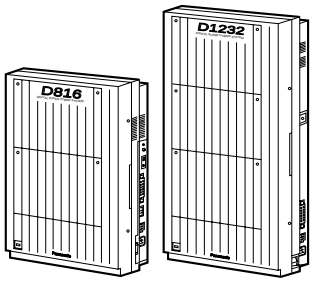
Panasonic



Digital Super Hybrid System

Installation Manual

KX-TD816NE

Model No. KX-TD1232NE

Please read this manual before connecting the Digital Super Hybrid System.

Thank you for purchasing the Panasonic Model KX-TD816/KX-TD1232, Digital Super Hybrid System.

System Components

System Components Table

	Model	Description
Service Unit	KX-TD816	Digital Super Hybrid System (Main Unit)
	KX-TD1232	Digital Super Hybrid System (Main Unit)
Proprietary Telephone (PT)	KX-T7531	Digital proprietary telephone with 1-line display
	KX-T7533	Digital proprietary telephone with 3-line display
	KX-T7536	Digital proprietary telephone with 6-line display
	KX-T7550	Digital proprietary telephone with monitor
	KX-T7230	Digital proprietary telephone with 2-line display
	KX-T7235	Digital proprietary telephone with 6-line display
	KX-T7250	Digital proprietary telephone with monitor
Console	KX-T7540	Digital DSS Console
	KX-T7541	Digital Attendant Console
	KX-T7545	Add-on Key Module
	KX-T7240	Digital DSS Console
Optional Equipment	KX-TD170	8-Station Line Unit
	KX-TD280	2-ISDN S0 Line Unit
	KX-TD281 *1	4-ISDN S0 Line Card
	KX-TD282 *2	2-ISDN S0 Line Card
	KX-TD286CE	6-ISDN S0 Line Unit
	KX-TD290CE *1	Primary Rate Interface ISDN Expansion Unit
	KX-TD190	Message Unit
	KX-TD192 *1	System Inter Connection Cards (2 Cards and 1 Cable)
	KX-TD196 *1	2400bps Remote Card
	KX-TD197	9600bps Speed Remote Card
	KX-TD198 *2	9600bps Speed Remote Unit
	KX-TD199 *2	Message Card

- In this Installation Manual, the suffix "G,""G-B" or "S" of each model number is omitted.
- The Digital Proprietary Telephone is abbreviated as "DPT."

  The models marked *1 can be installed in KX-TD1232 only.

  The models marked *2 can be installed in KX-TD816 only.

Attention

- When the unit is working, the noise is less than 70dB(A) according to DIN 45635 Part 19.
- Keep the unit away from heating appliances and electrical noise generating devices such as fluorescent lamps, motors and television. These noise sources can interfere with the performance of the Digital Super Hybrid System.
- This unit should be kept free of dust, moisture, high temperature (more than 40°C) and vibration, and should not be exposed to direct sunlight.
- Never attempt to insert wires, pins, etc. into the vents or other holes of this unit.
- If there is any trouble, disconnect the unit from the telephone line. Plug the telephone directly into the telephone line. If the telephone operates properly, do not reconnect the unit to the line until the trouble has been repaired. If the telephone does not operate properly, chances are that the trouble is in the telephone system, and not in the unit.
- Do not use benzine, thinner, or the like, or any abrasive powder to clean the cabinet. Wipe it with a soft cloth.
- This unit may only be installed and serviced by Qualified Service Personnel.
- The ISDN Line Unit / Card (KX-TD280 / KX-TD281 / KX-TD282 / KX-TD286 / KX-TD290) is in accordance with the European Telecommunication Standards (ETS).
  If your telephone company provides an ISDN service which follows the standards other than ETS, some ISDN features in this manual may not work properly. (E.g. Charge Fee Reference, CLIP, COLP, etc.)
- To use the point-to-multi-point configuration with the KX-TD286, the number on the name plate, which is on the back of the unit, must be ④ or later.

WARNING

THIS UNITY MAY ONLY BE INSTALLED AND SERVICED BY QUALIFIED SERVICE PERSONNEL.

WHEN A FAILURE OCCURS WHICH RESULTS IN THE INTERNAL PARTS BECOMING ACCESSIBLE, DISCONNECT THE POWER SUPPLY CORD IMMEDIATELY AND RETURN THIS UNIT TO YOUR DEALER.

DISCONNECT THE TELECOM CONNECTION BEFORE DISCONNECTING THE POWER CONNECTION PRIOR TO RELOCATING THE EQUIPMENT, AND RECONNECT THE POWER FIRST.

THIS UNIT IS EQUIPPED WITH AN EARTHING CONTACT PLUG. FOR SAFETY REASONS THIS PLUG MUST ONLY BE CONNECTED TO AN EARTHING CONTACT SOCKET WHICH HAS BEEN INSTALLED ACCORDING TO REGULATIONS.

THE POWER SOCKET WALL OUTLET SHOULD BE LOCATED NEAR THIS EQUIPMENT AND BE EASILY ACCESSIBLE.

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR ANY TYPE OF MOISTURE.

The serial number of this product may be found on the label affixed to the bottom of the unit. You should note the serial number of this unit in the space provided and retain this book as a permanent record of your purchase to aid in identification in the event of theft.

MODEL NO.: _____

SERIAL NO.: _____

For your future reference

DATA OF PURCHASE _____

NAME OF DEALER _____

DEALER'S ADDRESS _____

Introduction

This Installation Manual provides technical information for the Panasonic Digital Super Hybrid System, KX-TD816/KX-TD1232. It is designed to serve as an overall technical reference for the system and includes a description of the system, its hardware and software, features and services and environmental requirements.

This manual contains the following sections:

Section 1, System Outline.

Provides general information on the system including system capacity and specifications.

Section 2, Installation.

Contains the basic system installation and wiring instructions, as well as how to install the optional cards and units.

Section 3, Troubleshooting.

Provides information for system and telephone troubleshooting.

Section 4, DECT Portable Station.

Describes Features and System Programmings for DECT Portable Station.

Note

The following document may be used in conjunction with this manual:

User Manual for the KX-TD816/KX-TD1232 System

Table of Contents

Section 1

System Outline

This section provides general information on the system, including system capacity and specifications.

1.1 System Highlights

1.1.1 System Highlights

System Capacity

		Basic System	Module Expansion	System Connection
KX-TD816	ISDN S0 line	**0**	**4**	**—**
	Extension	**8**	**16**	**—**
KX-TD1232	ISDN S0 line	**0**	**6**	**12**
	Extension	**16**	**32**	**64**

Module Expansion

Expansion modules are used to increase the system capacity. Extension modules and ISDN modules can be added to the basic system to add extensions and ISDN S0 lines.

