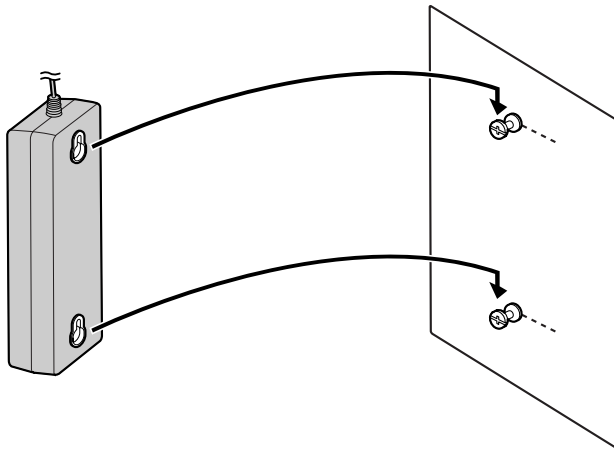
2. Install the screws and washers (included) in the wall.



#### **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 AC adaptor on the screw heads.



#### **Note**

Be careful not to drop the AC adaptor.

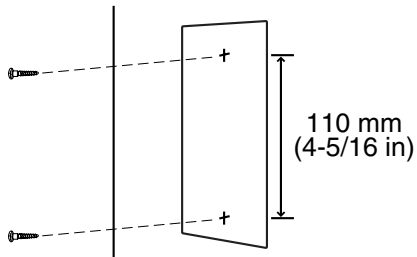


## Mounting on Concrete or Mortar Wall

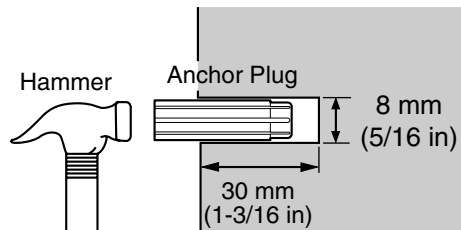
### CAUTION

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

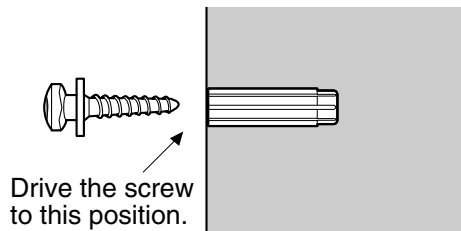
1. Place the reference for wall mounting (on the following page) on the wall to mark the two screw positions.



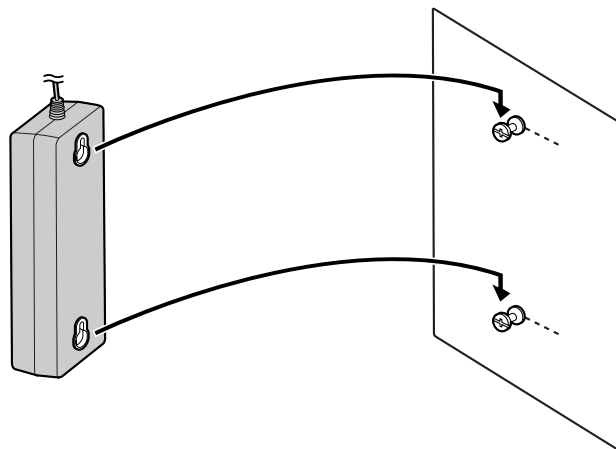
2. Install two anchor plugs (user-supplied) in the wall.



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



4. Hook the AC adaptor on the screw heads.

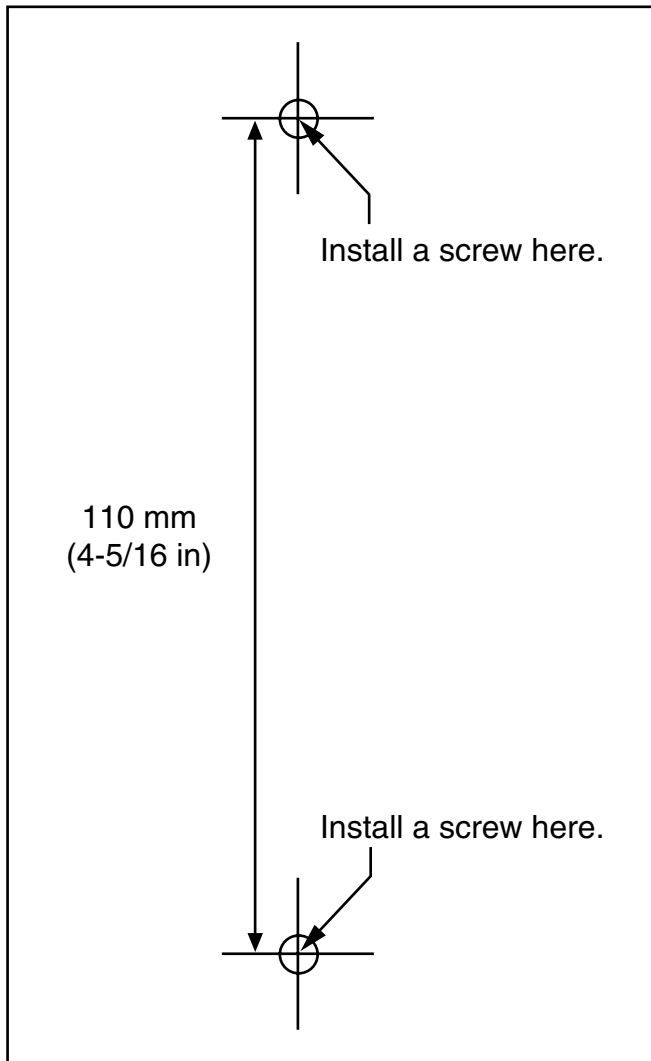


### Note

Be careful not to drop the AC adaptor.

## Reference for Wall Mounting

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



### **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.

## 2.2.11 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.

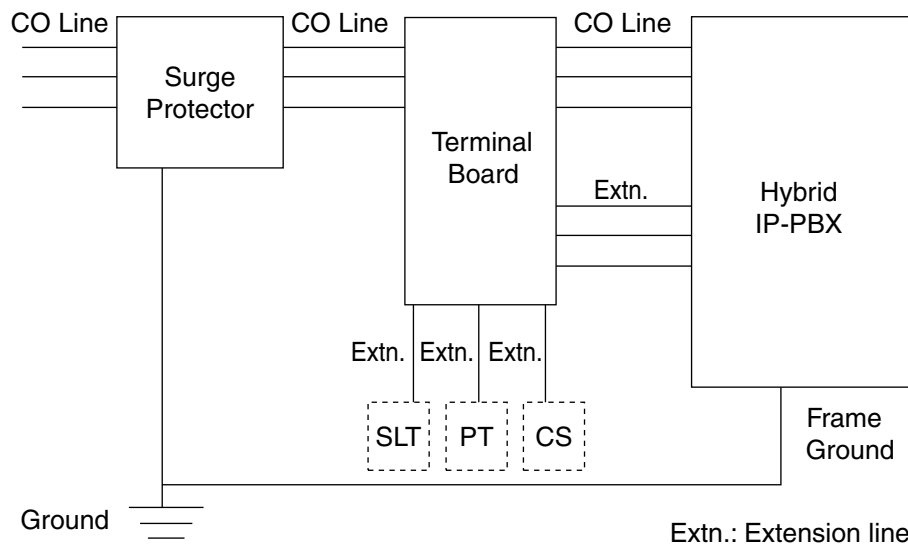
To protect the system from electrical surges, we strongly recommend connecting the system to a surge protector that meets the following specifications:

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

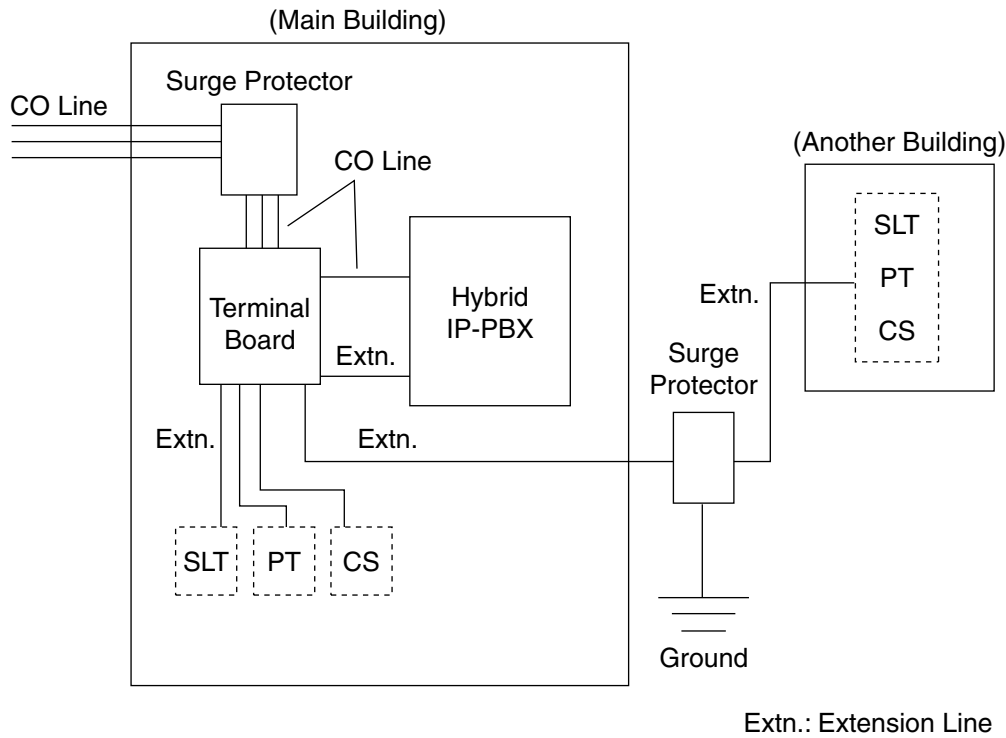
Additionally, proper grounding is very important for the protection of the system (refer to "2.2.5 Frame Ground Connection").

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

### Installation



## Outside Installation



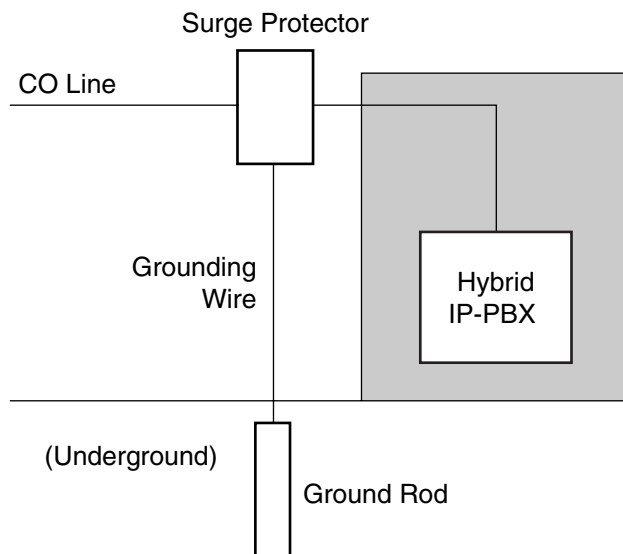
If you install an extension outside of the building, the following precautions are recommended:

- 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



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

### **Notes**

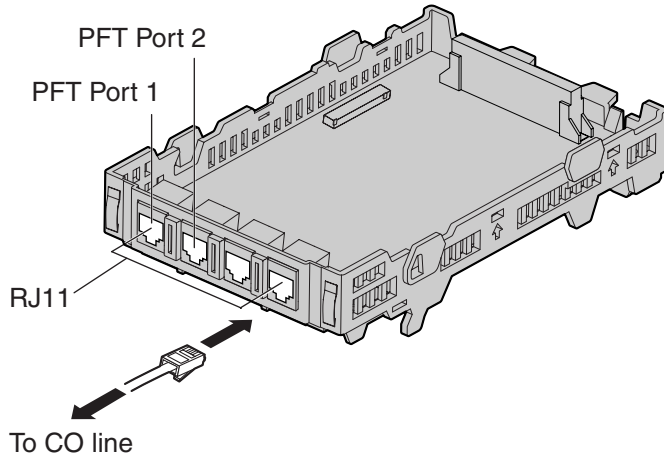
- The above figures are recommendations only.
- The length of ground rod and the required depth depend on the composition of the soil.

## 2.3 Information about the CO Line Cards

### 2.3.1 LCOT4 Card (KX-TDA5180)

#### 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 (KX-TDA5193)").



#### Accessories and User-supplied Items

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

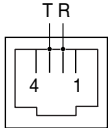
**User-supplied (not included):** RJ11 connector

#### Notes

- 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

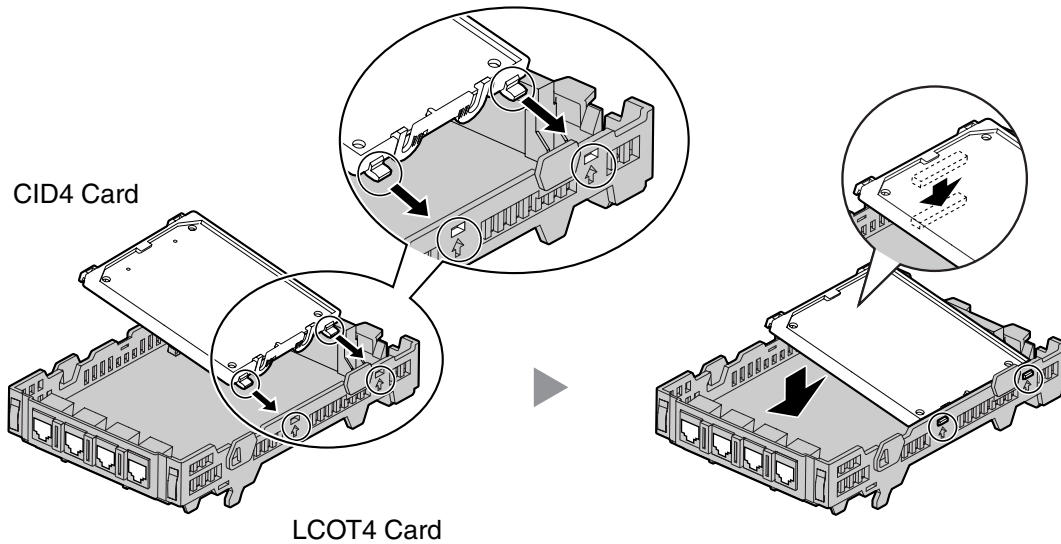
##### RJ11 Connector

|   | Signal Name | Function |
|---|-------------|----------|
|  | R           | Ring     |
|   | T           | Tip      |
|   | -           | Reserved |

## 2.3.2 CID4 Card (KX-TDA5193)

### 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.



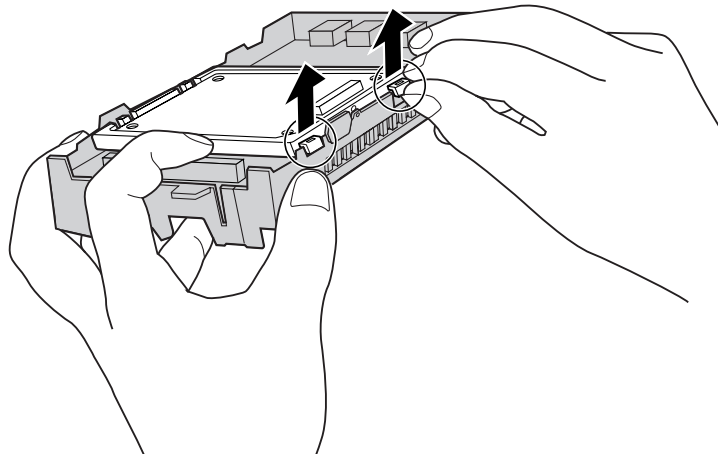
### Accessories and User-supplied Items

**Accessories (included):** none

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

### Note

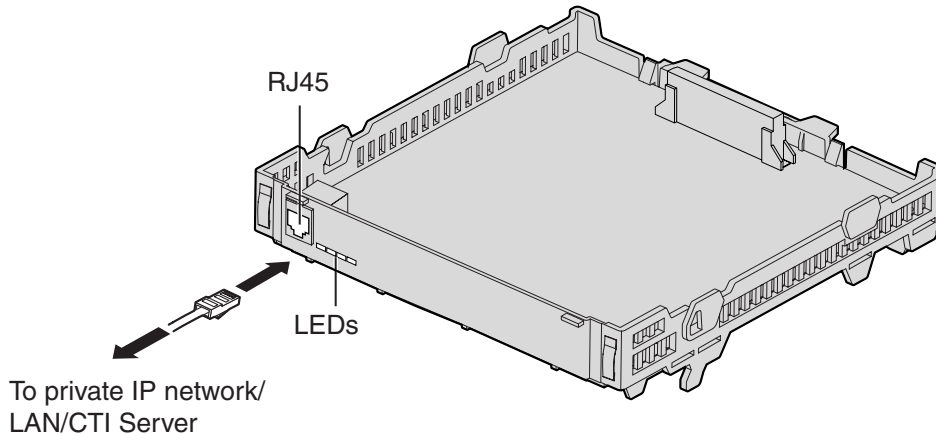
If you need to remove the CID4 card:



## 2.3.3 IP-GW4 Card (KX-TDA5480)

### Function

4-channel VoIP gateway card. This card also enables CTI communication and system programming via a LAN. Compliant with VoIP H.323 V.2 protocol, and ITU-T G.729a, G.723.1, and G.711 CODEC methods. CSTA Phase 3 protocol compatible.



### Accessories and User-supplied Items

**Accessories (included):** Extension Bolt × 1, Strap × 1, CD-ROM (including documentation for web programming) × 1

**User-supplied (not included):** RJ45 connector

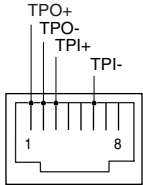
### Notes

- The maximum length of the cable to be connected to this optional service card is 100 m (328 ft).
- This optional service card can be connected to PCs on a LAN via a CTI server to provide third party call control CTI.  
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.
- For CTI communication and system programming, the firmware (not LPR software) of the card must be version 1.400 or later. For details about the firmware version, refer to the documentation for the IP-GW4 card.
- For programming instructions and other information about the IP-GW4 card, refer to the documentation for the IP-GW4 card. To program the IP-GW4 card, use the web programming designed 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+        | O                    | Transmit data+ |
|   | TPO-        | O                    | Transmit data- |
|   | TPI+        | I                    | Receive data+  |
|   | TPI-        | I                    | Receive data-  |
|   | -           | -                    | Reserved       |

## LED Indications

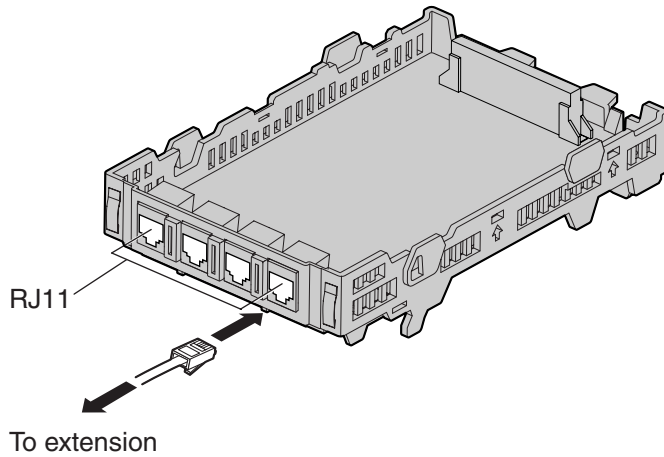
| Indication | Color | Description   |
|------------|-------|---|
| ON LINE    | Green | On-line status indication <ul style="list-style-type: none"> <li>• ON: On-line mode</li> <li>• OFF: Off-line mode</li> <li>• Flashing: Maintenance mode</li> </ul> <p><b>Note</b><br/>If the LINK indicator is OFF, the ON LINE indicator will also be OFF.</p> |
| ALARM      | Red   | Alarm indication <ul style="list-style-type: none"> <li>• ON: Alarm</li> <li>• OFF: Normal</li> </ul>   |
| LINK       | Green | Link status indication <ul style="list-style-type: none"> <li>• ON: Normal Connection</li> <li>• OFF: Connection Error</li> </ul>   |
| DATA       | Green | Data transmission indication <ul style="list-style-type: none"> <li>• ON: Data transmitting</li> <li>• OFF: No data transmitted</li> </ul>  |

## 2.4 Information about the Extension Cards

### 2.4.1 HLC4 Card (KX-TDA5170)

#### Function

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



#### Accessories and User-supplied Items

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

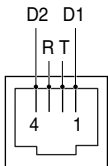
**User-supplied (not included):** RJ11 connector

#### 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

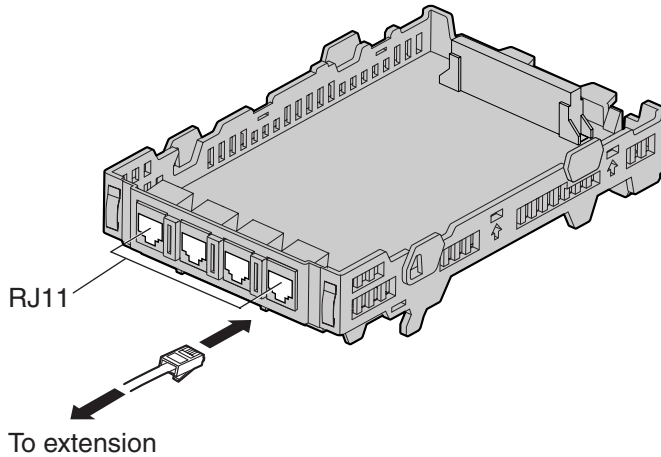
|   | Signal Name | Function         |
|---|-------------|------------------|
|  | D1          | Data port (High) |
|   | T           | Tip              |
|   | R           | Ring             |
|   | D2          | Data port (Low)  |

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

## 2.4.2 DLC4 Card (KX-TDA5171)

### Function

4-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs.\*<sup>1</sup>



### Accessories and User-supplied Items

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

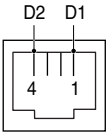
**User-supplied (not included):** RJ11 connector

#### 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

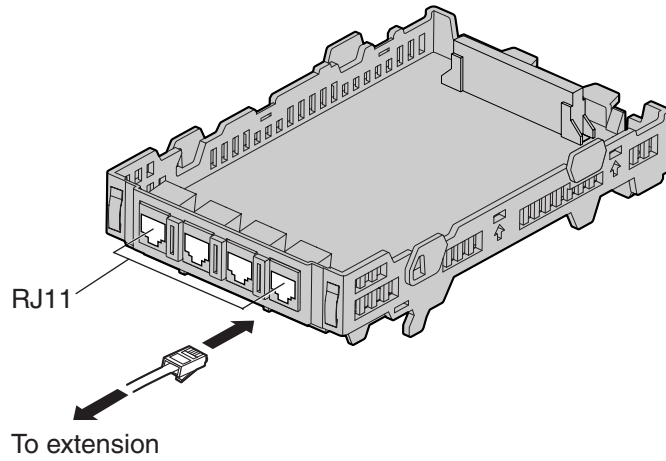
|   | Signal Name | Function         |
|---|-------------|------------------|
|  | D1          | Data port (High) |
|   | D2          | Data port (Low)  |
|   | -           | Reserved         |

\*<sup>1</sup> The PT-interface CS can be connected to the Hybrid IP-PBX using a cable like a PT.