EXtra Device Port (XDP)

Each extension jack in the system supports the connection of a proprietary telephone/console and a single line device. The devices have different extension numbers and are treated as two completely different extensions.

Parallelled Telephone Connection

Every jack in the system also supports the parallel connection of a digital proprietary telephone and a single line device. They share the same extension number and are considered by the system to be one extension.

Super Hybrid System

This system supports the connection of digital proprietary telephones, consoles and single line devices such as single line telephones, facsimiles, and data terminals.

System Connection*1

With the addition of optional System Inter Connection Card, two Digital Super Hybrid Systems can be connected together to expand the system capacity. The two systems function as one, however, some functions such as paging and music on hold are duplicated.

*1 Available for KX-TD1232 only.

Proprietary Telephones (PT)

The system supports seven different models of proprietary telephones.

Programming System

The system can be programmed from a proprietary telephone or from a personal computer.

Automatic Route Selection (ARS)

Automatically selects the pre-programmed least expensive route for outgoing toll calls.

Trunk (CO Line) Answer From Any Station (TAFAS)

Ringing occurs over the external paging system; call can be answered from any station.

Charge Fee Reference

Allows the user to see charges and to print out the charges.

Budget Management

Limits the telephone usage to a pre-assigned amount.

Hotel Application

Allows to handle the front and operator services such as check-in/check-out and wake-up call setting.

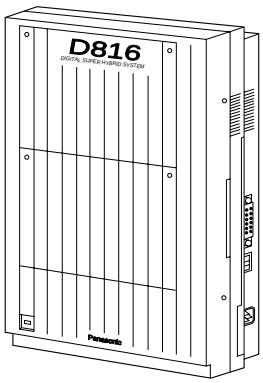
Uniform Call Distribution (UCD)

Allows an incoming calls to be distributed uniformly to a specific group of extensions.

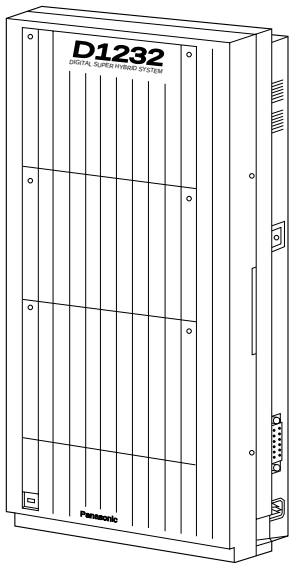
1.2 Basic System Construction

1.2.1 Basic System Construction

The KX-TD816 has a basic capacity of eight extensions, and the KX-TD1232 has a basic capacity of 16 extensions. It is capable of supporting Panasonic proprietary telephones, consoles and single line devices such as single line telephones, facsimiles.
To expand its capabilities the system can be equipped with optional components or customer-supplied peripherals such as external speakers and external music sources (e.g., radios).



KX-TD816



KX-TD1232

1.3 Proprietary Telephones

1.3.1 Proprietary Telephones

The following Panasonic proprietary telephones (PT) are available with this system.

Proprietary Telephone	Description
KX-T7531	Digital, 1-line display, jog dial, speakerphone, 12 COs
KX-T7533	Digital, 3-line display, jog dial, speakerphone, 12 COs
KX-T7536	Digital, 6-line display, jog dial, speakerphone, 12 COs
KX-T7550	Digital, jog dial, monitor, 12 COs
KX-T7230	Digital, 2-line display, speakerphone, 24 COs
KX-T7235	Digital, 6-line display, speakerphone, 12 COs
KX-T7250	Digital, monitor, 6 COs

Note

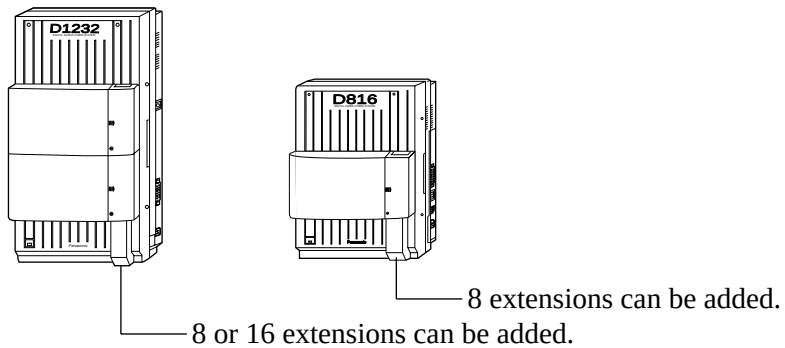
CO: CO line access button

1.4 Options

1.4.1 Options

Station Line Unit (KX-TD170)

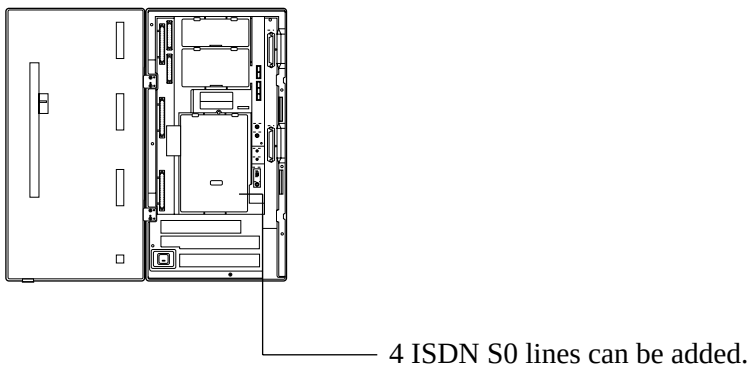
Each unit adds eight extensions. One unit for KX-TD816 and up to two units for KX-TD1232 can be installed per system.



ISDN S0 Line Card (KX-TD281)*1

The following card can be installed per system.

KX-TD281: Adds four ISDN S0 lines (Basic Rate Interface).

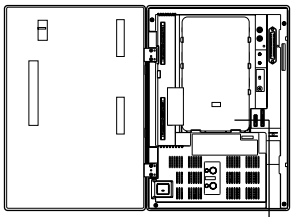


*1 Available for the KX-TD1232 only.

ISDN S0 Line Card (KX-TD282)[*1]

The following card can be installed.

KX-TD282: Adds two ISDN S0 lines (Basic Rate Interface).



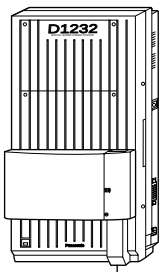
2 ISDN S0 lines can be added.

ISDN S0 Line Unit (KX-TD280, KX-TD286)

One of the following units can be installed per system.

KX-TD280: Adds two ISDN S0 lines (Basic Rate Interface).

KX-TD286: Adds six ISDN S0 lines (Basic Rate Interface).



2 ISDN S0 lines,or 6 ISDN S0 lines can be added.

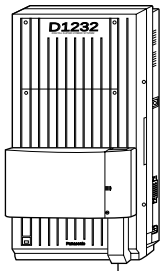
Note

- The KX-TD1232 is illustrated as the main unit.
- Either one KX-TD280, one KX-TD286, or one KX-TD290[*2] can be installed in a system.

[*1] Available for the KX-TD816 only.
[*2] Available for the KX-TD1232 only.

Primary Rate Interface ISDN Expansion Unit (KX-TD290)*1

This unit adds one PRI ISDN line.
When this unit is installed in the system for the system connection, the maximum number of available CO lines is limited to 38.
Therefore, if another CO line card or unit is used, it is required to program which area it is installed in by programme [450] beforehand. One PRI ISDN line adds 30 CO lines (CO25 through CO54) to the system. This unit can be only installed to the KX-TD1232 Master system.

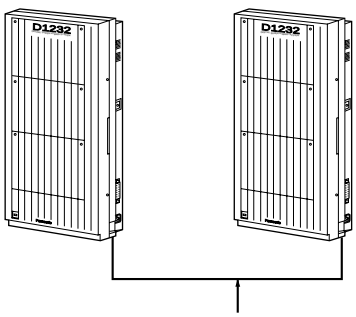


1 PRI ISDN line can be added.

Note
Either one KX-TD280, one KX-TD286, or one KX-TD290*2 can be installed in a system.

System Inter Connection Cards (KX-TD192)*3

Permits two KX-TD1232 to be connected together — to double system capacity.

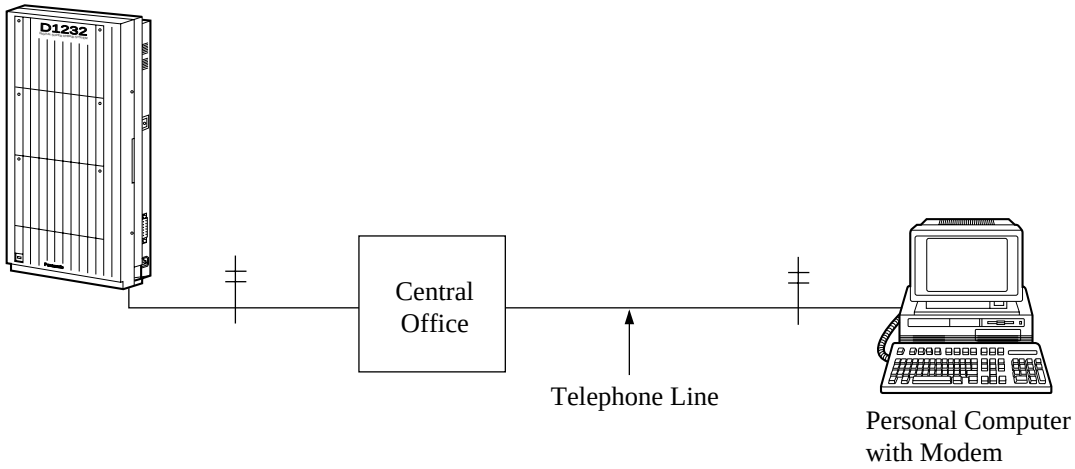


Connection Cable

*1 Available for the KX-TD1232 only.
*2 Available for the KX-TD1232 only.
*3 Available for the KX-TD1232 only.

Remote Card (KX-TD196)[*1]

The Remote Card allows programming and maintenance of the system from a remote location. (Baud Rate: 300/1200/2400 bps)



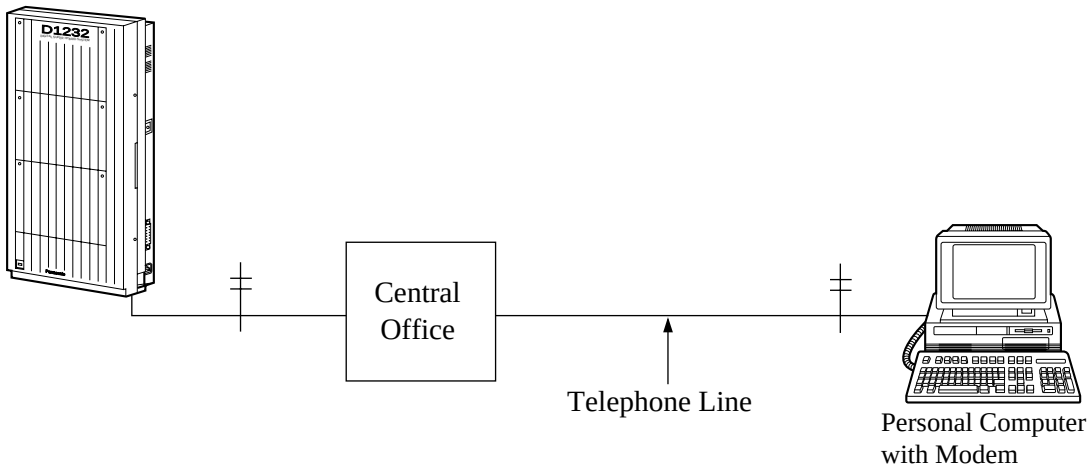
9600bps Speed Remote Card (KX-TD197) / 9600bps Speed Remote Unit (KX-TD198)[*2]

These card and unit allow system programming and maintenance from a remote location.

KX-TD197: Can be installed inside the KX-TD1232 or to the Message Unit (KX-TD190).

KX-TD198: Can be installed to the KX-TD816.

Be sure not to install this card and unit at the same time.



Note

The KX-TD1232 is illustrated as the main unit.

[*1] Available for the KX-TD1232 only.