## 2.4.3 SLC4 Card (KX-TDA5173)

### Function

4-port extension card for SLTs.



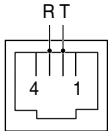
### Accessories and User-supplied Items

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

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

### Pin Assignments

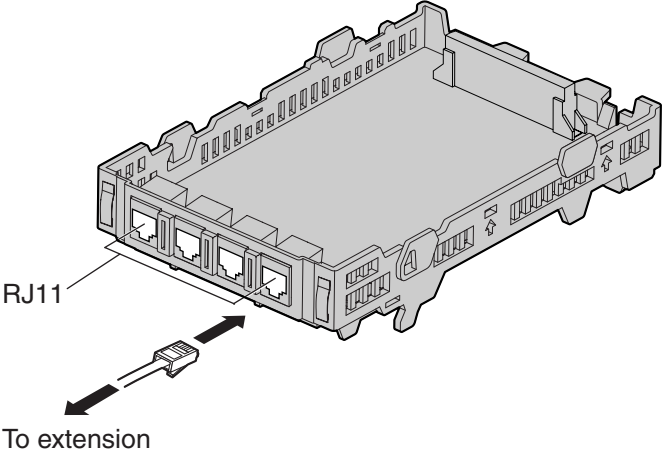
#### RJ11 Connector

|   | Signal Name | Function |
|---|-------------|----------|
|  | T           | Tip      |
|   | R           | Ring     |
|   | -           | Reserved |

## 2.4.4 PLC4 Card (KX-TDA5175)

### Function

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



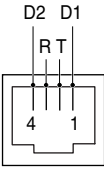
### Accessories and User-supplied Items

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

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

### Pin Assignments

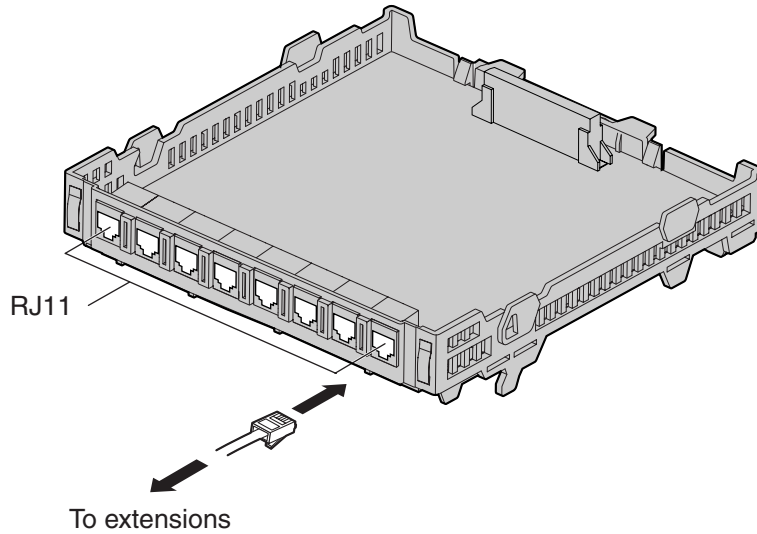
#### RJ11 Connector

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

## 2.4.5 DLC8 Card (KX-TDA5172)

### Function

8-port digital extension card for DPTs, DSS consoles, a VPS, and PT-interface CSs.\*<sup>1</sup>



### Accessories and User-supplied Items

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

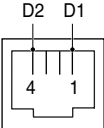
**User-supplied (not included):** RJ11 connector

#### 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

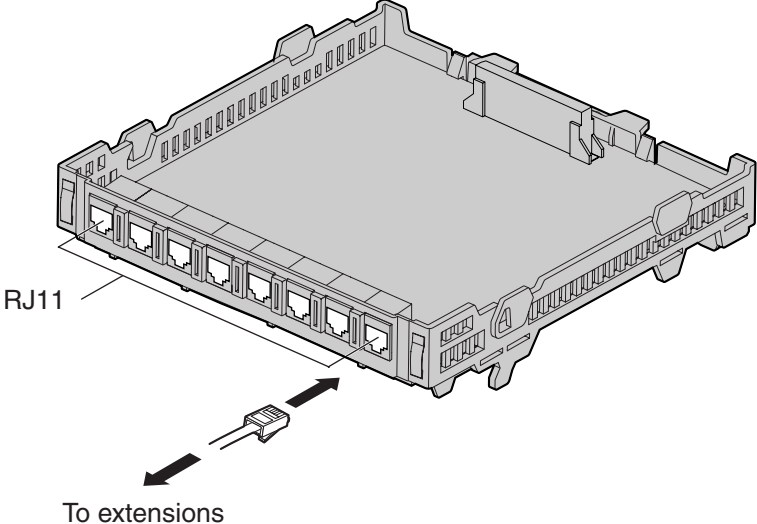
|   | Signal Name | Function         |
|---|-------------|------------------|
|  | D1          | Data port (High) |
|   | D2          | Data port (Low)  |
|   | -           | Reserved         |

\*<sup>1</sup> The PT-interface CS can be connected to the Hybrid IP-PBX using a cable like a PT.

## 2.4.6 SLC8 Card (KX-TDA5174)

### Function

8-port extension card for SLTs.



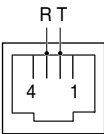
### Accessories and User-supplied Items

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

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

### Pin Assignments

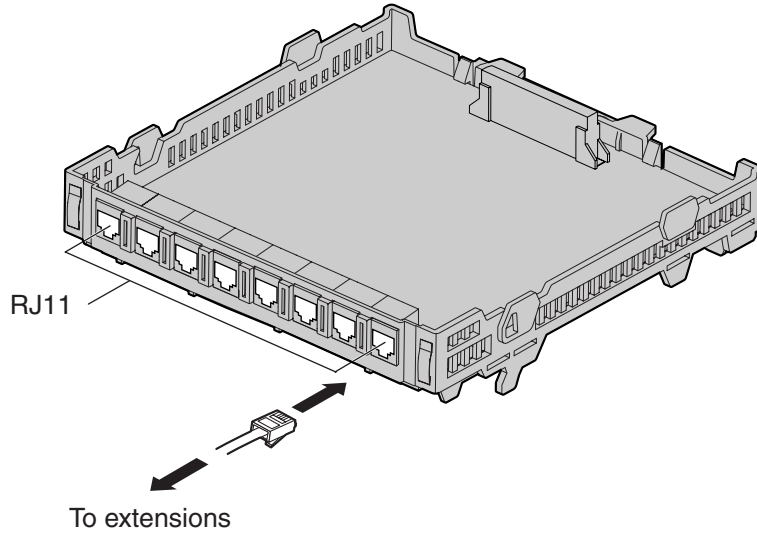
#### RJ11 Connector

|  | Signal Name | Function |
|---|-------------|----------|
|   | T           | Tip      |
|   | R           | Ring     |
|   | —           | Reserved |

## 2.4.7 PLC8 Card (KX-TDA5176)

### Function

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



### Accessories and User-supplied Items

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

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

### Pin Assignments

#### RJ11 Connector

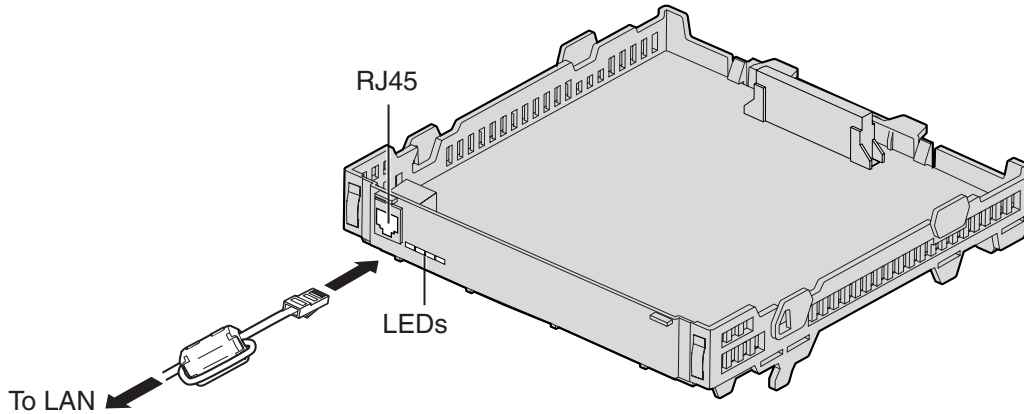
|  | Signal Name | Function         |
|--|-------------|------------------|
|  | D1          | Data port (High) |
|  | T           | Tip              |
|  | R           | Ring             |
|  | D2          | Data port (Low)  |



## 2.4.8 IP-EXT4 Card (KX-TDA5470)

### Function

4-channel VoIP extension card. Compliant with Panasonic proprietary protocol, and ITU-T G.729a and G.711 CODEC methods.



### Accessories and User-supplied Items

**Accessories (included):** Ferrite core × 1, Extension Bolt × 1, Strap × 1

**User-supplied (not included):** RJ45 connector

#### Notes

- The maximum length of the cable to be connected to this optional service card is 100 m (328 ft).
- When connecting the RJ45 connector, attach the included ferrite core. Refer to "2.2.9 Attaching a Ferrite Core".

### Pin Assignments

#### RJ45 Connector (100BASE-TX)

|  | Signal Name | Input (I)/Output (O) | Function       |
|--|-------------|----------------------|----------------|
|  | TPO+        | O                    | Transmit data+ |
|  | TPO-        | O                    | Transmit data- |
|  | TPI+        | I                    | Receive data+  |
|  | TPI-        | I                    | Receive data-  |
|  | —           | —                    | Reserved       |

## LED Indications

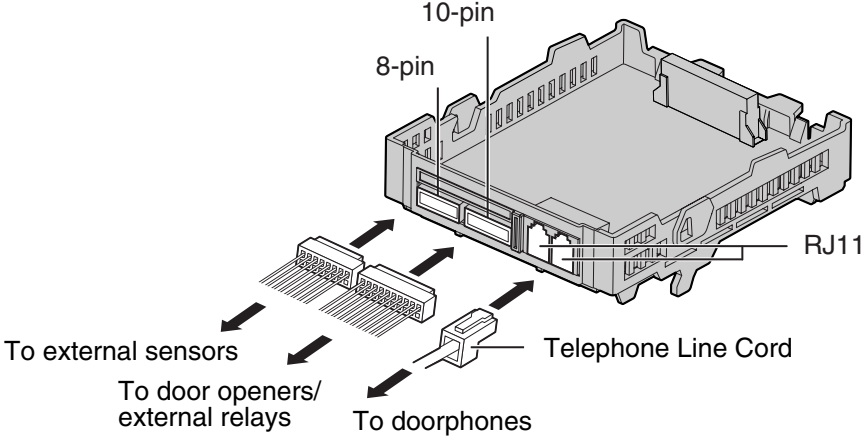
| Indication | Color | Description  |
|------------|-------|--|
| ON LINE    | Green | <p>On-line status indication</p> <ul style="list-style-type: none"> <li>• ON: At least one port is in use (an IP-PT is connected)</li> <li>• OFF: No ports are in use (no IP-PTs are connected)</li> </ul> <p><b>Note</b></p> <p>If the LINK indicator is OFF, the ON LINE indicator will also be OFF.</p> |
| ALARM      | Red   | <p>Alarm indication</p> <ul style="list-style-type: none"> <li>• ON: Alarm</li> <li>• OFF: Normal</li> </ul>   |
| LINK       | Green | <p>Link status indication</p> <ul style="list-style-type: none"> <li>• ON: Normal connection</li> <li>• OFF: Connection error</li> </ul>   |
| DATA       | Green | <p>Data transmission indication</p> <ul style="list-style-type: none"> <li>• ON: Data transmitting</li> <li>• OFF: No data transmitted</li> </ul>  |

# 2.5 Information about the Other Cards

## 2.5.1 DPH4 Card (KX-TDA5161)

### 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

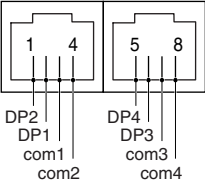
**User-supplied (not included):** Copper wire

### Note

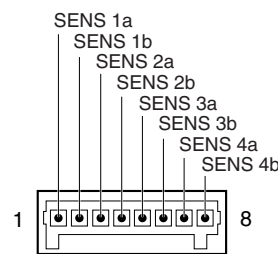
For details about connection to doorphones, door openers, external sensors, and external relays, refer to "2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays".

## Pin Assignments

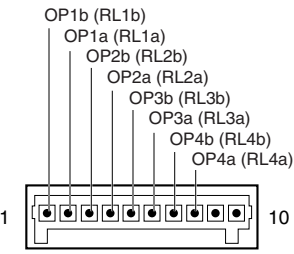
### RJ11 Connector

|  | 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

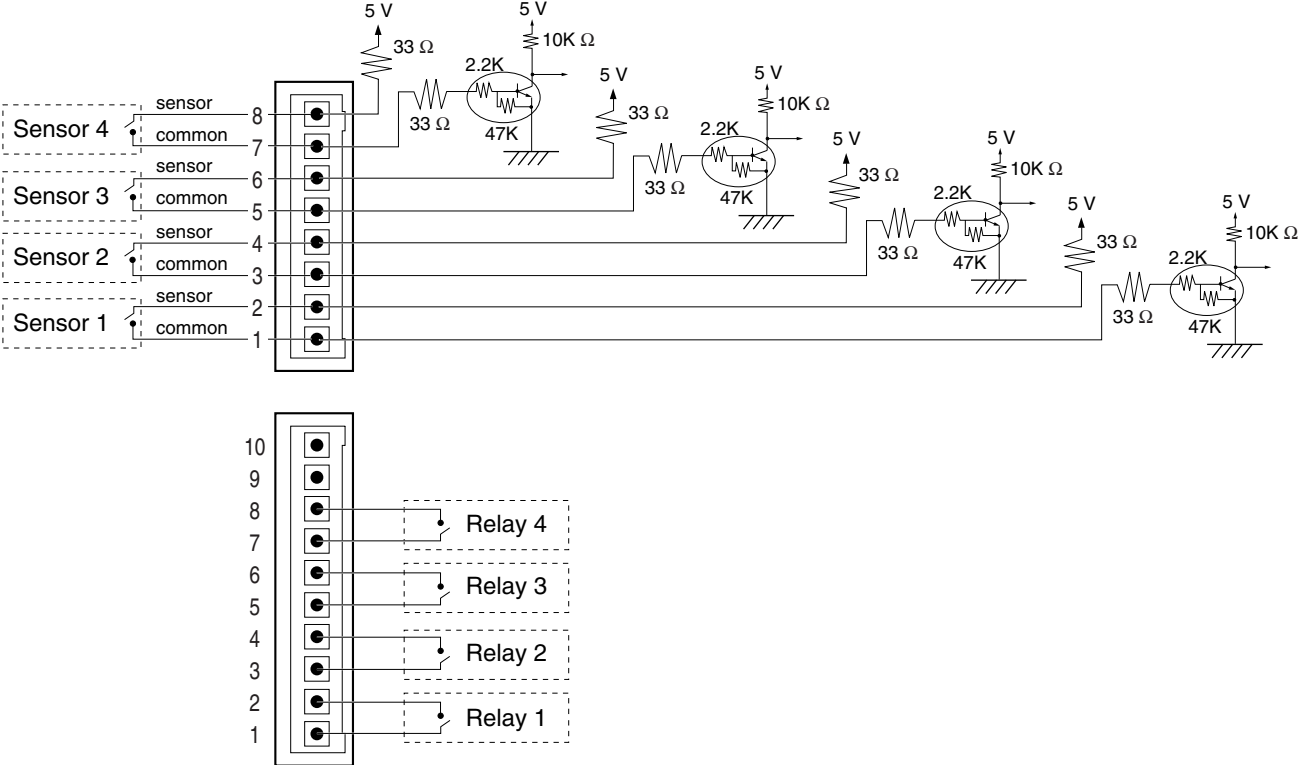
|  | Signal Name | Function       |
|---|-------------|----------------|
|   | SENS 1a     | Sensor Input 1 |
|   | SENS 1b     | com 1          |
|   | SENS 2a     | Sensor Input 2 |
|   | SENS 2b     | com 2          |
|   | SENS 3a     | Sensor Input 3 |
|   | SENS 3b     | com 3          |
|   | SENS 4a     | Sensor Input 4 |
|   | SENS 4b     | com 4          |

### 10-pin Terminal Block

|  | Signal Name | Function                        |
|--|-------------|---------------------------------|
|  | OP1b (RL1b) | 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

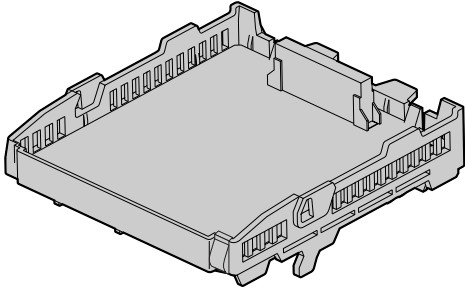
Power to the external sensor is provided from the DPH4 card and must be grounded through the DPH4 card as indicated in the diagram below. A pair of "sensor" and "common" lines must be connected to the DPH4 card for each external sensor. The Hybrid IP-PBX detects input from the sensor when the signal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



## 2.5.2 ECHO8 Card (KX-TDA5166)

### 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

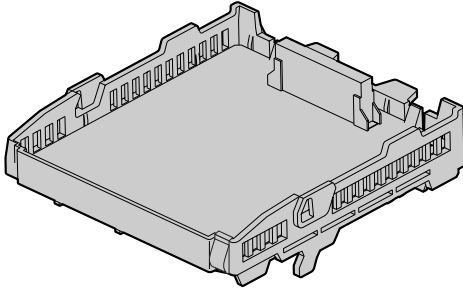
### Note

To establish a conference call involving 6 to 8 parties, install an ECHO8 card and enable echo cancellation for conferences using the KX-TDA50 Maintenance Console. For details, refer to "Echo Cancel—Conference" in "2.8.17 [2-9] System Options" of the PC Programming Manual.

## 2.5.3 MSG2 Card (KX-TDA5191)

### Function

2-channel message card.



### Accessories and User-supplied Items

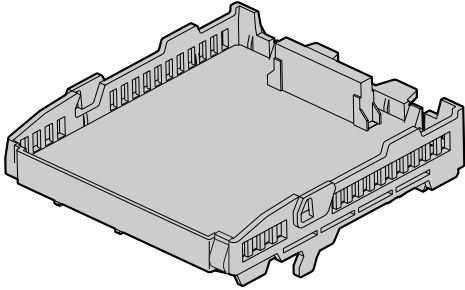
**Accessories (included):** Extension Bolt × 1, Screw × 1

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

## 2.5.4 SVM2 Card (KX-TDA5192)

### Function

2-channel simplified voice message card for Simplified Voice Message feature.



### Accessories and User-supplied Items

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

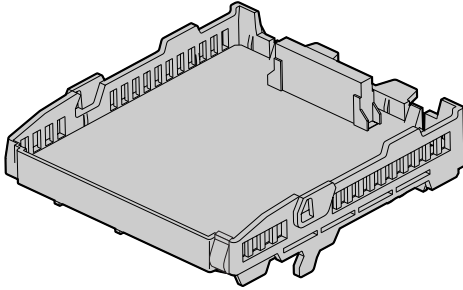
**User-supplied (not included):** none



## 2.5.5 EXT-CID Card (KX-TDA5168)

### Function

Sends Caller ID signals to extension ports.



### Accessories and User-supplied Items

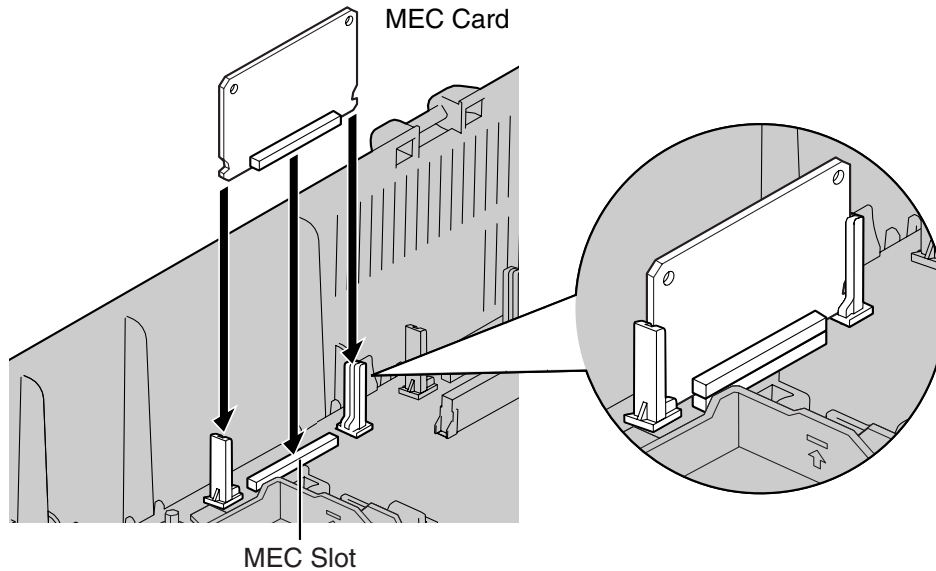
**Accessories (included):** Extension Bolt × 1, Screw × 1

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

## 2.5.6 MEC Card (KX-TDA5105)

### Function

Memory expansion card to increase system data 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.



### Accessories and User-supplied Items

**Accessories (included):** none

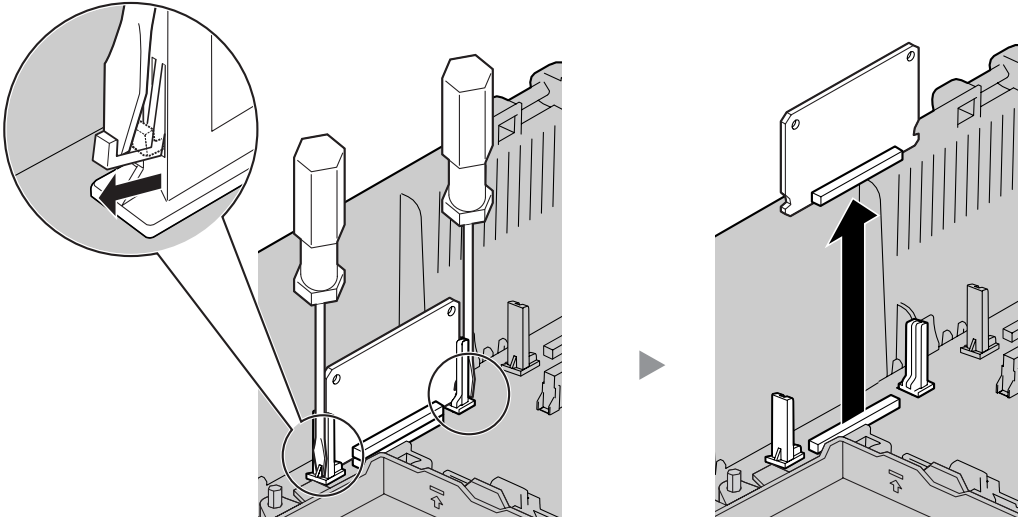
**User-supplied (not included):** none

### **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**

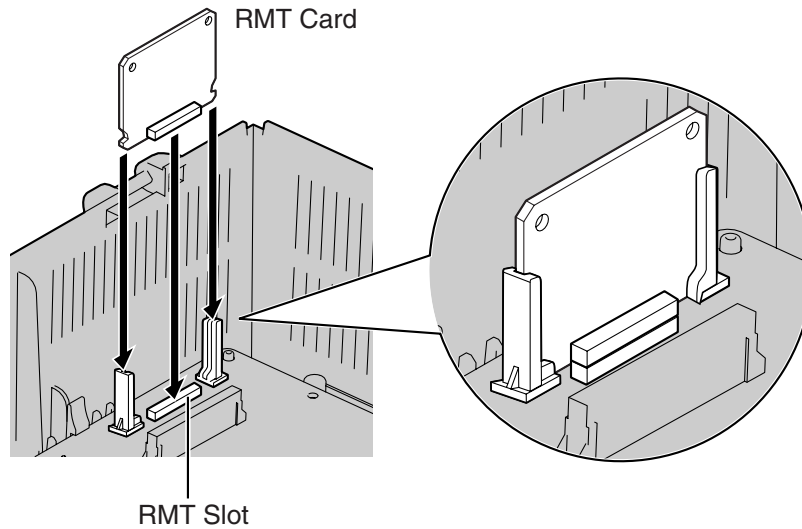
Pull open the guide rails using a flathead screwdriver and, while holding them open, remove the MEC card.



## 2.5.7 RMT Card (KX-TDA5196)

### Function

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



### Accessories and User-supplied Items

**Accessories (included):** none

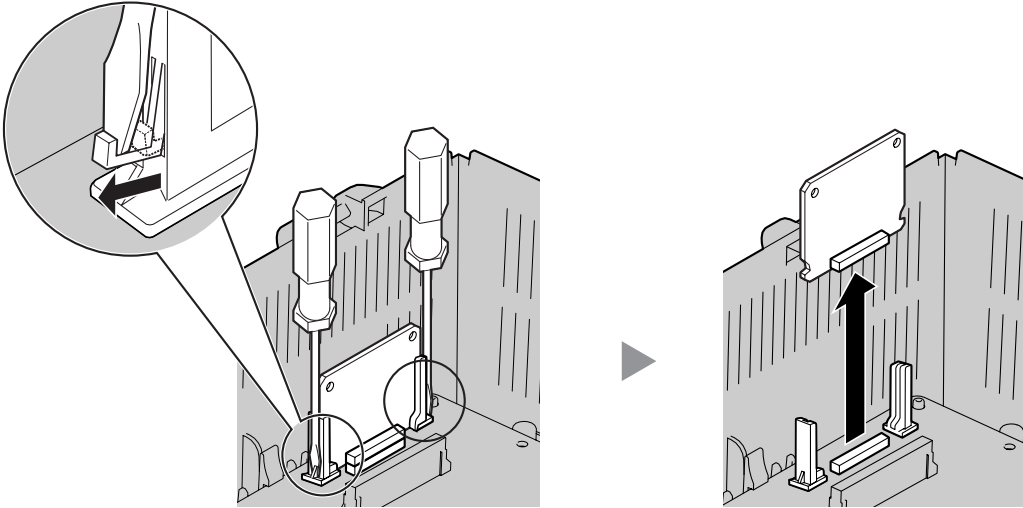
**User-supplied (not included):** none

### **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.

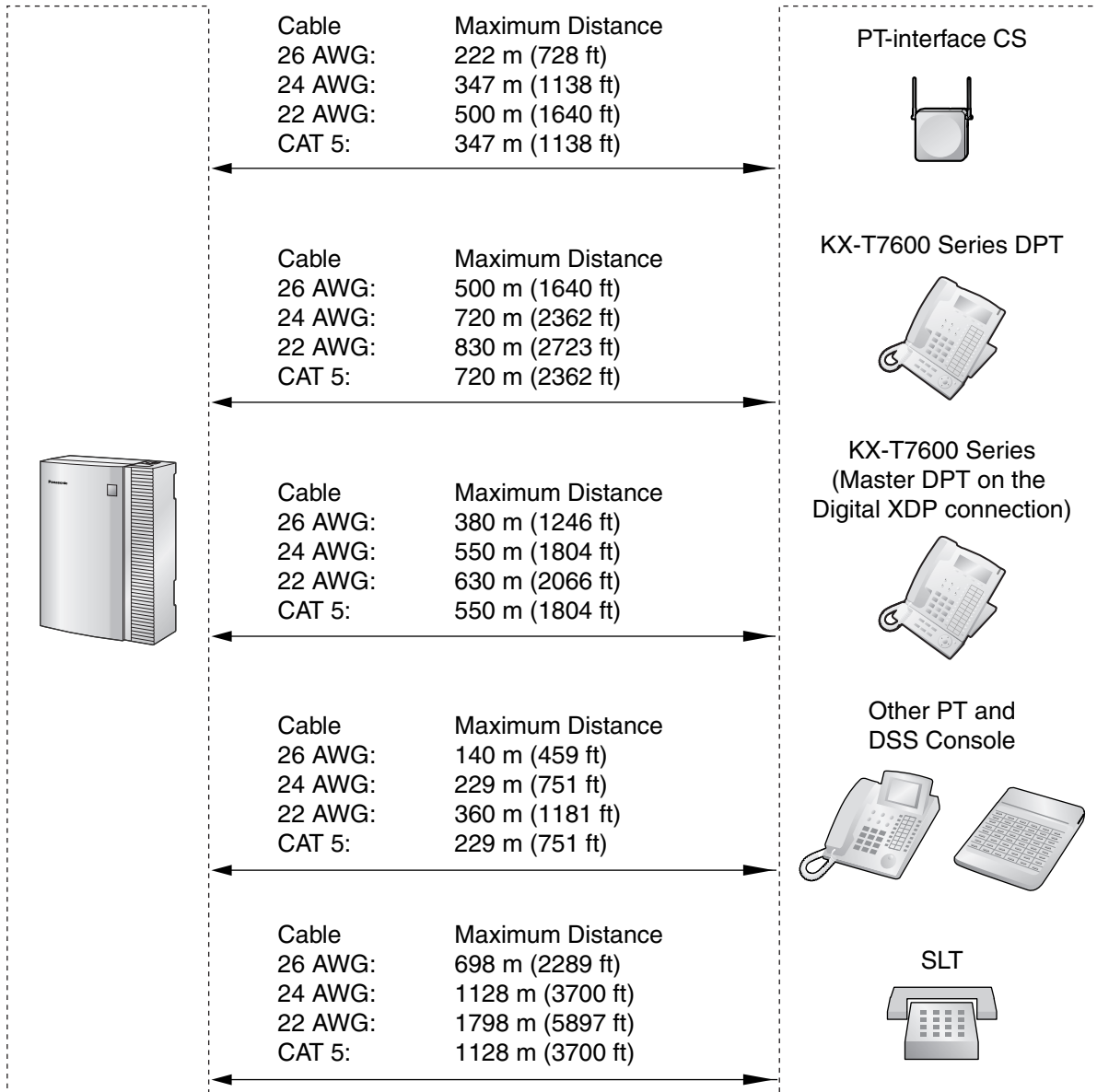
**Removing the RMT Card**

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)



**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.

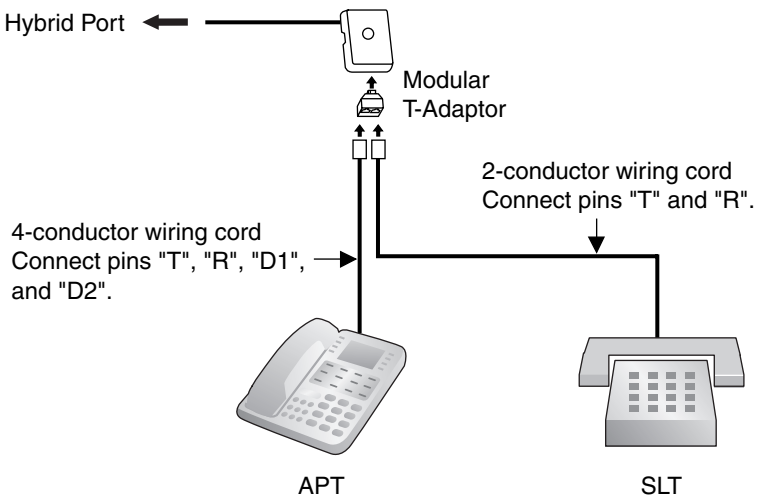
### Note

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

For parallel connection, eXtra Device Port (XDP) mode must be disabled for that port through system programming. Refer to "1.13.2 Paralleled Telephone" and "1.5.7 Extension Port Configuration" in the Feature Manual for further information.

To a Super Hybrid Port ←



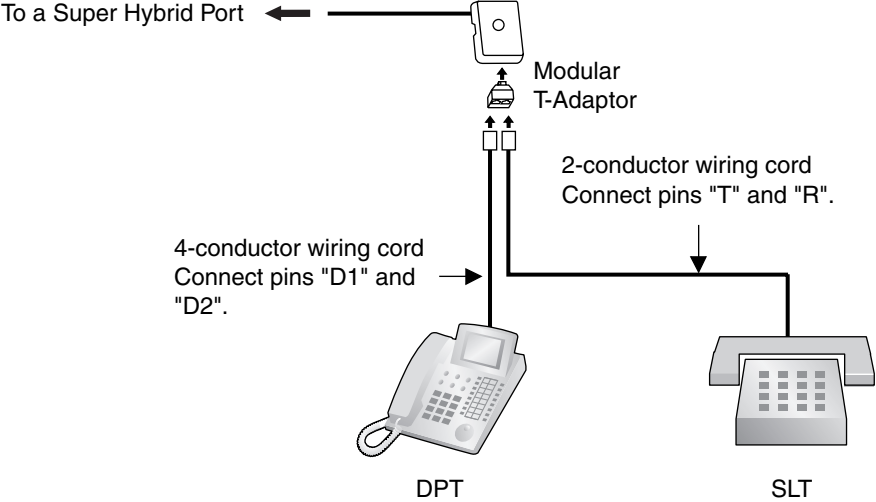
### With DPT

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

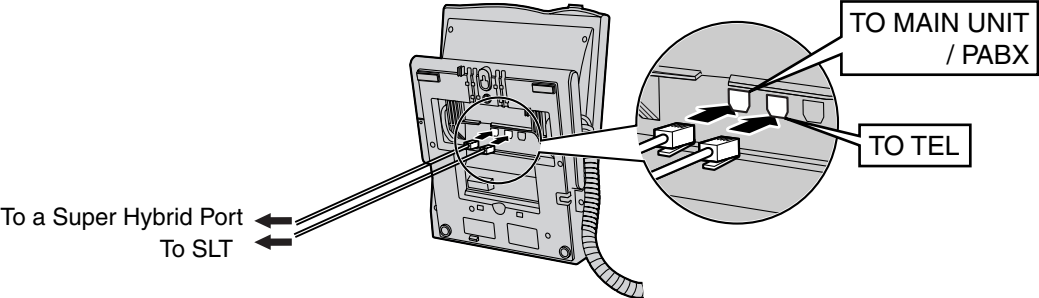
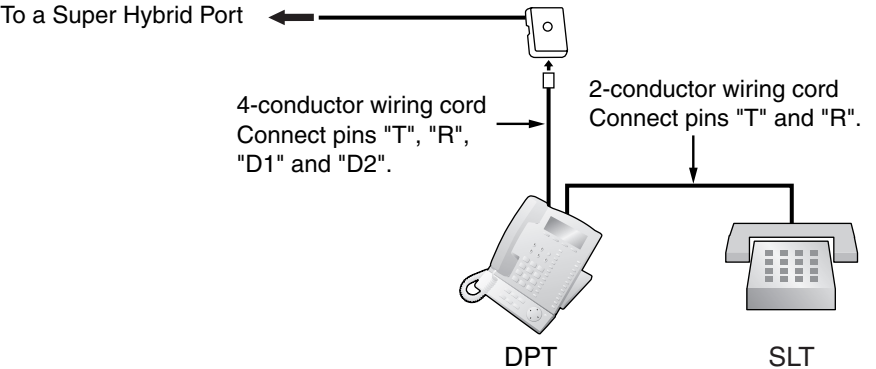
If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.13.2 Paralleled Telephone" and "1.5.7 Extension Port Configuration" in the Feature Manual for further information.



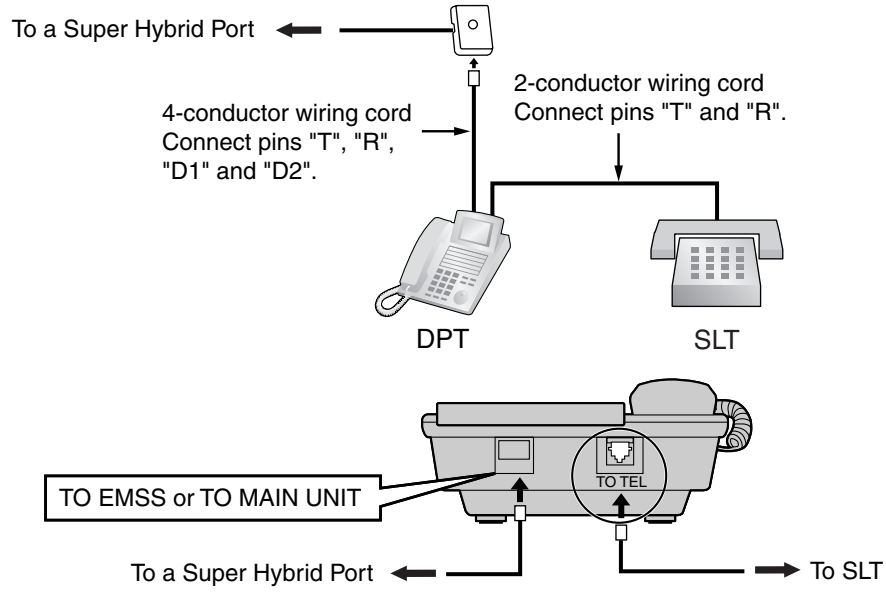
**Using a Modular T-Adaptor**



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



**With Other DPT**



## 2.6.3 Digital EXtra Device Port (Digital XDP) Connection

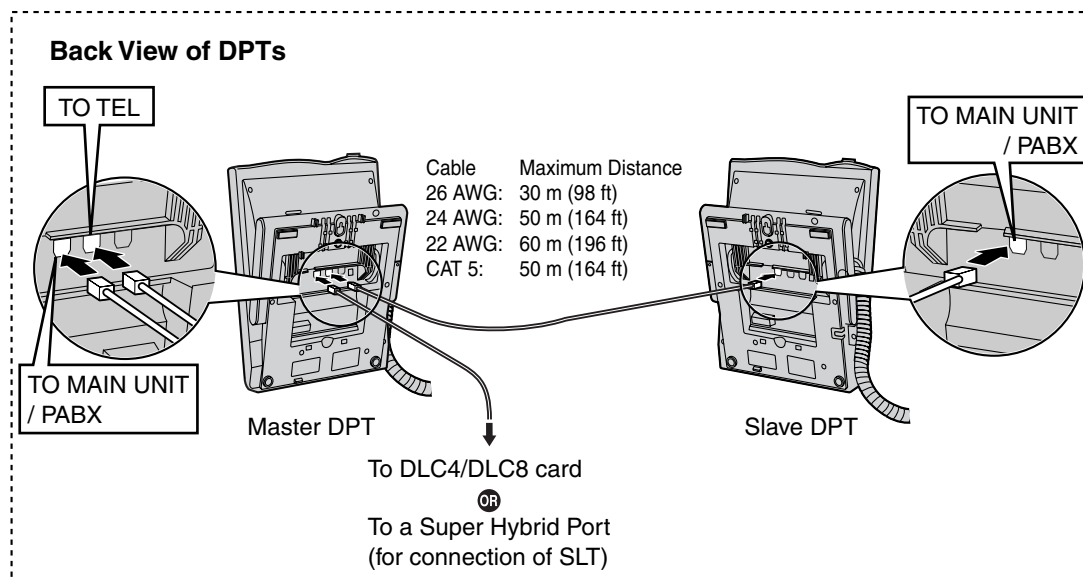
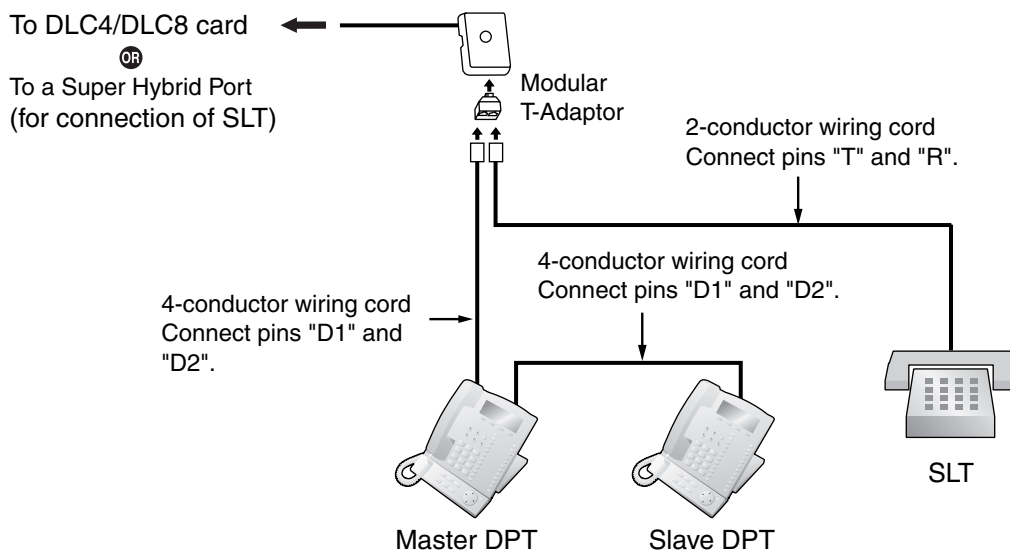
A DPT can be connected to another DPT on the Digital XDP connection. In addition, if the DPT is connected to a Super Hybrid Port, it can also have an SLT connected in Parallel mode or XDP mode.