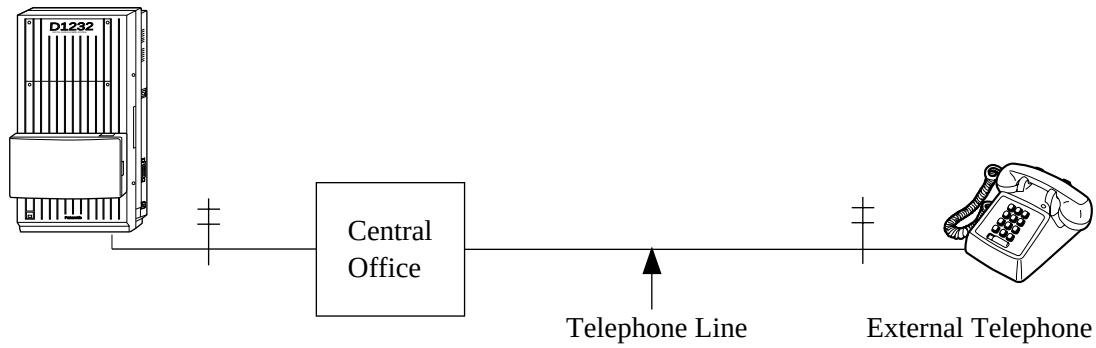
[*2] Available for the KX-TD816 only.

Message Unit (KX-TD190) / Message Card (KX-TD199)[*1]

These unit and card require recording an Outgoing Message (OGM). OGM for external callers and/or an OGM for Timed Reminder can be recorded.

KX-TD190: Can be installed to the KX-TD816 and KX-TD1232.

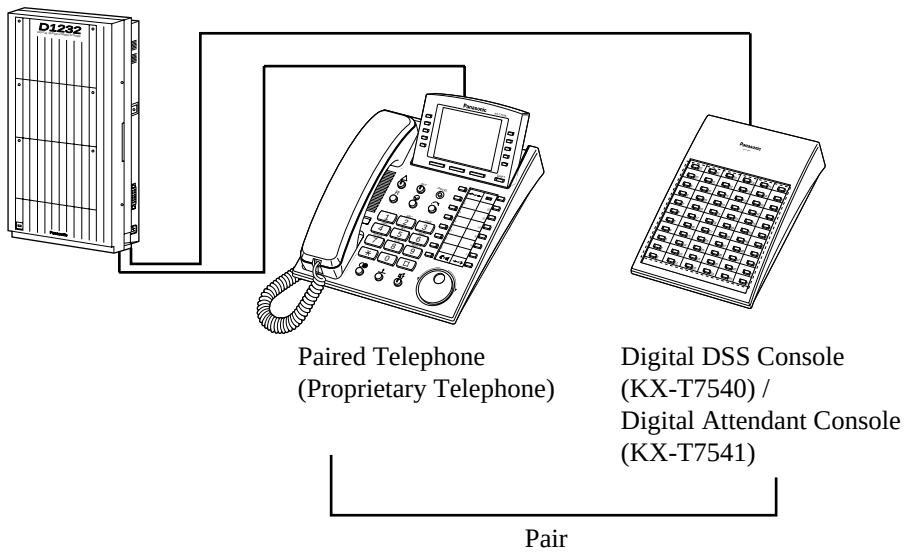
KX-TD199: Can be installed to the 9600bps Speed Remote Unit (KX-TD198).
Be sure not to install this unit and card at the same time.



Note
The KX-TD1232 is illustrated as the main unit.

DSS Console (KX-T7540, KX-T7240) / Attendant Console (KX-T7541)

Permits easy and quick access to stations and features. The Busy Lamp Field (BLF) shows the idle, busy or Do Not Disturb state of each station. If the Operator uses a Console as well as a proprietary telephone, the BLF will show the check-in/check-out status. Consoles are designed for use with a proprietary telephone. The KX-TD816 supports up four Consoles. The KX-TD1232 supports up to eight Consoles per system.



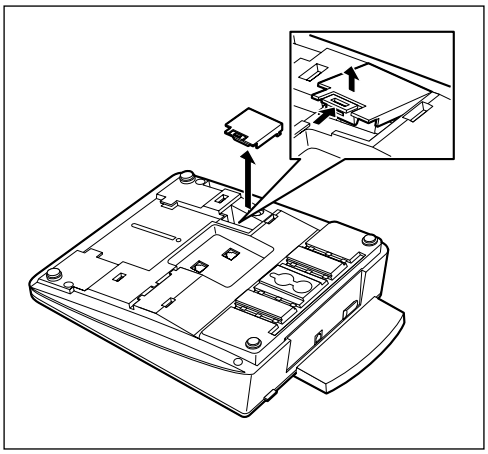
Note
The KX-TD1232 is illustrated as the main unit.

[*1] Available for the KX-TD816 only.

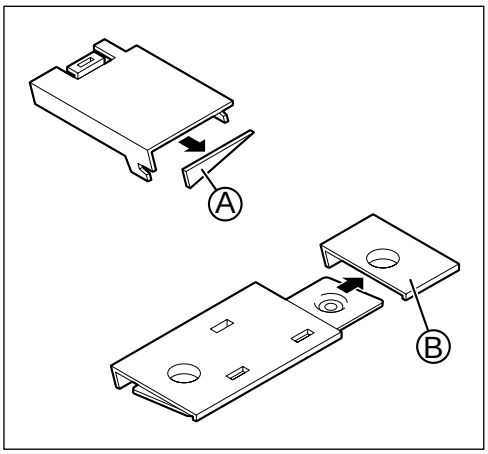
Connection

To attach the KX-T7540 Digital DSS Console or KX-T7541 Digital Attendant Console and the KX-T7500 series telephone, use the attached plate and screws.

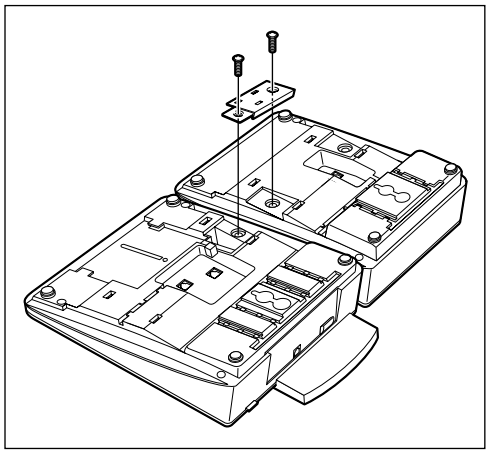
1. Open the cover.



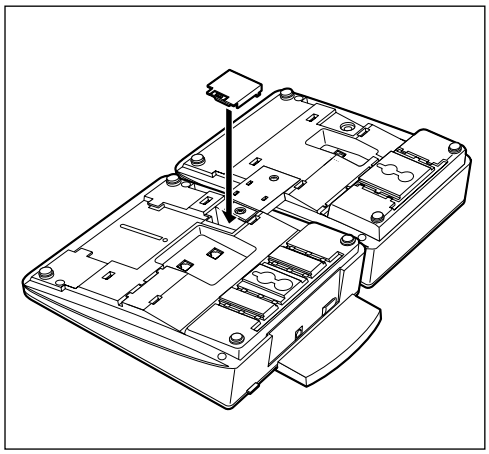
2. Remove Ⓐ and Ⓑ as shown below.



3. Attach the DSS console to your telephone with screws.

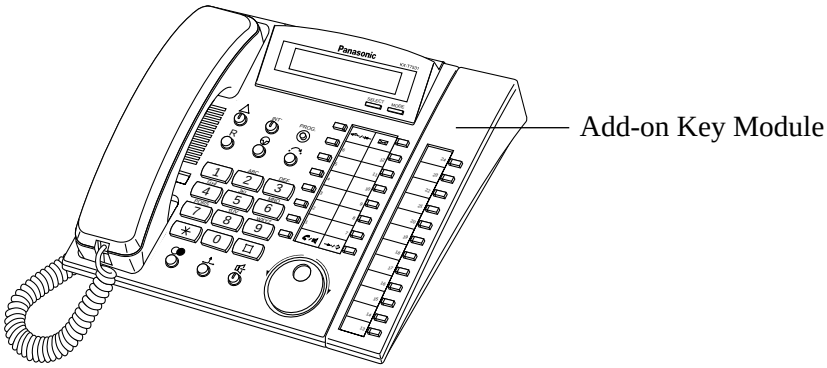


4. Close the cover.



Add-on Key Module (KX-T7545)

Adds 12 CO buttons to a KX-T7500 series telephone.



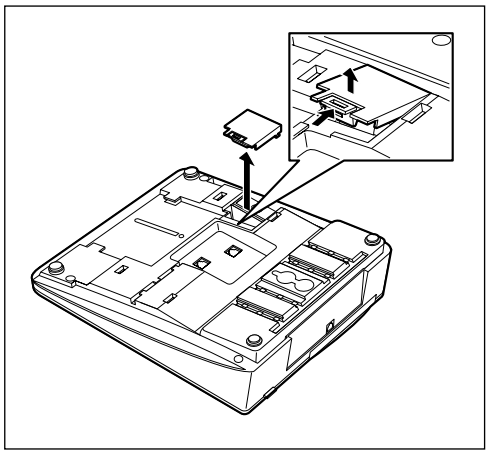
Note

The KX-T7531 is illustrated as the telephone.

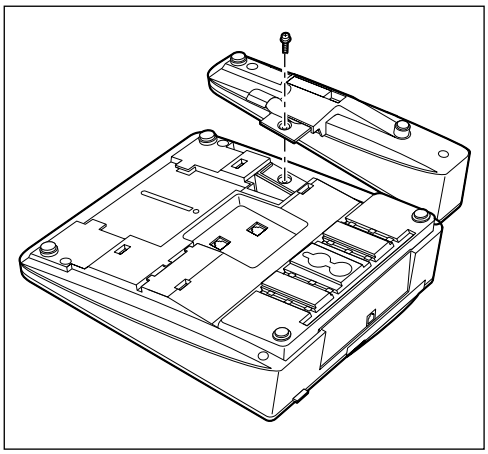
Connection

To connect the KX-T7545 Add-on Key Module to the KX-T7500 series telephone, use the attached screw.

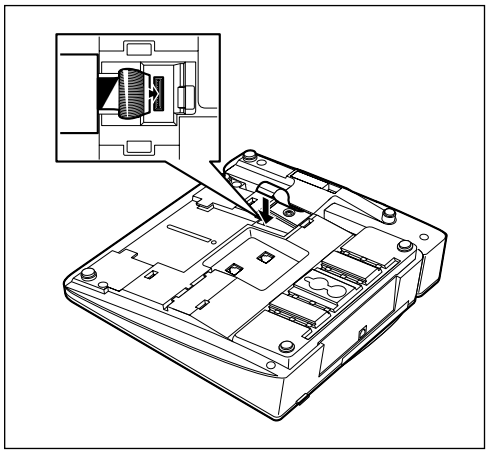
1. Open the cover.



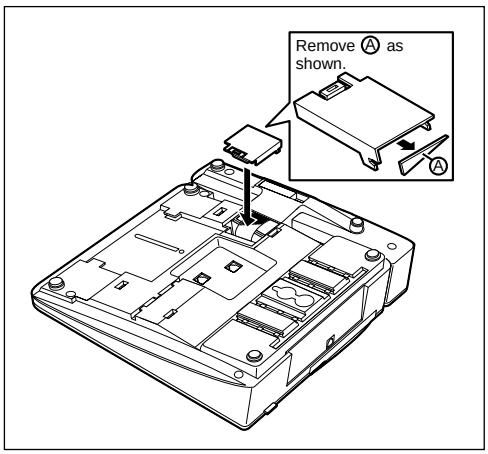
2. Attach the KX-T7545 to your telephone with a screw.



3. Insert the cable into the connector



4. Close the cover.



1.5 Specifications

1.5.1 General Description

System Capacity

KX-TD816 —	ISDN S0 lines	4 max.
	Stations	16 max. (32 max. with XDP)
KX-TD1232 —	ISDN S0 lines	6 max.
	Stations	32 max. (64 max. with XDP)

Control Method

Stored Program CPU: 16 bits CPU
Control ROM: 2 MB, Control RAM: 512 KB

Switching

Non Blocking PCM Time Switch

Power Supplies

Primary Power	230 VAC, 50 Hz
Secondary	Station Supply Volt: 30V
	Circuit Volt: ± 5V, ± 15V

Dialling

Internal	Dial Pulse (DP) 10 pps
	Tone (DTMF) Dialling

Connector

ISDN S0 lines	4-pin Connector
Stations	Amphenol Connector
Paging Output	Pin Jack (RCA JACK)

External Music Input	Two-conductors Jack (MINIJACK 3.5 mm diameter)

Extension Connection Cable

Single line telephones	1 pair wire (T, R)
KX-T7531, KX-T7533, KX-T7536, KX-T7550, KX-T7230, KX-T7235, KX-T7250, KX-T7540, KX-T7541, KX-T7240	1 pair wire (D1, D2): T and R are not necessary. or 2 pair wire (T, R, D1, D2)

SMDR (Station Message Detail Recording)

Interface	V. 24 (RS-232C)
Output Equipment	Printer
Detail Recording	Date, Time, Extension Number, Department Code, CO Line Number, Dialled Number, Call Duration, Charge Fee, Account Code

1.5.2 Characteristics

Station Loop Limit

KX-T7531 / KX-T7533 / KX-T7536 / KX-T7550 / KX-T7230 / KX-T7235 / KX-T7250
40 ohms

Single Line Telephone
600 ohms including set

Doorphone
20 ohms

Minimum Leakage Resistance
15 000 ohms

Maximum Number of Station Instruments per Line
1 for KX-T7531, KX-T7533, KX-T7536, KX-T7550, KX-T7230, KX-T7235, KX-T7250 or single line telephone
2 by Parallel or eXtra Device Port Connection of a proprietary telephone and a single line telephone

Ring Voltage
65 Vrms at 32 Hz depends on Ringing Load

Primary Power
230 VAC, 50 Hz

Central Office Loop Limit
1,600 ohms max.