### Notes

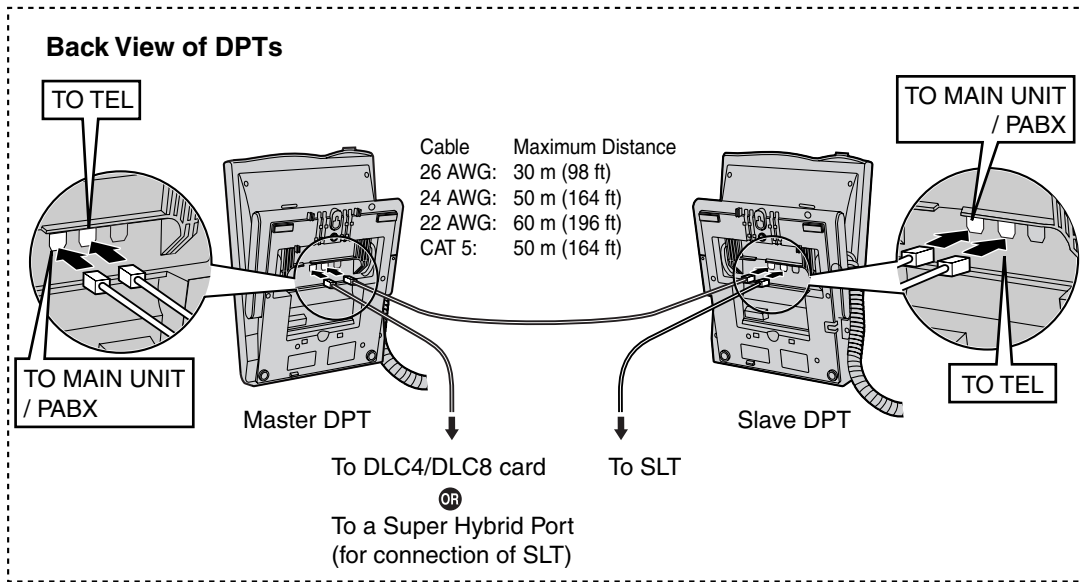
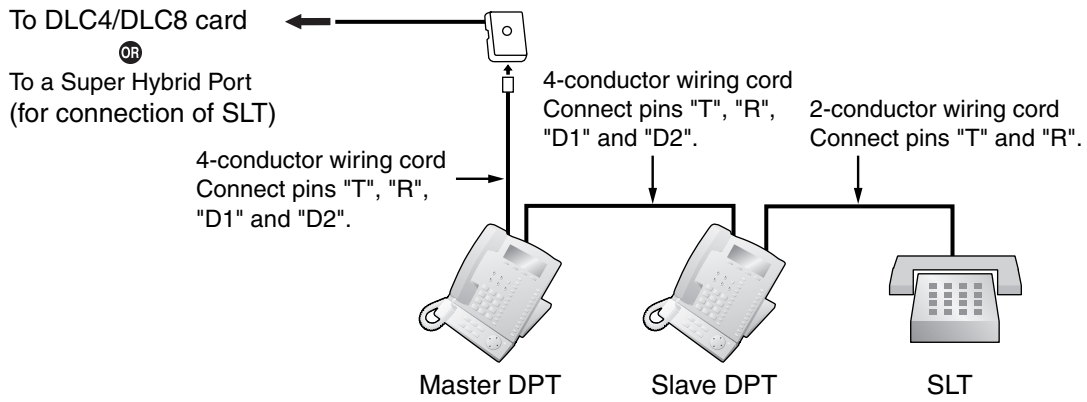
- Both DPTs must be KX-T7600 series DPTs (except KX-T7640). Note that the KX-T7667 can only be connected as a slave DPT.
- Parallel mode or XDP mode can be selected through system programming.
- If XDP mode is enabled through system programming, parallel connection is not possible. Refer to "1.13.2 Paralleled Telephone" and "1.5.7 Extension Port Configuration" in the Feature Manual for further information.

### With KX-T7600 Series DPT

#### Using a Modular T-Adaptor



Using an EXtra Device Port



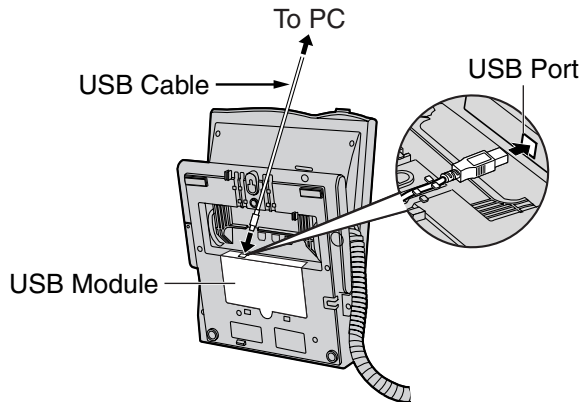
## 2.6.4 First Party Call Control CTI Connection

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 2.0), 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**

- The 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]), and 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 in conducting the site survey. An incorrectly performed 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 a map of the CS installation site.
- b. Identify the service area required by the user on the map.
- c. Plan the location of each CS, taking account of distance, building materials, 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.

#### Notes

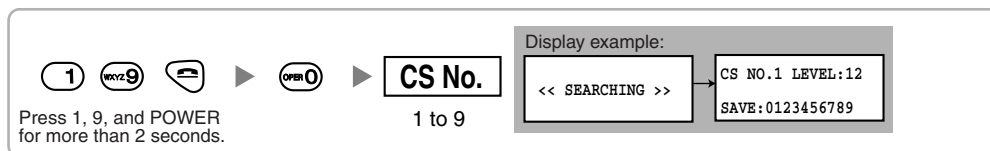
- Install at least 2 m (6 ft 7 in) above the floor.
- Keep the antennas in the upright position.

### 3. Conduct the site survey

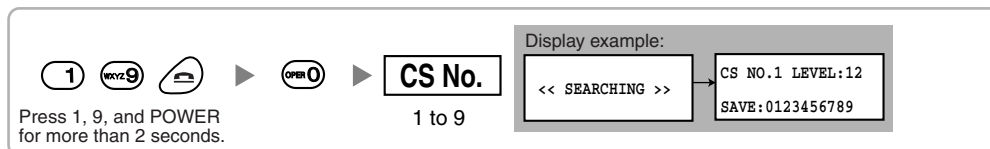
Refer to "2.7.5 Site Survey".

- 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



#### Using the KX-TD7690



- 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 required 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. If there are no problems in testing, 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

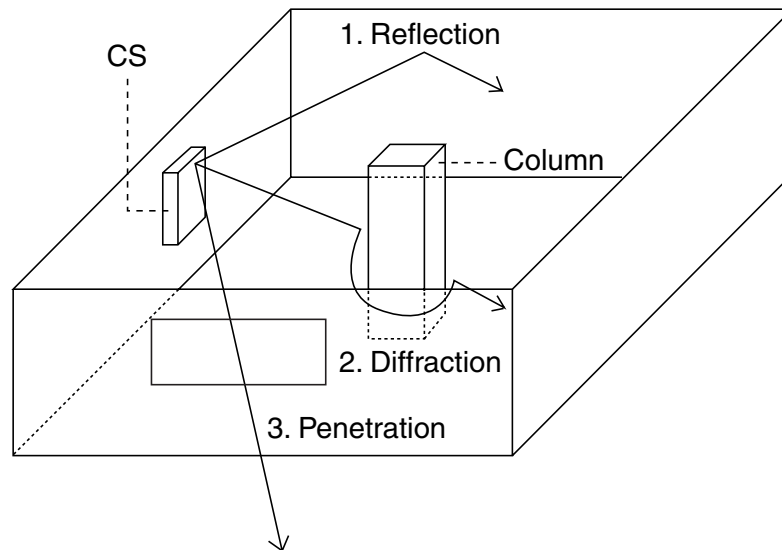
#### Characteristics of Radio Waves

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 made of materials such as metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects made of materials such as 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.

## 2.7 Connection of 2.4 GHz Portable Stations

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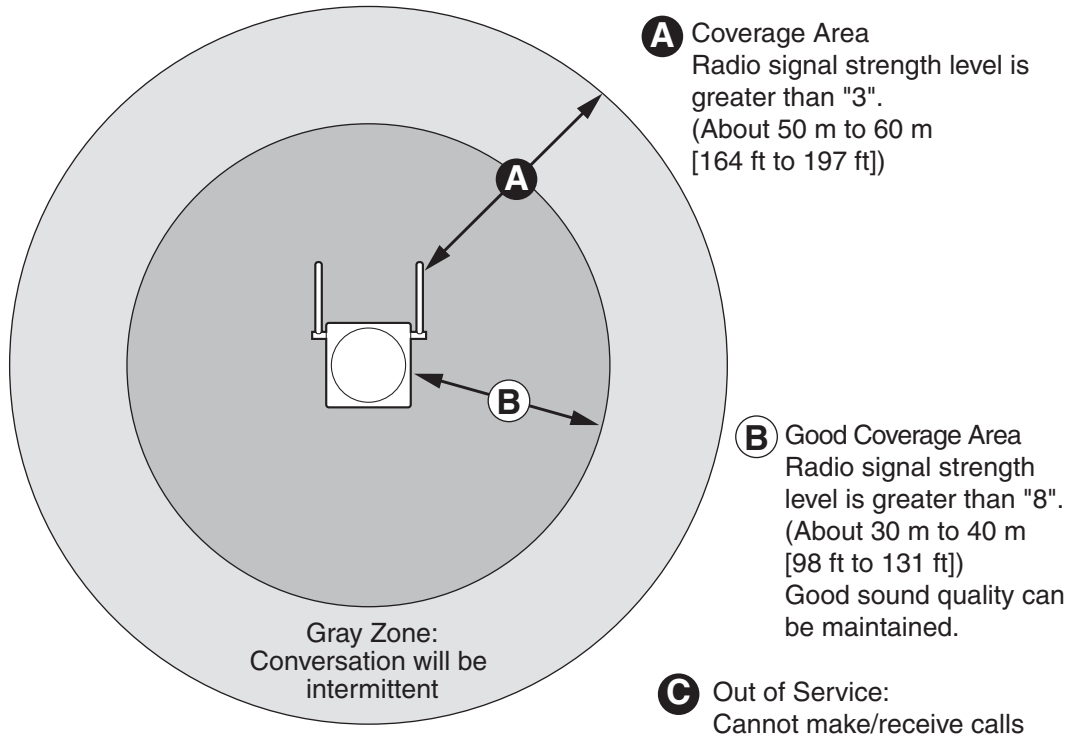
| <b>Object</b> | <b>Material</b>                        | <b>Transmission Tendency</b>   |
|---------------|--|--|
| Wall          | Concrete                               | The thicker they are, the less radio waves penetrate them.   |
|               | Ferroconcrete                          | Radio 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 net                    | 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 in an area with no obstacles.

### Note

Radio signal strength levels are measured during the site survey (refer to "2.7.5 Site Survey").



### 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

- Obtain a map and investigate the installation site.
  - Check the obstacles (e.g., shelves, columns, and partitions).
  - Check the materials of the structures (e.g., metal, concrete, and plywood).
  - Check the layout and dimensions of the room, corridor, etc.
  - Write down the above information to the map.
- Examine the service area required by the user on the map, referring to the following example.
  - Draw the coverage area around a CS. Extend the coverage area 30 to 60 meters (98 to 197 feet) in each 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.
  - 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

## 2.7 Connection of 2.4 GHz Portable Stations

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.

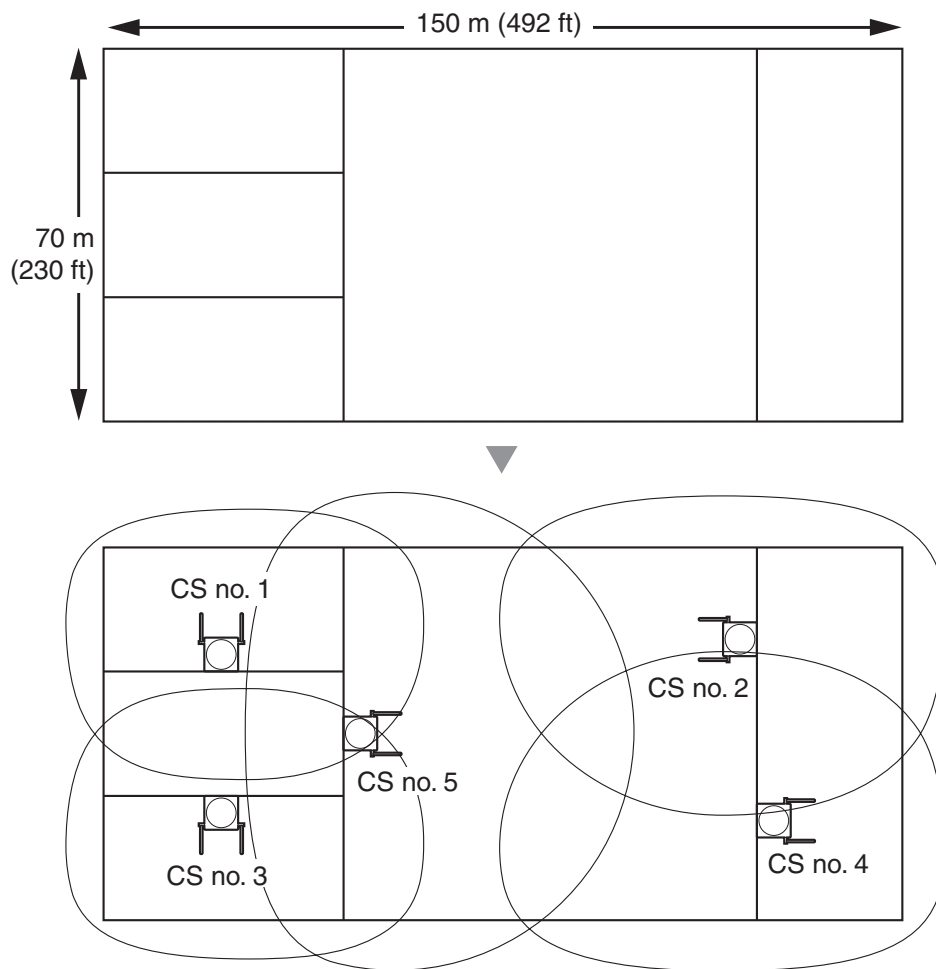
### Example: Installing in a Room Separated by Interior Walls

#### Things to take note of:

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

#### CS installation plan:

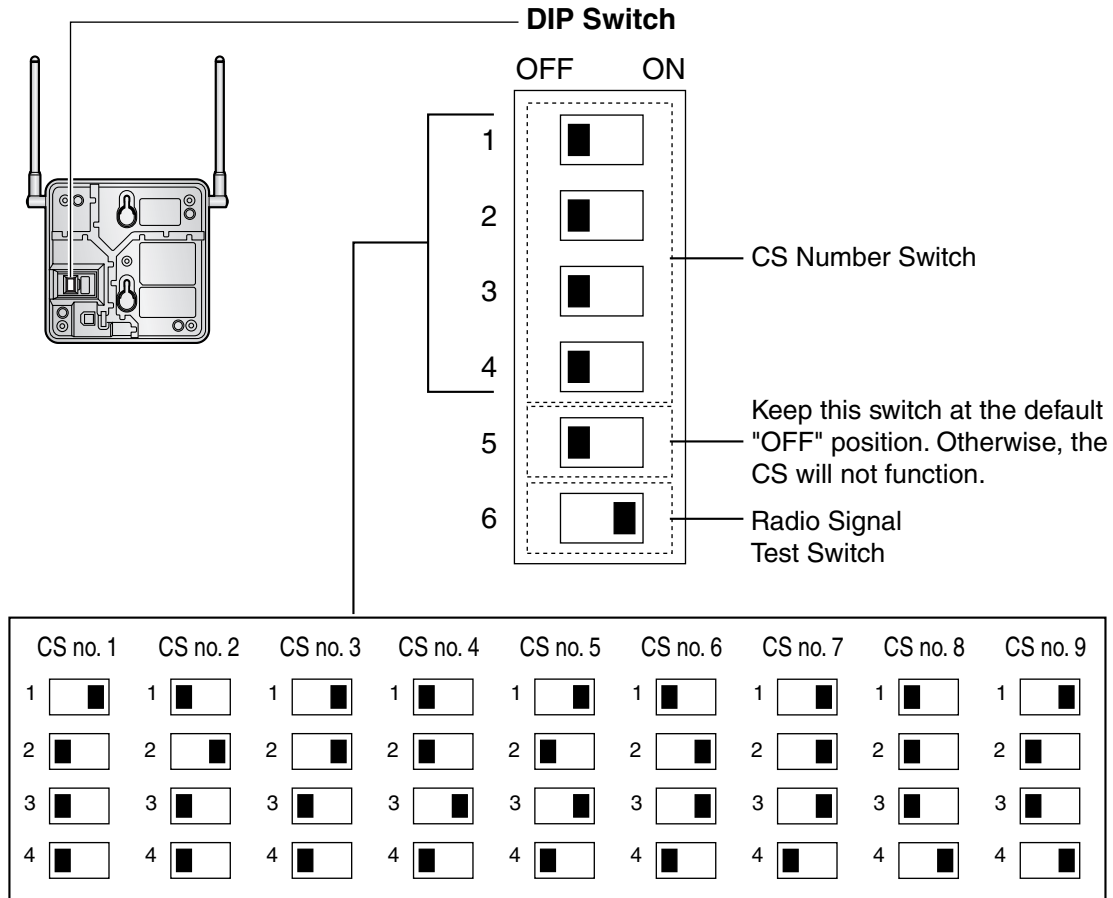
- The coverage area of each CS will not extend as far as when there are no obstacles, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



## 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.



**Note**

If more than 1 CS is in Radio Signal Test mode, each CS must have a unique CS number.

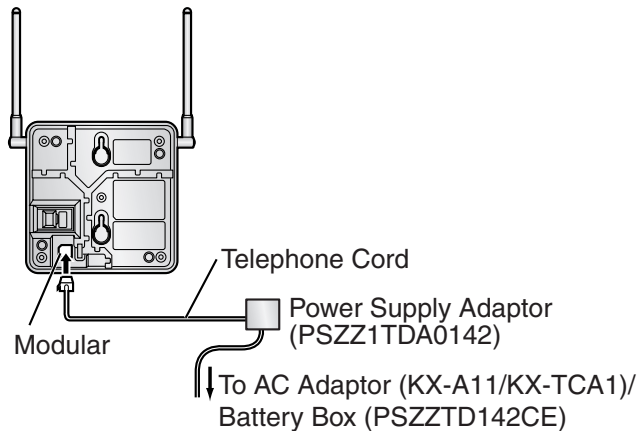
## 2.7 Connection of 2.4 GHz Portable Stations

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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.



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 Radio Signal Test mode and measure each CS coverage area. Then, record the results on the map of the installation site.

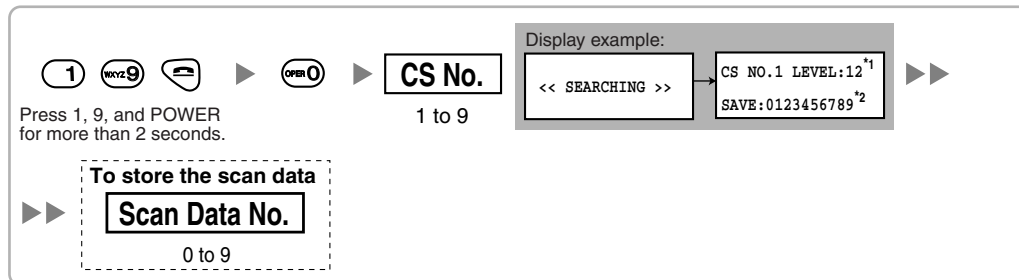
### Testing the Radio Signal Strength

#### Note

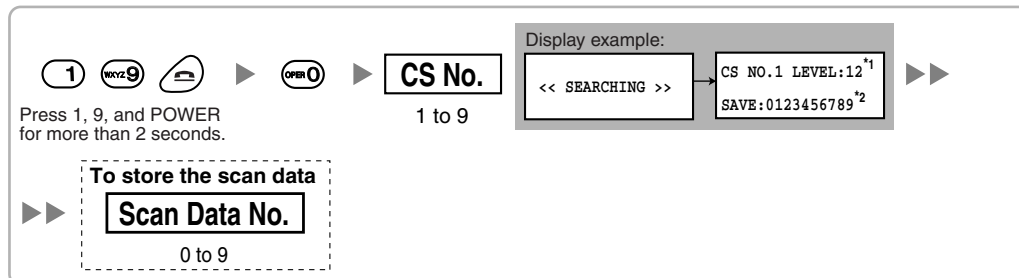
Display prompts for the site survey are only available in English.