Environmental Requirements
0 – 40 °C, 10 – 90%

1.5.3 System Capacity

Lines, Cards, Station Equipment

Item	KX-TD816 Max. Quantity	KX-TD1232 Max. Quantity	
		Single System	System Connection
System Inter Connection Cards	—	—	2
Service Units	1	1	2
ISDN S0 Line Cards	1	1	2
ISDN S0 Line Units	1	1	2
PRI ISDN Line Units	—	1	1
ISDN S0 Lines (Basic Rate Interfaces)	4	6	12
ISDN S0 Lines (Primary Rate Interfaces)	—	1	1
Station Line Units	1	2	4
Extension Jacks	16	32	64
Station Terminals (including Consoles)	32	64	128
{Consoles}	{4}	{8}	{16}
Remote Cards	—	1	2
9600bps Speed Remote Cards*1	—	1	2
9600bps Speed Remote Units	1	—	—
Message Cards*2	1	—	—
Message Units	—	1	2
Doorphones	1	1	2
Door Openers	2	2	4
External Music Sources	2	2	4
External Pagers	2	2	4
External Relays	1	1	2
External Ringers	1	1	2
External Sensors	1	1	2

*1 9600bps Speed Remote Card cannot be installed directly in KX-TD816, but can be installed in the Message Unit (KX-TD190) and then to the KX-TD816.

*2 Message Card cannot be installed directly in KX-TD816, but can be installed in the 9600bps Speed Remote Unit (KX-TD198) and then to the KX-TD816.

System Data

Item	Max. Quantity
Operator	2
System Speed Dialling	500
One-Touch Dialling	24 per station (proprietary telephone)
Station Speed Dialling	10 per station
Call Park Locations	10
Absent Messages	9
CO Line Groups	8
Toll Restriction Levels	8
Extension Groups	16
Class of Service	8
Message Waiting Settings	128
Hunting Groups	32

Section 2

Installation

This section contains the basic system installation and wiring instructions, as well as how to install the optional cards and units.

2.1 Before Installation

2.1.1 Before Installation

Please read the following notes concerning installation and connection before installing the system.

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 set is exclusively made for wall mounting only. Avoid installing in the following places. (Doing so may result in malfunction, noise, or discoloration.)

1. In direct sunlight and hot, cold, or humid places. (Temperature range: 0°C – 40°C)
2. Sulfuric gases produced in areas where there are thermal springs, etc. may damage the equipment or contacts.
3. Places in which shocks or vibrations are frequent or strong.
4. Dusty places, or places where water or oil may come into contact with the unit.
5. Near high-frequency generating devices 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 in the same room with the above equipment.)
7. Install at least 1.8 m from radios and televisions. (both the main unit and proprietary telephones)
8. Do not obstruct area around the main unit (for reasons of maintenance and inspection — be especially careful to allow space for cooling above and at the sides of the main unit).

Wiring Precautions

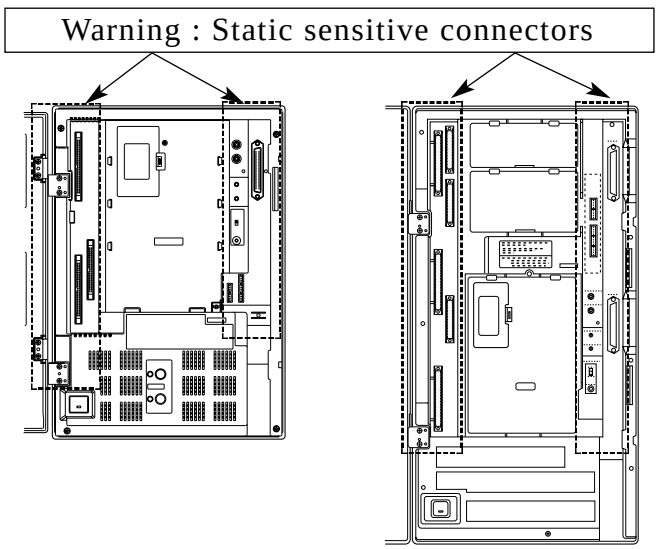
Make sure to keep the following instructions when wiring.

1. Do not wire the telephone cable in parallel with an AC power source, computer, telex, etc. If the cables are run near those wires, shield the cables with metal tubing or use shielded cables and ground the shields.

2. If cables are run on the floor, use protectors or the like to protect the wires where they may be stepped on. Avoid wiring under carpets.
3. Avoid using the same power supply outlet for computers, telexes, and other office equipment. Otherwise, the system operation may be interrupted by the induction noise from such equipment.
4. Please use one pair telephone wire for extension connection of (telephone) equipment such as single line telephones, data terminals, answering machines, computers, voice processing systems, etc., except proprietary telephones (KX-T7536, KX-T7235 etc.).
5. Unplug the system during wiring. After all the wiring are completed, plug the system.
6. Mis-wiring may cause the system to operate improperly. Refer to 3.1.1 Installation and 3.1.2 Connection.
7. If an extension does not operate properly, disconnect the telephone from the extension line and then connect again, or unplug the system and then plug the system again.
8. The system is equipped with a 3-wire grounding type plug. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
9. Use twisted pair cable for CO line connection.
10. CO lines should be installed with lightning protectors. For details, refer to 2.4.3 Lightning Protector Installation.

WARNING

Static sensitive devices used.
To protect printed circuit boards from static electricity, do not touch connectors indicated on the right picture without first discharging body static by touching a grounded or wearing a properly installed grounding strap.