1. Enter Radio Signal Test mode.

#### Using the KX-TD7680



#### Using the KX-TD7690

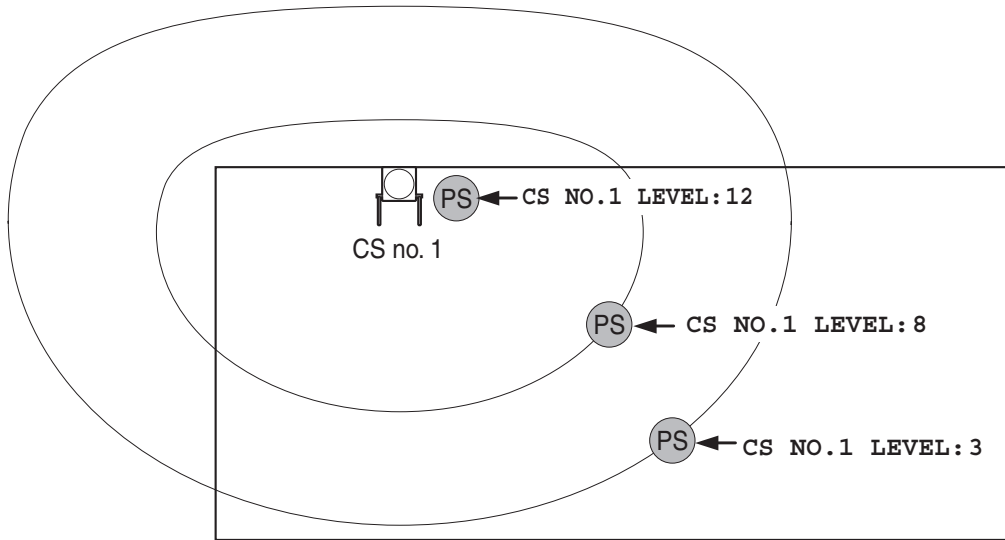


#### Notes

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

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

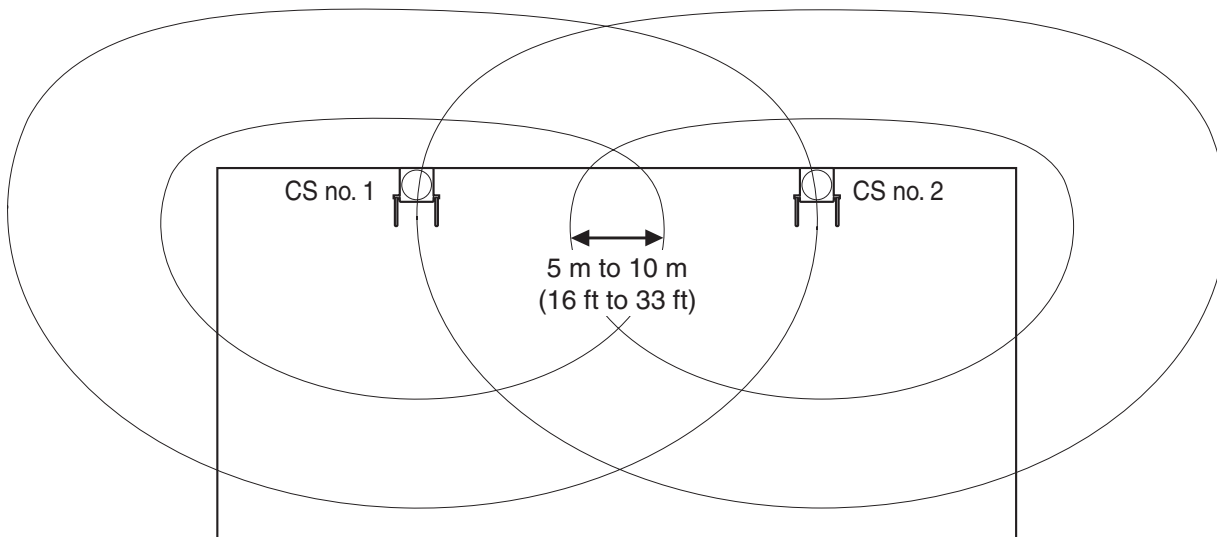
2. Measure the radio signal strength by moving towards and away from the CS.
  - a. Move to the CS until the radio signal strength level becomes "12".
  - b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the 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.



**Radio Signal Strength Levels**

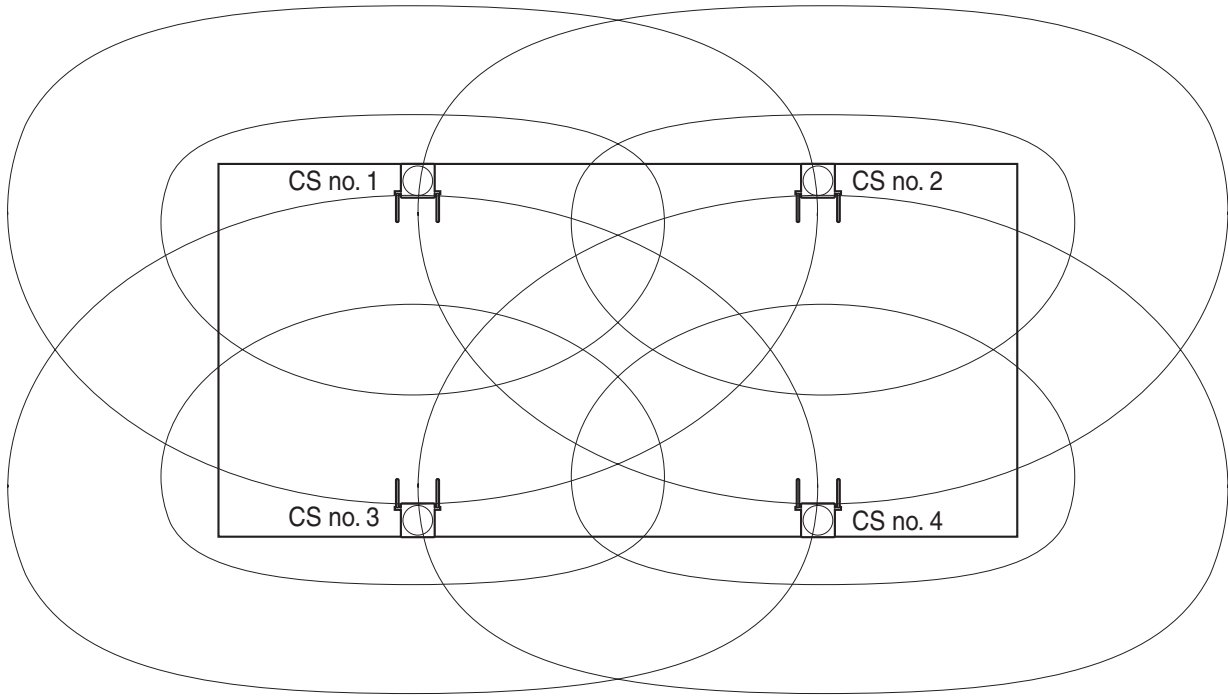
|                 |                                      |
|-----------------|--------------------------------------|
| Level: 00       | Out of range                         |
| Level: 01 to 02 | Receives noise easily or disconnects |
| Level: 03 to 07 | May receive noise                    |
| Level: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

3. Repeat 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).





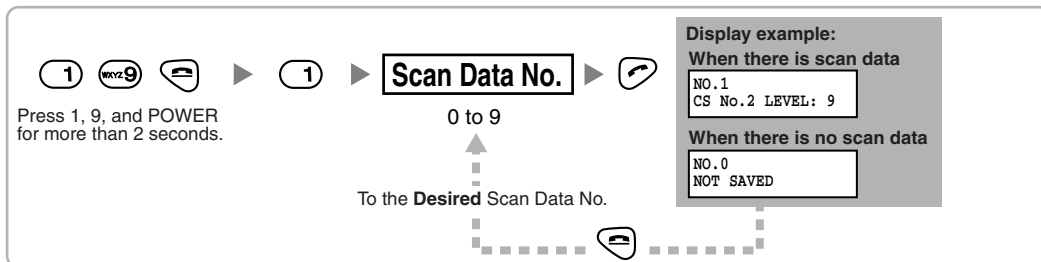
- b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.



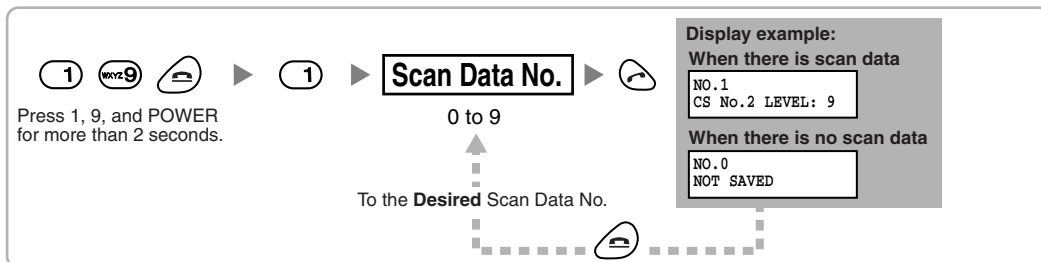
- c. Make sure that the radio signal strength level is greater than "3" at any location in the service area required by the user.

## Referring to the Stored Scan Data

### Using the KX-TD7680

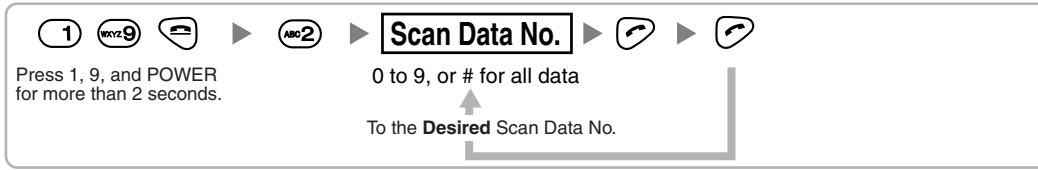


### Using the KX-TD7690

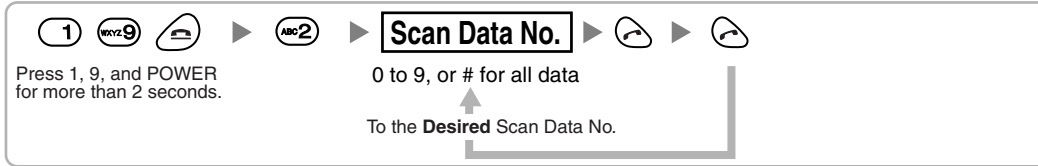


## Deleting the Stored Scan Data

### Using the KX-TD7680



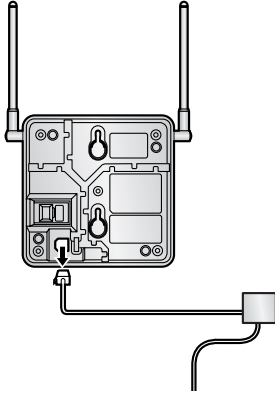
### Using the KX-TD7690



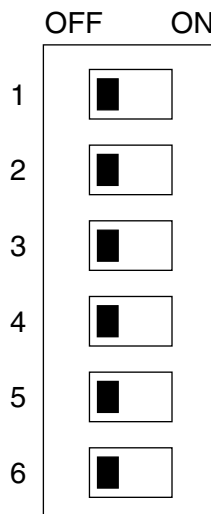
## 2.7.6 After Site Survey

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

1. Keep pressing the 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.

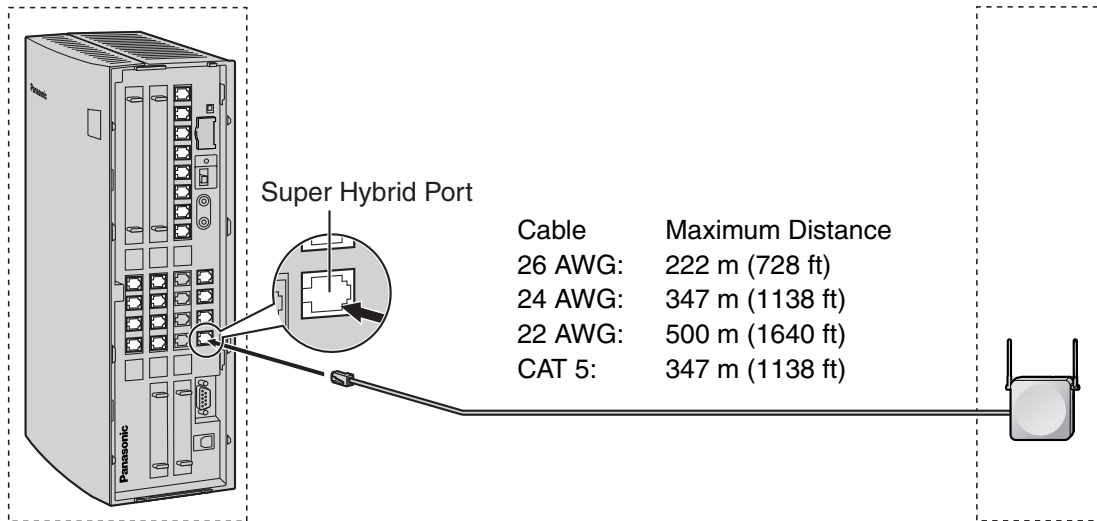


3. Switch all DIP switches on the CS from ON to OFF.



## 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.



A Super Hybrid Port,  
or HLC4/DLC4/DLC8 card  
(RJ11)

CS (RJ11)

| Signal Name | Pin No. | Pin No. | Signal Name |
|-------------|---------|---------|-------------|
| D1          | 1       | 1       | D1          |
|             | 2       | 2       |             |
|             | 3       | 3       |             |
| D2          | 4       | 4       | D2          |

### Accessories and User-supplied Items for the CS

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

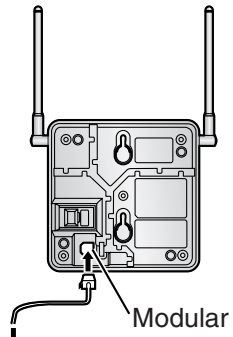
**User-supplied (not included):** RJ11 connector

#### Note

For details about HLC4 card, DLC4 card or DLC8 card, refer to "2.4.1 HLC4 Card (KX-TDA5170)", "2.4.2 DLC4 Card (KX-TDA5171)" or "2.4.5 DLC8 Card (KX-TDA5172)".

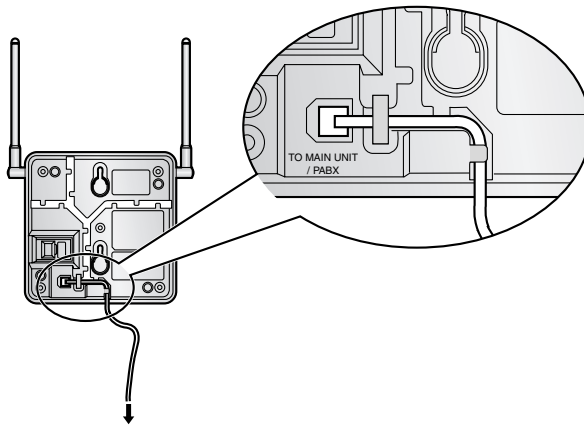
## Connecting the CS

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



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

## Registering the PS

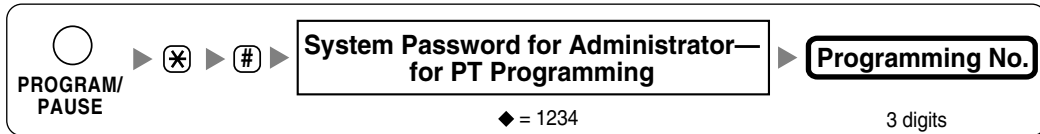
The PS must be registered to the Hybrid IP-PBX before it can be used. Programming of both the PS and Hybrid IP-PBX is required. A PT with multiline display (e.g., KX-T7636 6-line display) is required to perform the Hybrid IP-PBX system programming.

### Note

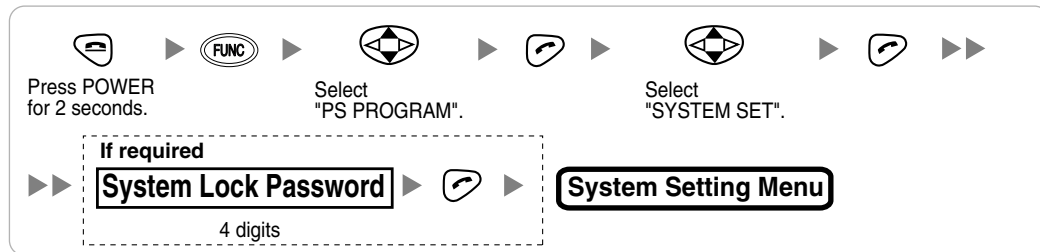
For details about system programming using a PT, refer to "1.13.28 PT Programming" in the Feature Manual and "2.1 PT Programming" in the PT Programming Manual.

## Entering the System Programming Mode

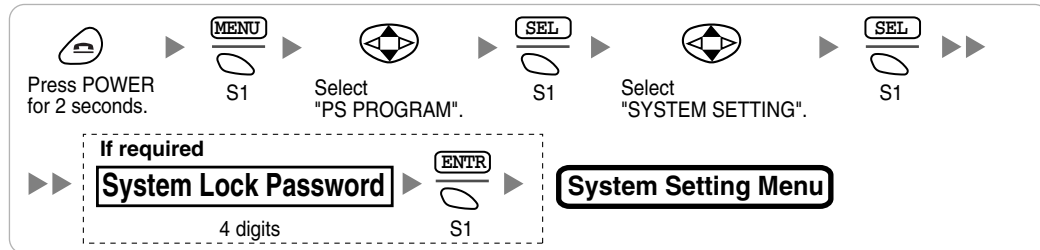
### PT (Administrator Level)



### PS (Using the KX-TD7680)



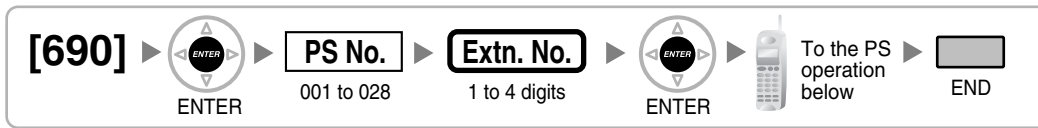
### PS (Using the KX-TD7690)



### Note

◆ means default value throughout this section.

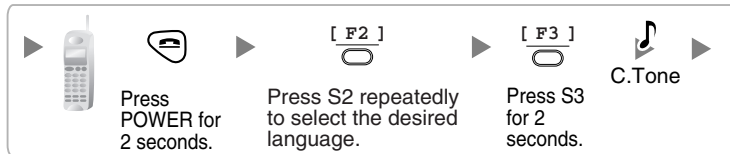
### PS Registration



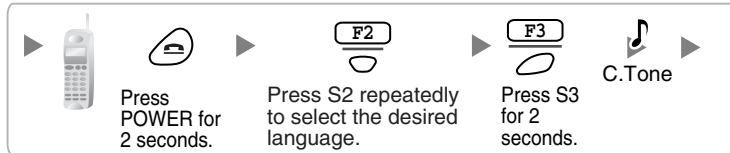
#### When the PS has not been registered yet

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



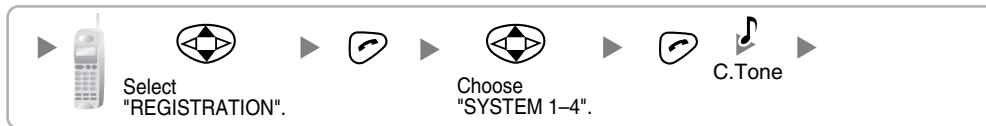
#### Using the KX-TD7690



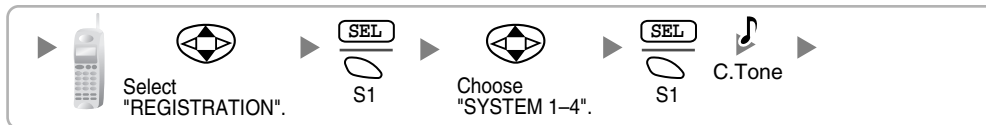
#### When the PS has already been registered to another Hybrid IP-PBX

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

#### Using the KX-TD7680



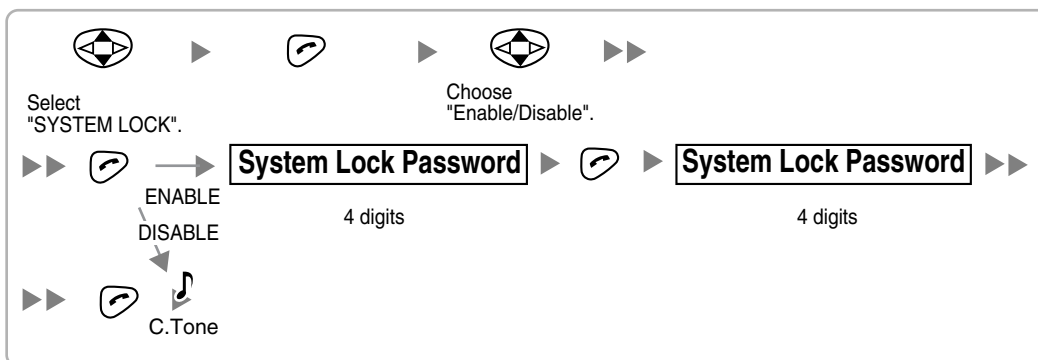
#### Using the KX-TD7690



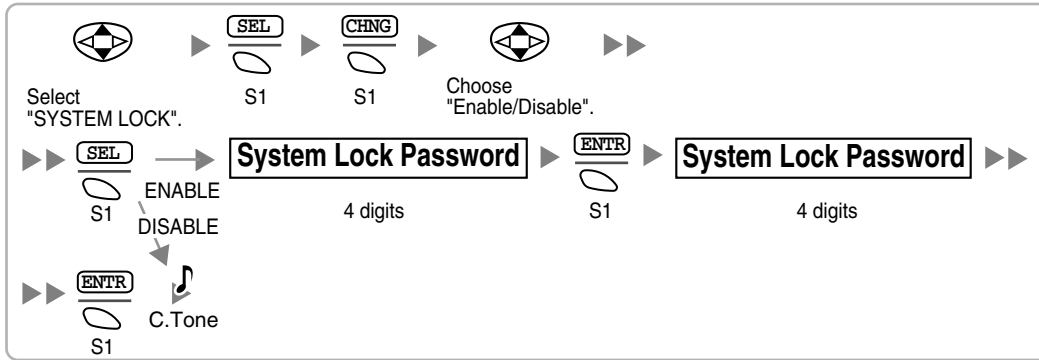
### Setting the System Lock

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

#### Using the KX-TD7680



**Using the KX-TD7690**



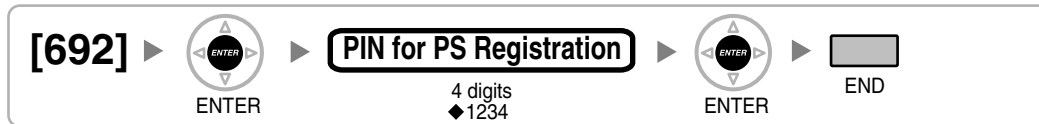
**Setting the Personal Identification Number (PIN) for PS Registration**

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, enter 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, during normal operation after registration, even if there is more than 1 Hybrid IP-PBX with the same PIN near the PS, the PS will not be inadvertently linked to a different Hybrid IP-PBX.

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

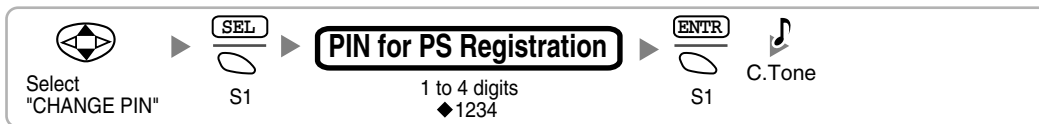


**Setting the PIN for PS**

**Using the KX-TD7680**



**Using the KX-TD7690**

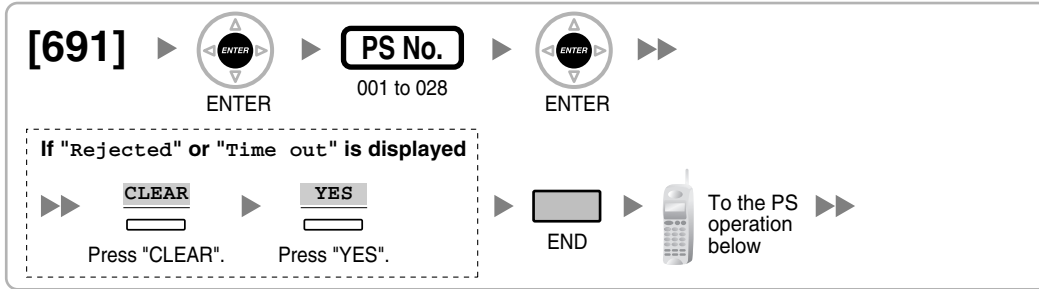




### PS Termination

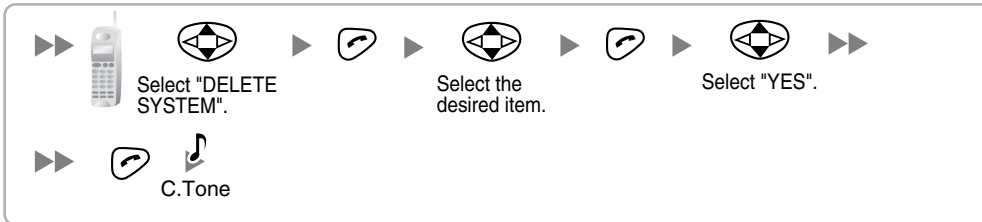
Confirm the following before canceling the PS registration:

- The PS is turned on.
- The PS is within range.

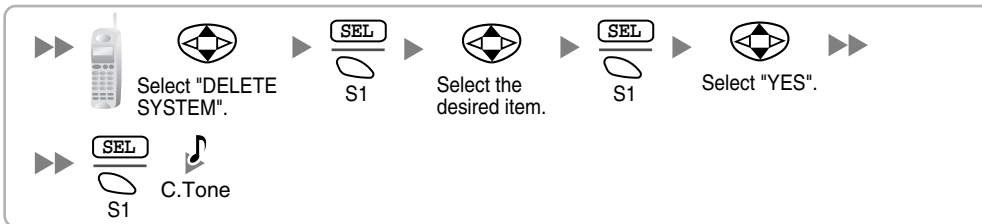


#### If the registration information is still stored in the PS

##### Using the KX-TD7680



##### Using the KX-TD7690



### Testing the Operation

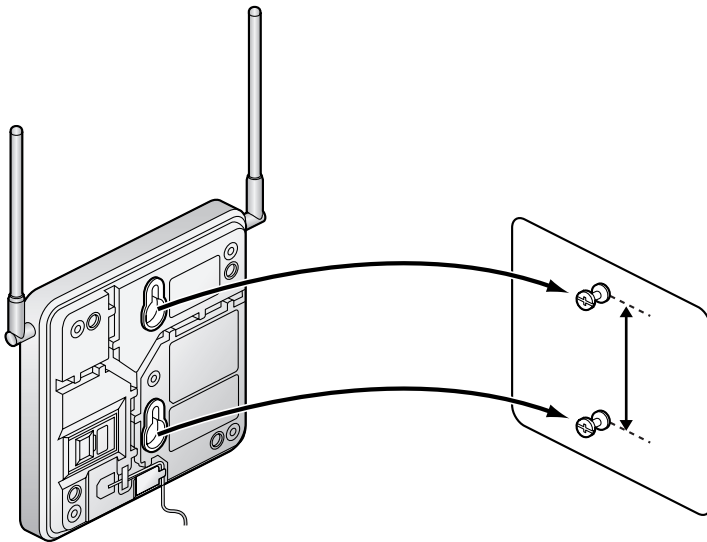
Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install an additional CS.

## 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.

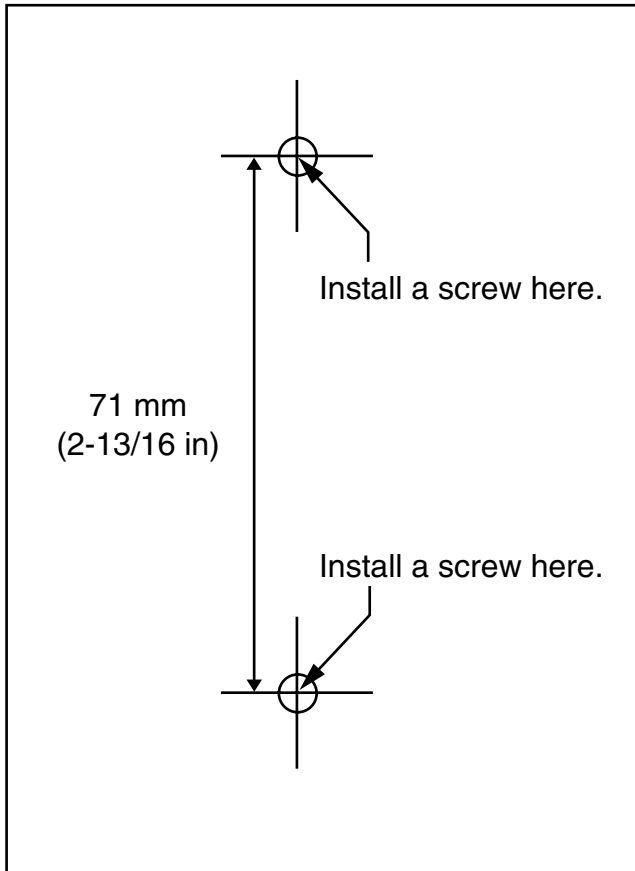
### Notes

- 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.



### **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

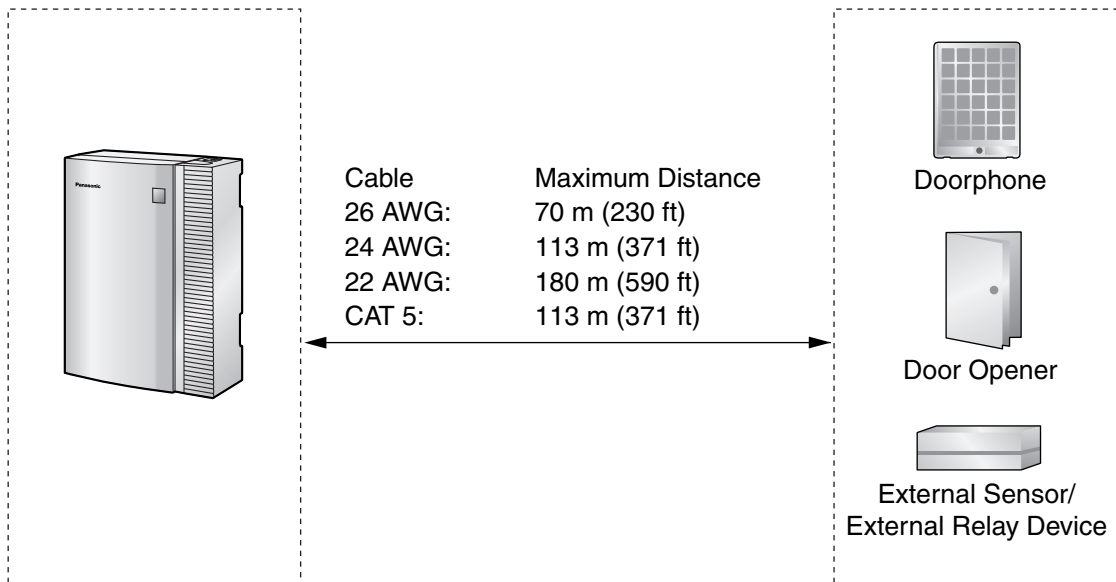
### 2.8.1 Connection of Doorphones, Door Openers, External Sensors, and External Relays

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**

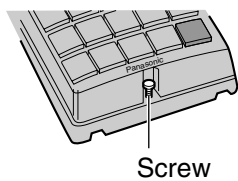
Doorphones, door openers, external sensors, and external relays are user-supplied.

#### Maximum Cabling Distance

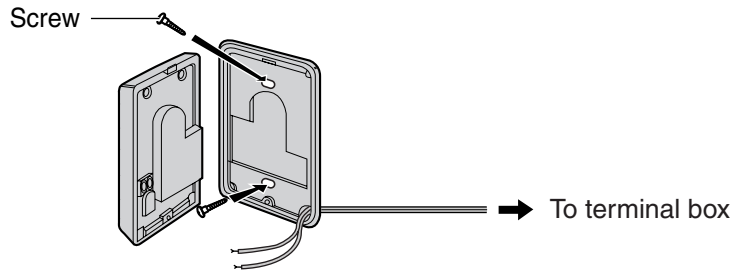


#### Installing the Doorphone (KX-T30865)

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





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



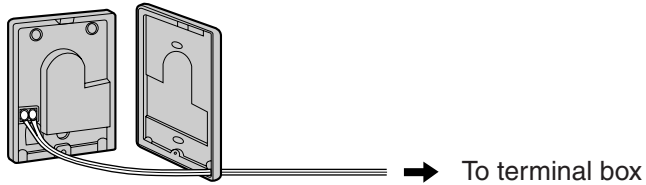
**Note**

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

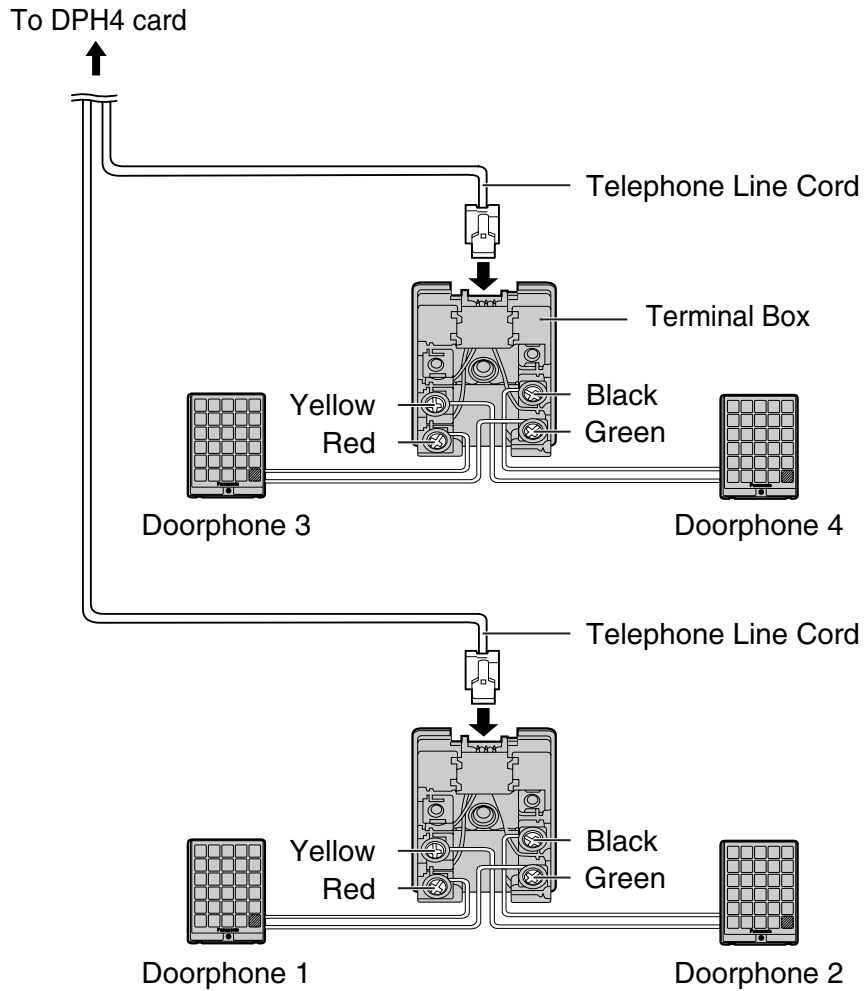
3. Connect the wires to the screws located in the front cover.



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

## Connection of Doorphones

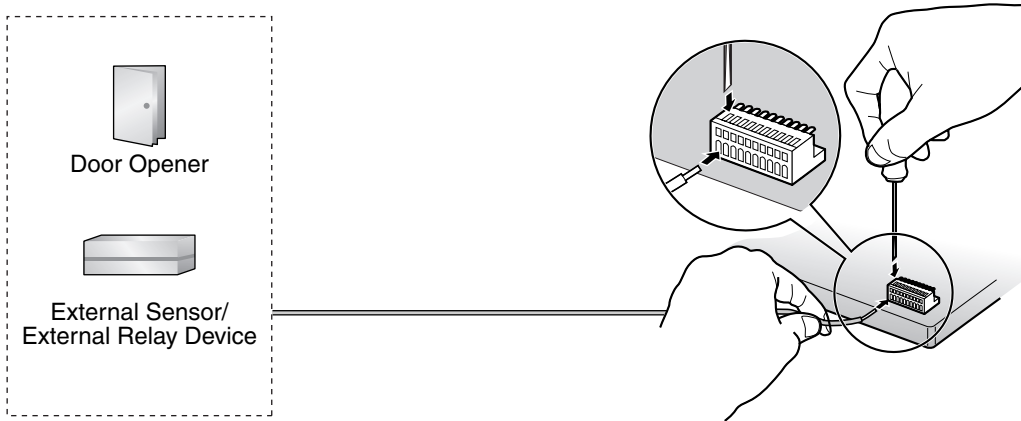
1. Connect DPH4 Card to the terminal boxes using telephone line cords. Refer to "2.5.1 DPH4 Card (KX-TDA5161)" for pin assignments.
2. Connect the wires of doorphones 1 and 3 to the red and green screws on the terminal box.
3. Connect the wires of doorphones 2 and 4 to the yellow and black screws on the terminal box.



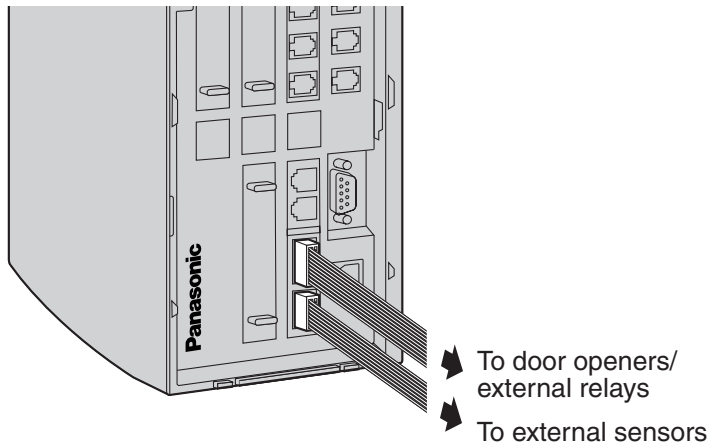
## Connection of Door Openers, External Sensors, and External Relays

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 (KX-TDA5161)" for pin assignments.

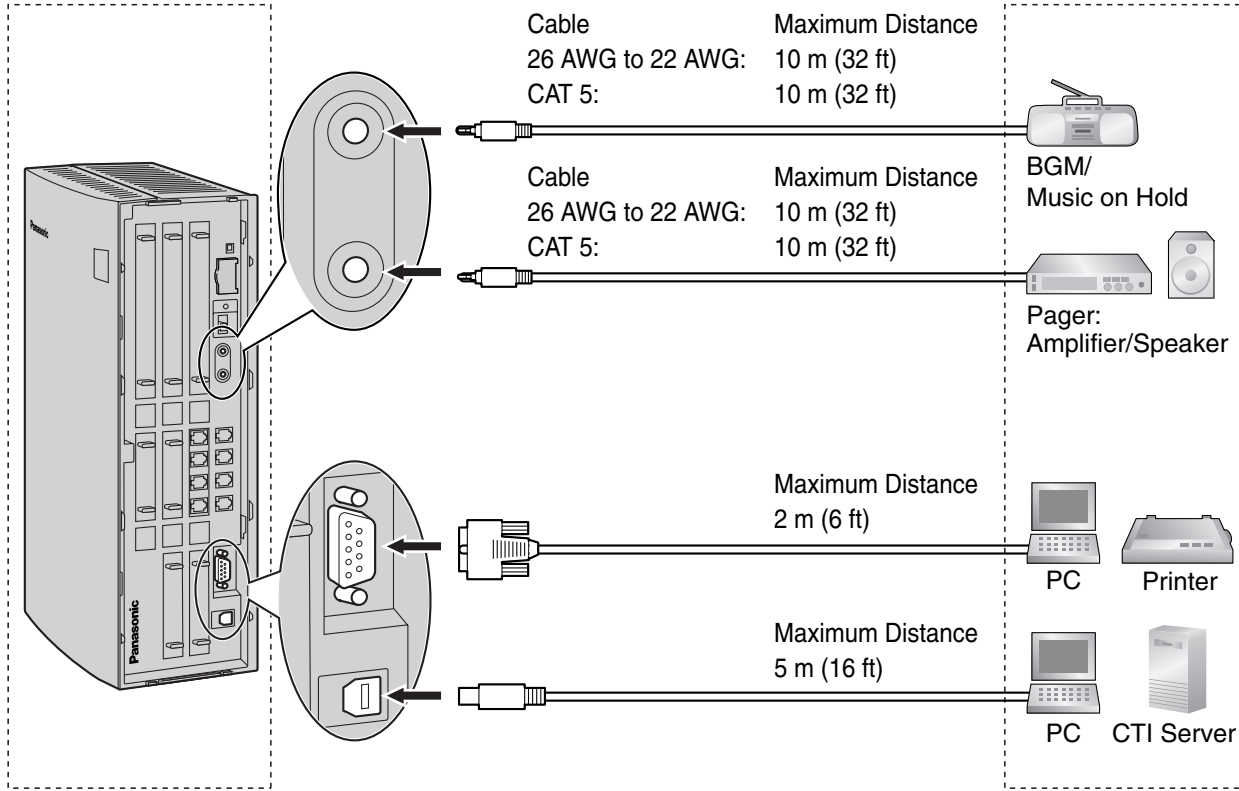


2. Attach the terminal blocks to the connectors of the DPH4 card in the Hybrid IP-PBX.



## 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, sound may only be heard intermittently.
- 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.