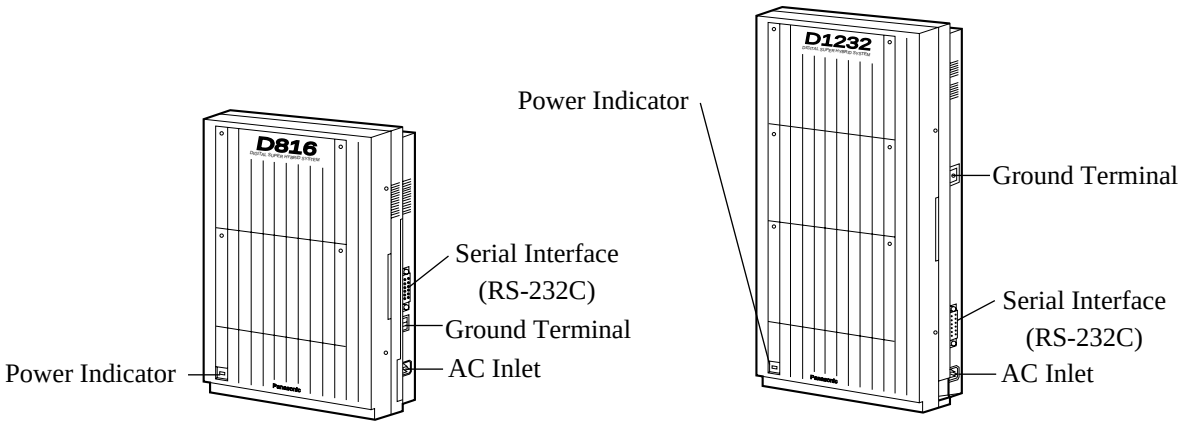
2.2 Installation of the Main Unit

2.2.1 Unpacking

	KX-TD816	KX-TD1232
Main Unit	one	one
AC Cord	one	one
Templet	one	one
Screw	three	four
Anchor Plug	three	four
Pager Connector	two	two
Music Source Connector	two	two
Doorphone, Door Opener Connector	five	five
Expansion Line Cord Holder	one	one
Ferrite Core	—	two
User Manual	one	one
Reference Manual for Single Line Telephone	one	one
Overlay for a proprietary telephone	one	one

2.2.2 Name and Location

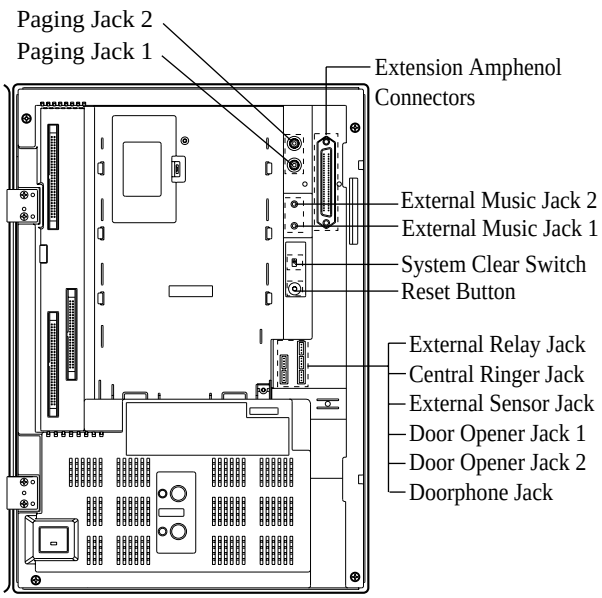
Overview of the Main Unit



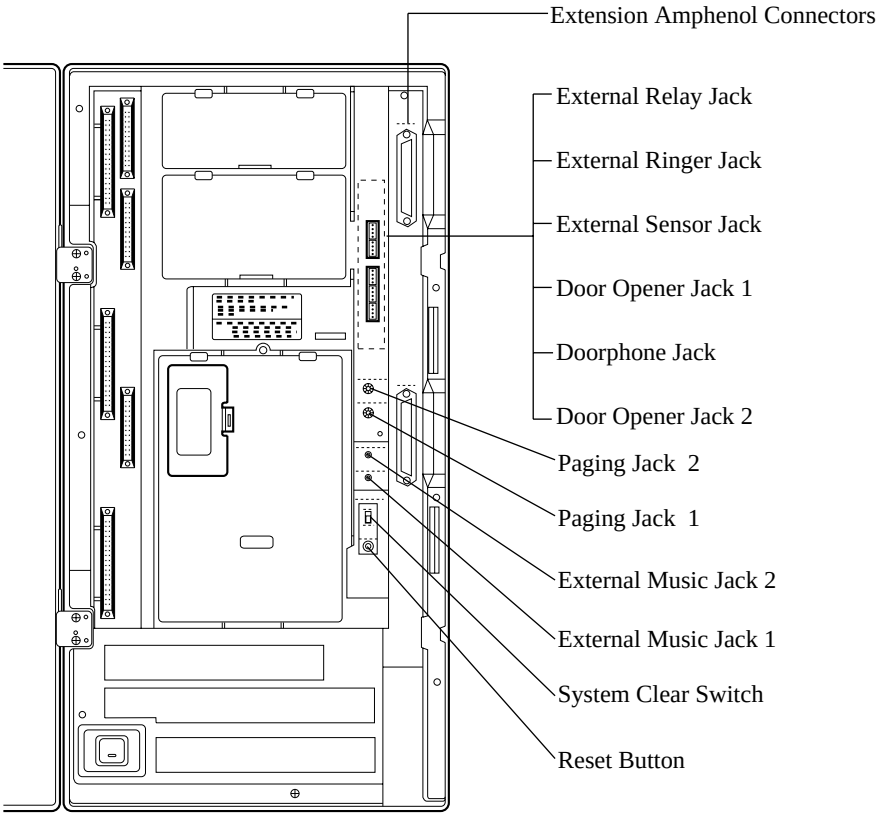
KX-TD816 **KX-TD1232**

Inside View of the Main Unit

KX-TD816



KX-TD1232

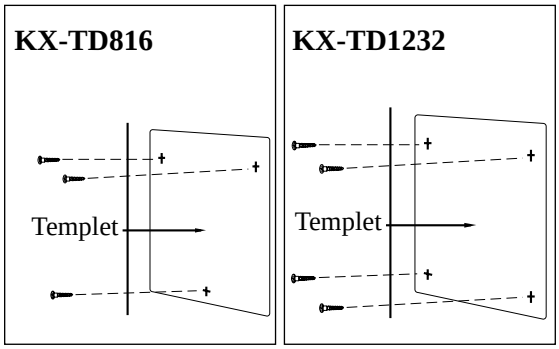

Extension Amphenol Connectors
External Relay Jack
External Ringer Jack
External Sensor Jack
Door Opener Jack 1
Doorphone Jack
Door Opener Jack 2
Paging Jack 2
Paging Jack 1
External Music Jack 2
External Music Jack 1
System Clear Switch
Reset Button

2.2.3 Wall Mounting

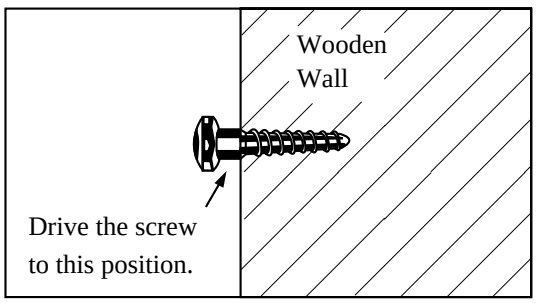
This set is made for wall mounting only. The wall where the main unit is to be mounted must be able to support the weight of the main unit. If screws other than the ones supplied are used, use the same-sized diameter screws as the enclosed ones.