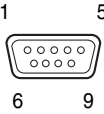
## PC/Printer (via RS-232C)

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

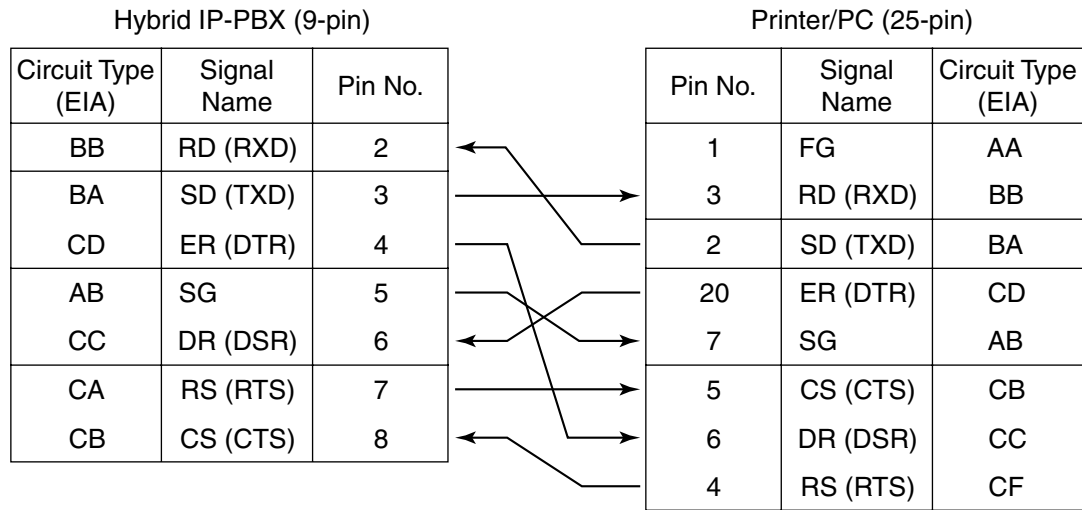
|  | No. | Signal Name | Function            | Circuit Type |       |
|--|-----|-------------|---------------------|--------------|-------|
|  |     |             |                     | EIA          | CCITT |
|  | 2   | RD (RXD)    | Receive Data        | BB           | 104   |
|  | 3   | SD (TXD)    | 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 (9-pin) |             |         | Printer/PC (9-pin) |         |             |                    |
|-----------------------|-------------|---------|--------------------|---------|-------------|--------------------|
| 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**



**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 2.0)

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 |
|---|-----|-------------|
|   | 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 "1.13.9 Power Failure Transfer" in the Feature Manual for further information.

#### 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

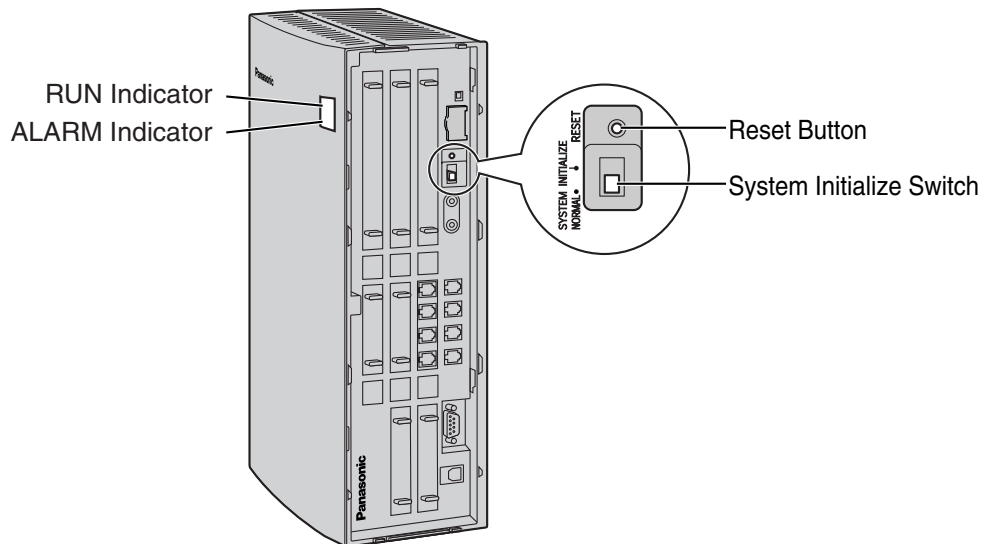
### 2.11.1 Starting the Hybrid IP-PBX

#### **CAUTION**

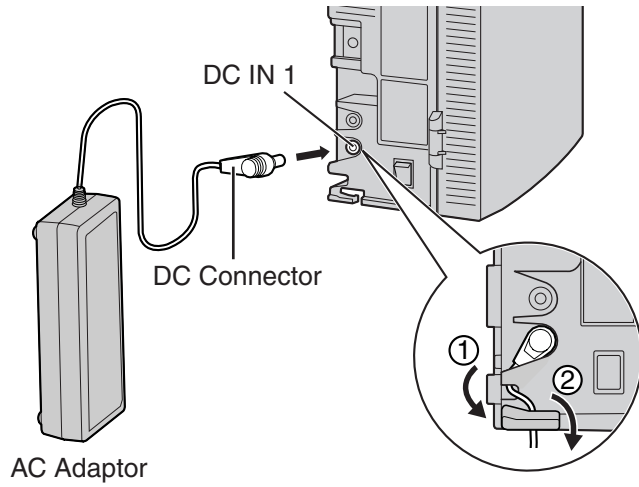
- The SD Memory Card must be inserted in the SD Memory Card slot of the main board before startup.
- Before touching the System Initialize Switch, discharge static electricity by touching ground or wearing a grounding strap.
- Once you have started the Hybrid IP-PBX and if you unplug the Hybrid IP-PBX, 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.

#### System Initialization Procedure

1. Slide the System Initialize Switch to the "SYSTEM INITIALIZE" position.

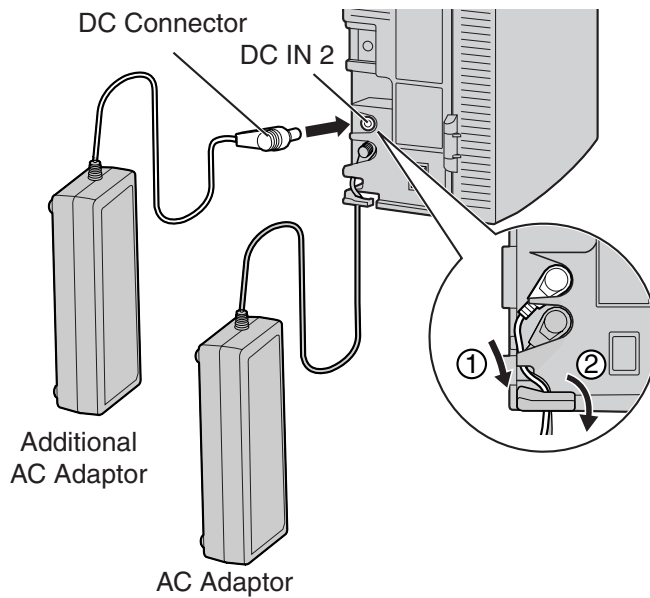


2. Plug the DC connector of the AC adaptor into DC IN 1.

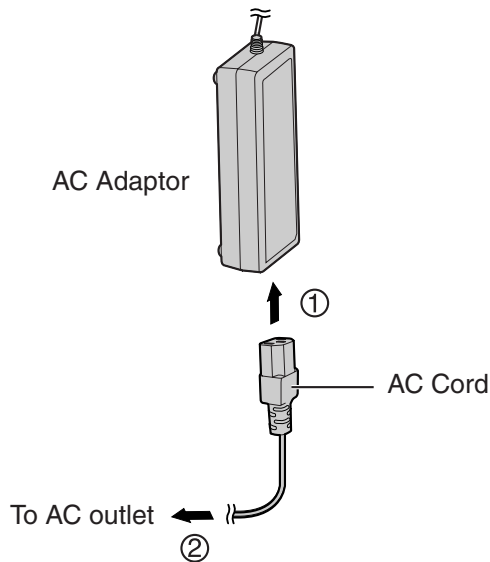


### **Notes**

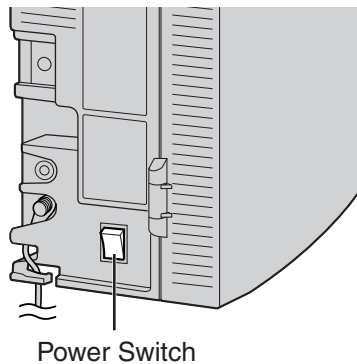
- The AC adaptor supplied with the Hybrid IP-PBX must be connected to DC IN 1. If an AC adaptor is connected only to DC IN 2, the Hybrid IP-PBX will not start.
- If you need to connect an additional AC adaptor, plug the DC connector of the additional AC adaptor into DC IN 2.



3. Plug the AC cord into the AC adaptor, and then plug the other end into an AC outlet.



4. Turn on the power switch. The RUN indicator will flash.



#### **Notes**

- 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, slide the System Initialize Switch back 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 stay 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.

#### **IMPORTANT**

**Use only the AC adaptor (Panasonic PSLP1244/Panasonic PSLP1434) and AC cord supplied with the Hybrid IP-PBX, or the Additional AC Adaptor (KX-A236).**

## LED Indications

| Indication | Color | Description   |
|------------|-------|---|
| RUN        | Green | PBX status indication <ul style="list-style-type: none"> <li>• OFF: Power off (includes normal reset)</li> <li>• ON: Power on and running (on-line)</li> <li>• Flashing (60 times per minute): Starting up</li> <li>• Flashing (120 times per minute): Starting up or resetting with:               <ul style="list-style-type: none"> <li>• the System Initialize Switch in "SYSTEM INITIALIZE" position</li> <li>• the SD Memory Card not inserted</li> </ul> </li> </ul> |
| ALARM      | Red   | Alarm detection status indication <ul style="list-style-type: none"> <li>• OFF: Normal</li> <li>• ON: Alarm (CPU stop, alarm for each optional service card)</li> <li>• Flashing: Alarm (MPR file error in restarting)</li> </ul>   |

## Confirming the CO Line Connection

After initialization, program the Hybrid IP-PBX and connect CO lines to the Hybrid IP-PBX.

To confirm that the CO lines are successfully connected, dial [\*] [3] [7] + CO line number (3 digits) on a PT, or press the PT's S-CO button. You will hear a dial tone if the 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.*

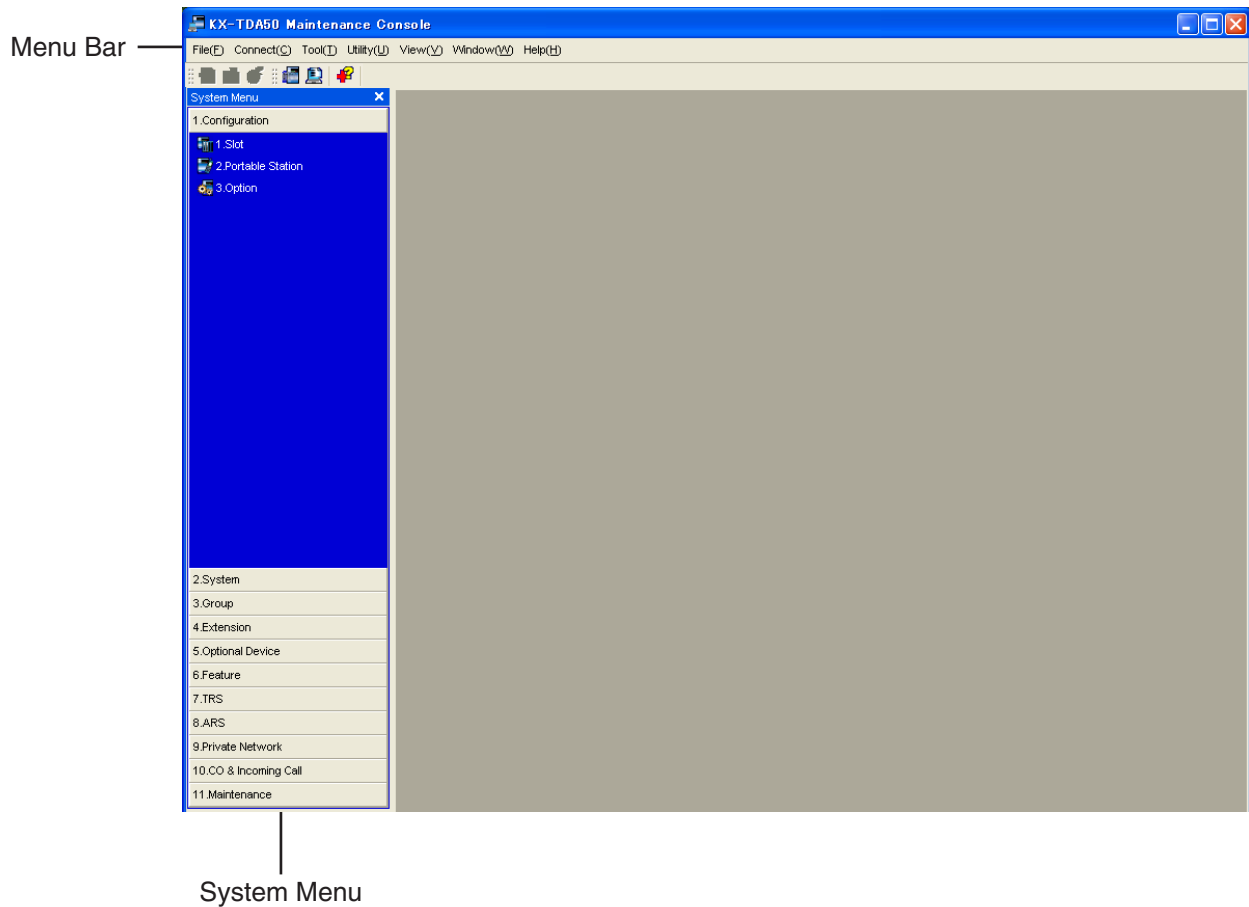
# 3.1 Overview

## 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\*<sup>1</sup>

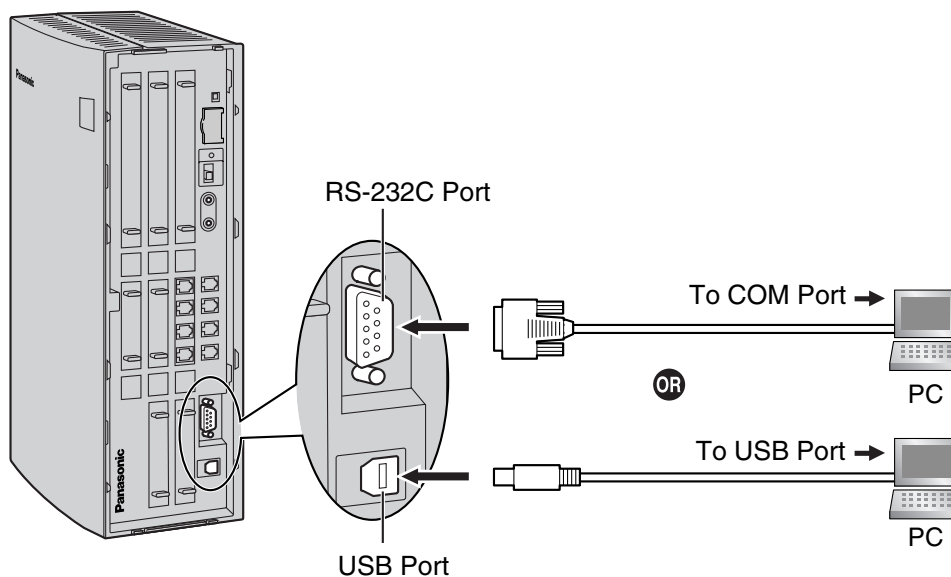


\*<sup>1</sup> The contents and design of the software are subject to change without notice.

## 3.2 Connection

### 3.2.1 Connection

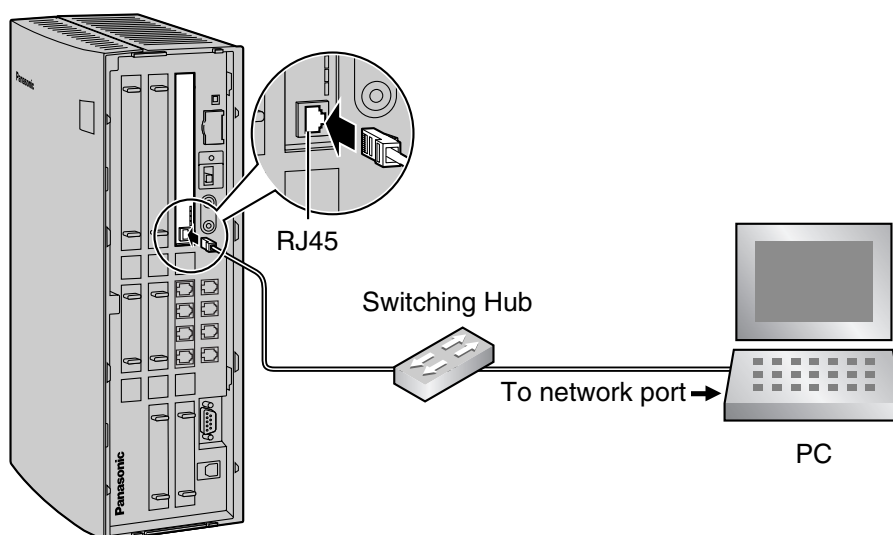
#### Serial Interface Connection



#### Note

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

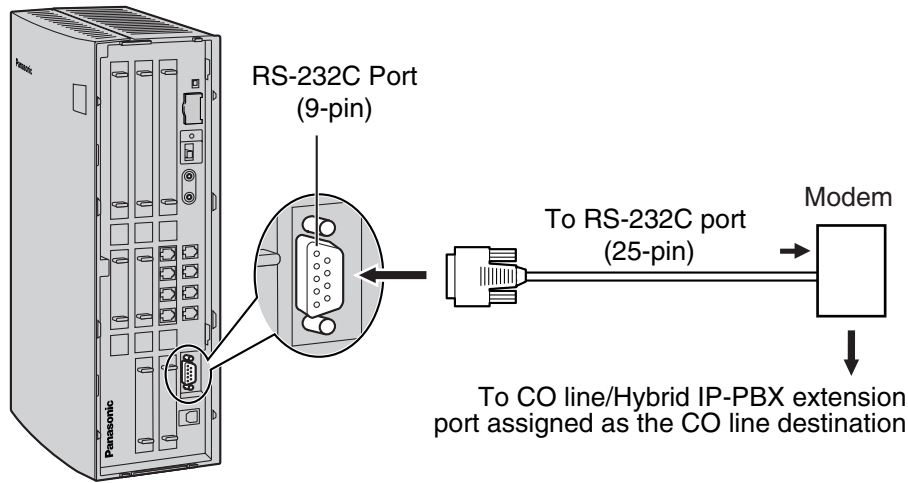
#### LAN Connection via IP-GW4 Card



#### Note

For pin assignments and maximum cabling distance, refer to "2.3.3 IP-GW4 Card (KX-TDA5480)".

## External Modem Connection

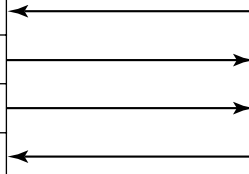


Hybrid IP-PBX (9-pin)

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

External Modem (25-pin)

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



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.
- 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&F" 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

##### Required Operating System

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

##### Minimum Hardware Requirements

- CPU: 300 MHz Intel® Celeron® microprocessor
- HDD: 100 MB of available hard disk space
- RAM: 128 MB of available RAM

#### Installing the KX-TDA50 Maintenance Console

##### Notes

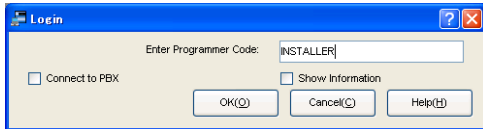
- Make sure to install and use the latest version of the KX-TDA50 Maintenance Console.
- To install or uninstall the software on a PC running Windows 2000 Professional or Windows XP Professional, you must be logged in as a user in either the "Administrators" or "Power Users" group.
- To connect the PC to the Hybrid IP-PBX via USB, the KX-TDA USB driver must be installed. Follow the instructions of the wizard to install the KX-TDA USB driver. When the Hybrid IP-PBX is first connected to the PC via USB, you may be asked to select the appropriate USB driver. Browse for and select the KX-TDA USB driver that was installed previously.



1. Copy the setup file of the KX-TDA50 Maintenance Console to your 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 set up the basic items. For details about the basic items, refer to "1.14.2 Quick Setup" in the Feature Manual.

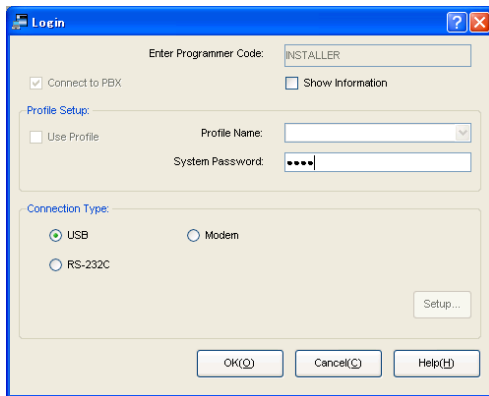


1. Connect the PC to the Hybrid IP-PBX with a USB cable.
2. Start the **KX-TDA50 Maintenance Console** from the Start menu.
3. "Information before programming" appears.
  - a. Carefully read this important additional information, which includes updates to this and other manuals.
  - b. Click **OK** to close this window.
4. Enter the Installer Level Programmer Code (default: **INSTALLER**).

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

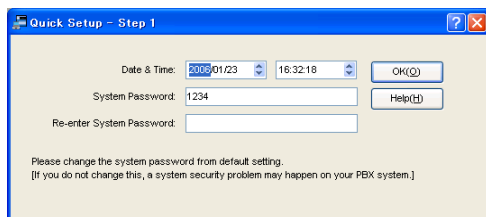
There are 2 other Programmer Codes with limited authorization: Administrator Level (default: **ADMIN**), and User Level (default: **USER**).



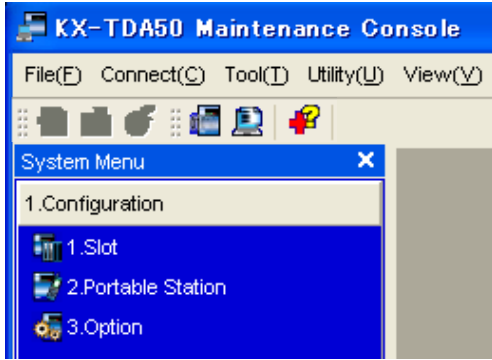
5. a. Click the check box to connect to the Hybrid IP-PBX. Options will appear as shown here, on the left.
- b. Enter the system password for installer (default: **1234**).
- c. Select "USB", then click **OK**.

### Note

To connect to the Hybrid IP-PBX via USB, the KX-TDA USB driver must be installed on the PC, as explained above in "Installing the KX-TDA50 Maintenance Console".



6. Follow the instructions of the Quick Setup wizard and assign the basic items (Quick Setup).



The system menu appears. You may now begin programming the Hybrid IP-PBX.

**Notes**

- During a long programming session, it is highly recommended that you periodically save the system data to the SD Memory Card. If the Hybrid IP-PBX undergoes a sudden power failure or if the system is reset for some reason, all the system data in RAM will be lost. However, if system data has been saved to the SD Memory Card, it can be easily restored. To save the system data to the SD Memory Card, (1) click the "SD Memory Backup" icon before resetting the Hybrid IP-PBX or turning off the power, or (2) exit the KX-TDA50 Maintenance Console so that the Hybrid IP-PBX automatically saves the system data.
- 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 | €  |    | ,  | f  | „  | ... | †  | ‡  | ^  | %  | Š  | <  | œ  |    | Ž  |    |
| 90 |    | ‘  | ’  | “  | ”  | •   | —  | ~  | ™  | š  | >  | œ  |    | ž  | ÿ  |    |
| a0 |    | ı  | ¢  | £  | ¤  | ¥   | ¦  | §  | ¨  | ©  | 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

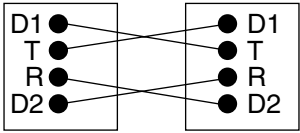
| PROBLEM  | PROBABLE CAUSE  | SOLUTION  |
|--|---|---|
| Extension does not operate.  | Bad extension card.   | <ul style="list-style-type: none"> <li>Exchange the card for a known working one.</li> </ul>  |
|  | Bad connection between the Hybrid IP-PBX and telephone.   | <ul style="list-style-type: none"> <li>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.</li> </ul>   |
|  | A telephone with an A-A1 relay is connected.  | <ul style="list-style-type: none"> <li>Use a 2-wire cord.</li> <li>Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position.</li> </ul>  |
|  | Bad telephone.  | <ul style="list-style-type: none"> <li>Take the telephone and plug it into another extension port that is working. If the telephone does not work, replace the telephone.</li> </ul>  |
|  | The number of terminal equipment exceeds the capacity of the Hybrid IP-PBX with the supplied AC adaptor only. | <ul style="list-style-type: none"> <li>Connect an additional AC adaptor.</li> </ul>   |
| The Hybrid IP-PBX does not operate properly.   |   | <ul style="list-style-type: none"> <li>Press the Reset Button (refer to "4.1.4 Using the Reset Button").</li> <li>Turn off the power switch, and then turn it back on.</li> <li>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.</li> </ul> |
| Noise on external paging.  | Induced noise on the wire between the Hybrid IP-PBX and the amplifier.  | <ul style="list-style-type: none"> <li>Use a shielded cable as the connection wire between the Hybrid IP-PBX and amplifier. A short shielded cable is recommended.</li> </ul>   |
| Distorted external music.  | Excessive input level from external music source.   | <ul style="list-style-type: none"> <li>Decrease the output level of the external music source by using the volume control on the music source.</li> </ul>   |
| 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.                       | <ul style="list-style-type: none"> <li>Switch the calling mode to ring-calling.</li> <li>Set the LCS mode to "Private".</li> </ul>  |

---

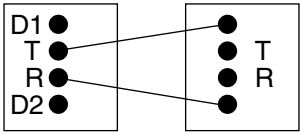
| <b>PROBLEM</b>  | <b>PROBABLE CAUSE</b>                             | <b>SOLUTION</b>   |
|---|---|---|
| The ALARM indicator on the front of the cabinet turns on red. | A major system error occurs in the Hybrid IP-PBX. | <ul style="list-style-type: none"><li>• See the error log using the KX-TDA50 Maintenance Console (refer to "4.1.5 Troubleshooting by Error Log").</li></ul> |

## 4.1.2 Connection

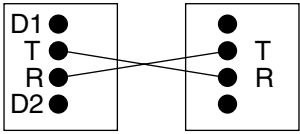
Connection between the Hybrid IP-PBX and a PT:

| Can you dial an extension? | No | Connection between the Hybrid IP-PBX and a PT:  |  |
|----------------------------|----|---|--|
|                            |    | CAUSE   | SOLUTION   |
|                            |    | <p>The T/R is connected to the D1/D2.</p>  <p>Hybrid IP-PBX    Extension</p> | <p>Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for D1/D2).</p> |

Connection between the Hybrid IP-PBX and an SLT:

| CAUSE   | SOLUTION  |
|---|---|
| <p>The T/R is connected to the D1/D2.</p>  <p>Hybrid IP-PBX    Extension</p> | <p>Use the correct cord (the inner 2 wires are for T/R).</p> <ul style="list-style-type: none"> <li>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".</li> </ul> |

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

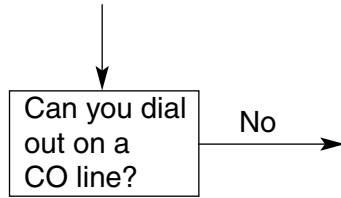
| CAUSE   | SOLUTION                                   |
|---|--|
| <p>The "T" is connected to the "R".</p>  <p>Hybrid IP-PBX    Extension</p> | <p>Reverse the connections of the T/R.</p> |

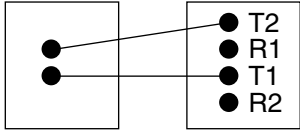
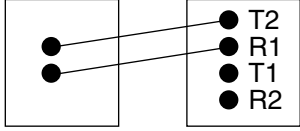
Yes

(Continued on the next page.)

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

(Continued from the previous page.)



| CAUSE   | SOLUTION   |
|---|--|
| <p>CO line is connected to the T2/T1.</p>  <p>CO line      Hybrid IP-PBX</p> | <p>Reconnect the CO line to the T1/R1 or T2/R2 of the telephone jack using 2-conductor wiring.</p> |
| <p>CO line is connected to the T2/R1.</p>  <p>CO line      Hybrid IP-PBX</p> |  |

### 4.1.3 Operation

| PROBLEM  | PROBABLE CAUSE   | SOLUTION   |
|--|--|--|
| <ul style="list-style-type: none"> <li>When using the speakerphone on an APT, nothing is audible.</li> <li>When using the speakerphone/monitor mode with a DPT, nothing is audible.</li> </ul> | <ul style="list-style-type: none"> <li>The HANDSET/HEADSET selector is set to the "HEADSET" position.</li> <li>The "HEADSET" mode is selected by Personal Programming, "Handset/Headset Selection".</li> </ul> | <ul style="list-style-type: none"> <li>When the headset is not used, set the HANDSET/HEADSET selector to the "HANDSET" position.</li> <li>When the headset is not used, select the "HANDSET" mode by Personal Programming.</li> </ul>  |
| <ul style="list-style-type: none"> <li>The PT does not ring.</li> </ul>  | <ul style="list-style-type: none"> <li>The ringer volume is off.</li> </ul>  | <ul style="list-style-type: none"> <li>Turn on the ringer volume.</li> </ul>   |
| <ul style="list-style-type: none"> <li>During a power failure, extensions connected to ports 1 and 2 of super hybrid ports do not operate.</li> </ul>  | <ul style="list-style-type: none"> <li>A DPT or APT is connected to the extension port.</li> <li>The dialing mode (tone or pulse) is incorrect.</li> </ul>   | <ul style="list-style-type: none"> <li>Disconnect the DPT or APT and connect an SLT.</li> <li>Set the Tone/Pulse switch to the other position.</li> </ul>  |
| <ul style="list-style-type: none"> <li>Originating an outside call, call transfer, or conference cannot be performed.</li> </ul>   | <ul style="list-style-type: none"> <li>The corresponding CO button does not exist on the PT.</li> </ul>  | <ul style="list-style-type: none"> <li>Program the CO button. Refer to "1.6.3 Flexible Buttons" in the Feature Manual.</li> </ul>  |
| <ul style="list-style-type: none"> <li>Cannot register the PS.</li> </ul>  | <ul style="list-style-type: none"> <li>Wrong Personal Identification Number (PIN) is registered to the PS.</li> <li>CS is not connected properly.</li> </ul>   | <ul style="list-style-type: none"> <li>Enter the PIN set to the Hybrid IP-PBX into the PS.</li> <li>Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits.</li> <li>Switch all DIP switches off.</li> </ul>   |
| <ul style="list-style-type: none"> <li>PS becomes out of range.</li> <li>Cannot make calls using the PS.</li> </ul>  | <ul style="list-style-type: none"> <li>CS is not working.</li> <li>Location of CS is not good.</li> <li>Access system of the PS is not properly set.</li> </ul>  | <ul style="list-style-type: none"> <li>Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits.</li> <li>Switch all DIP switches off.</li> <li>Locate the CS properly (refer to "2.7.5 Site Survey" ).</li> <li>Change the access system setting of the PS to the appropriate system or automatic.</li> </ul> |

---

| PROBLEM  | PROBABLE CAUSE   | SOLUTION  |
|--|--|---|
| <ul style="list-style-type: none"><li>Noise is frequent while using the PS.</li><li>Conversations disconnect while using the PS.</li></ul> | <ul style="list-style-type: none"><li>Call handover is not working while using the PS.</li><li>PS is out of CS coverage area.</li></ul>    | <ul style="list-style-type: none"><li>Locate the CS properly (refer to "2.7.5 Site Survey" ).</li></ul> |
| <ul style="list-style-type: none"><li>PS stays out of service when the CS status is changed from Out of Service to In Service.</li></ul>   | <ul style="list-style-type: none"><li>It may take about 10 s for CS to start up after the status has been changed to In Service.</li></ul> | <ul style="list-style-type: none"><li>Wait until the CS starts up.</li></ul>                            |

## 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.

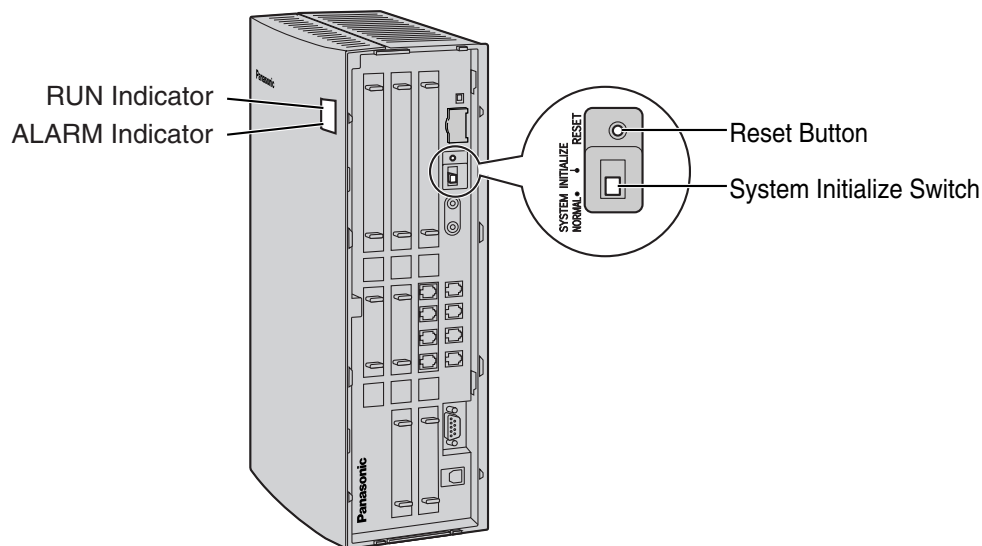
Other data stored in memory, except the above, are not cleared.

- 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. Slide the System Initialize Switch to the "NORMAL" position.
2. Press the Reset Button for about 1 second.





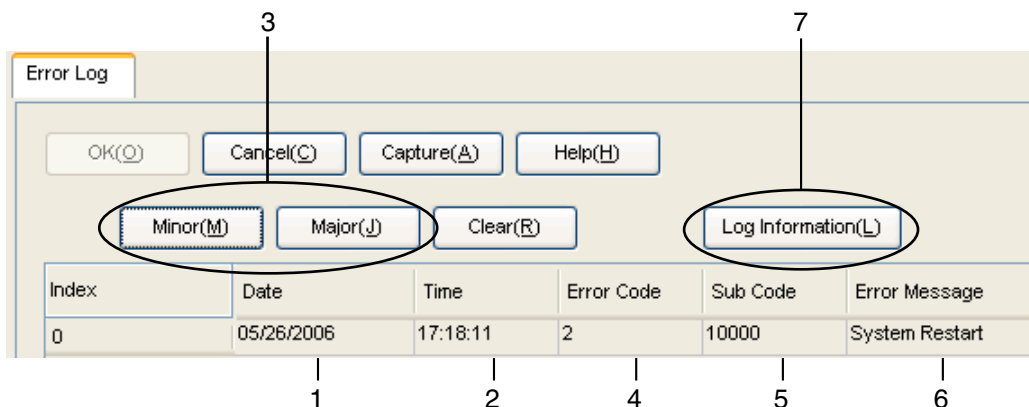
## 4.1.5 Troubleshooting by Error Log

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. For information about how to view the error log using the KX-TDA50 Maintenance Console, refer to "2.5.8 Utility—Error Log" in the PC Programming Manual.

**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
```

1 2 3 4 5 6

### Description

|   | Item       |                | Description   |
|---|------------|----------------|---|
| 1 | Date       |                | The date of the error detection.  |
| 2 | Time       |                | The time of the error detection.  |
| 3 | Level      | Minor (MN ALM) | Displays minor errors, which affect only a certain part of system operation.                    |
|   |            | Major (MJ ALM) | Displays major errors, which affect operation of the whole system, or result in system failure. |
| 4 | Error Code |                | The 3-digit error code assigned by the Hybrid IP-PBX.   |

## 4.1 Troubleshooting

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|   | Item            | Description  |
|---|-----------------|--|
| 5 | Sub Code        | <p>The 5-digit sub code of the relevant hardware (1XXYY).</p> <ul style="list-style-type: none"><li>• 1: Cabinet number</li><li>• XX: Slot number<br/>00 to 11<br/>(00: MPR card slot; 01: Super hybrid ports; 02 to 11: Slots for optional service cards)</li><li>• YY: Physical port number<ul style="list-style-type: none"><li>– For optional service cards:<br/>Physical port number (01 to 16) will be displayed.</li><li>– For optional service cards that are installed in Slots 08 to 11:<br/>Sub slot number 1 + port number (1 to 4) will be displayed as follows:<ul style="list-style-type: none"><li>• Sub slot 1: 11 to 14</li></ul></li></ul></li></ul> <p><b>Note</b></p> <p>When there are no parameters for the slot and physical port numbers, XX and YY will be displayed as "00".<br/>Example: Sub code for MPR card = 10000</p> |
| 6 | Error Message   | A description of the error.  |
| 7 | Log Information | Displays probable causes of the errors and their solutions.  |

---

***Section 5***  
***Appendix***

## 5.1 Revision History

### 5.1.1 PSMPR Software File Version 1.1xxx

#### New Options

- System Components Table
  - KX-TDA5105 Memory Expansion Card (MEC)

#### Changed Contents

- 1.4.3 System Capacity

## 5.1.2 PSMPR Software File Version 2.0xxx

### 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

## 5.1.3 PSMPR Software File Version 3.0xxx

### New Options

- System Components Table
  - KX-TDA5192 2-Channel Simplified Voice Message Card (SVM2)

## 5.1.4 PSMPR Software File Version 4.0xxx

### New Options

- System Components Table
  - KX-TDA5470 4-Channel VoIP Extension Card (IP-EXT4)

### Changed Contents

- 1.4.3 System Capacity
- 2.3.3 IP-GW4 Card (KX-TDA5480)
- 3.2.1 Connection





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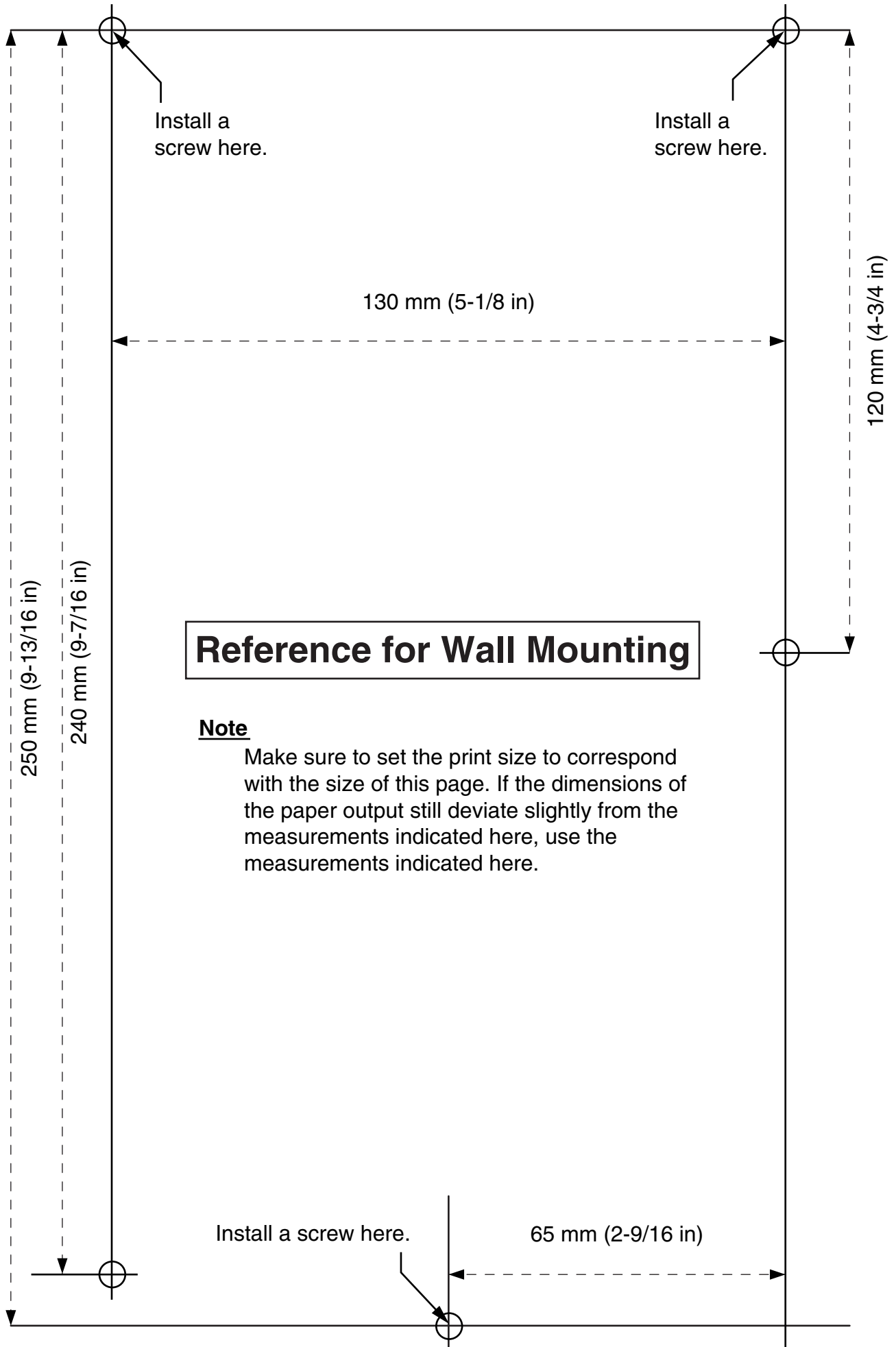
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## Reference for Wall Mounting

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