Mounting on Wooden Wall

1. Place the templet (included) on the wall to mark the screw positions.

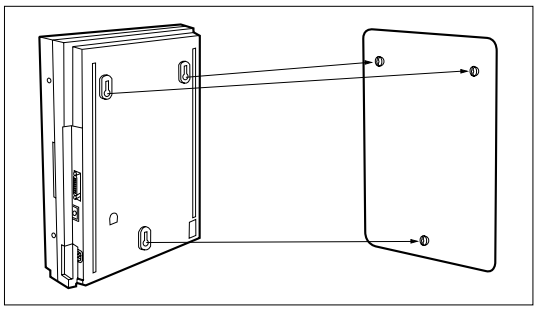


2. Install the screws (included) into the wall.



3. Hook the main unit on the screw heads.

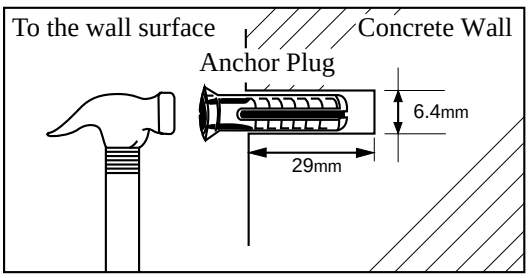
KX-TD816



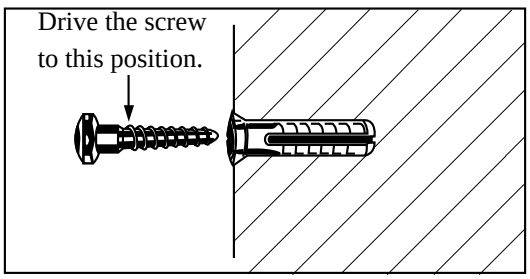
Mounting on Concrete or Mortar Wall

1. Place the templet (included) on the wall to mark the screw positions.

2. Drill holes and drive the anchor plugs (included) with a hammer, flush to the wall.

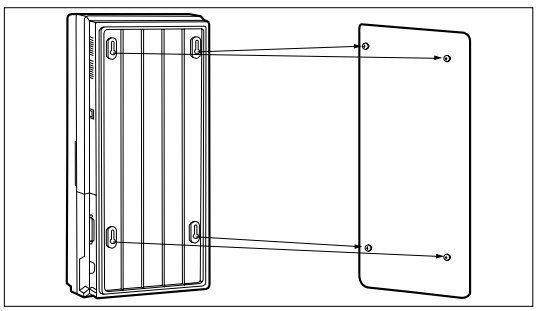


3. Install the screws (included) into the anchor plugs.



4. Hook the main unit on the screw heads.

KX-TD1232

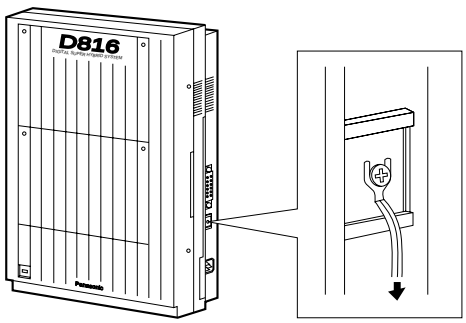


2.2.4 Frame Ground Connection

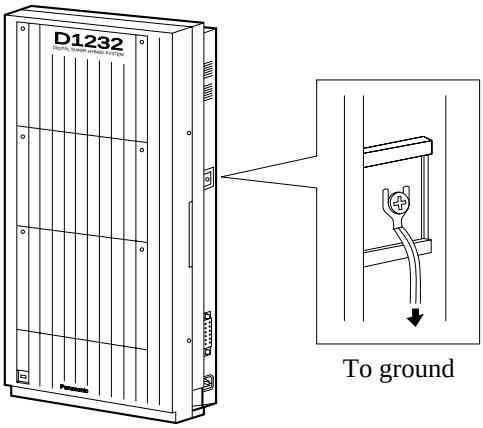
IMPORTANT

Connect the frame of the main unit to ground.

KX-TD816



KX-TD1232



Test Procedure

1. Obtain a suitable voltmeter and set it for a possible reading of up to 250 VAC.
2. Connect the meter probes between the two main AC voltage points on the wall outlet. The reading obtained should be 220-240 VAC.
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 220-240 VAC 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 220-240 VAC 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.

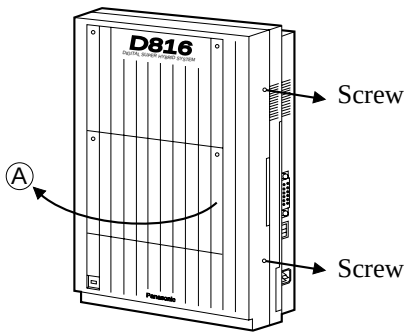
   A reading of less than 1 ohm should be obtained.
   If the reading is not obtained the outlet is not adequately grounded, see qualified electrician.

2.2.5 Opening Front Cover

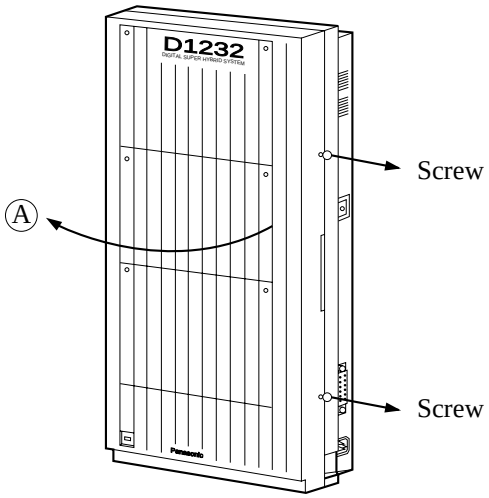
1. Loosen two screws on the right side of the main unit.

2. Open the front cover in the direction of arrow Ⓐ .

KX-TD816



KX-TD1232

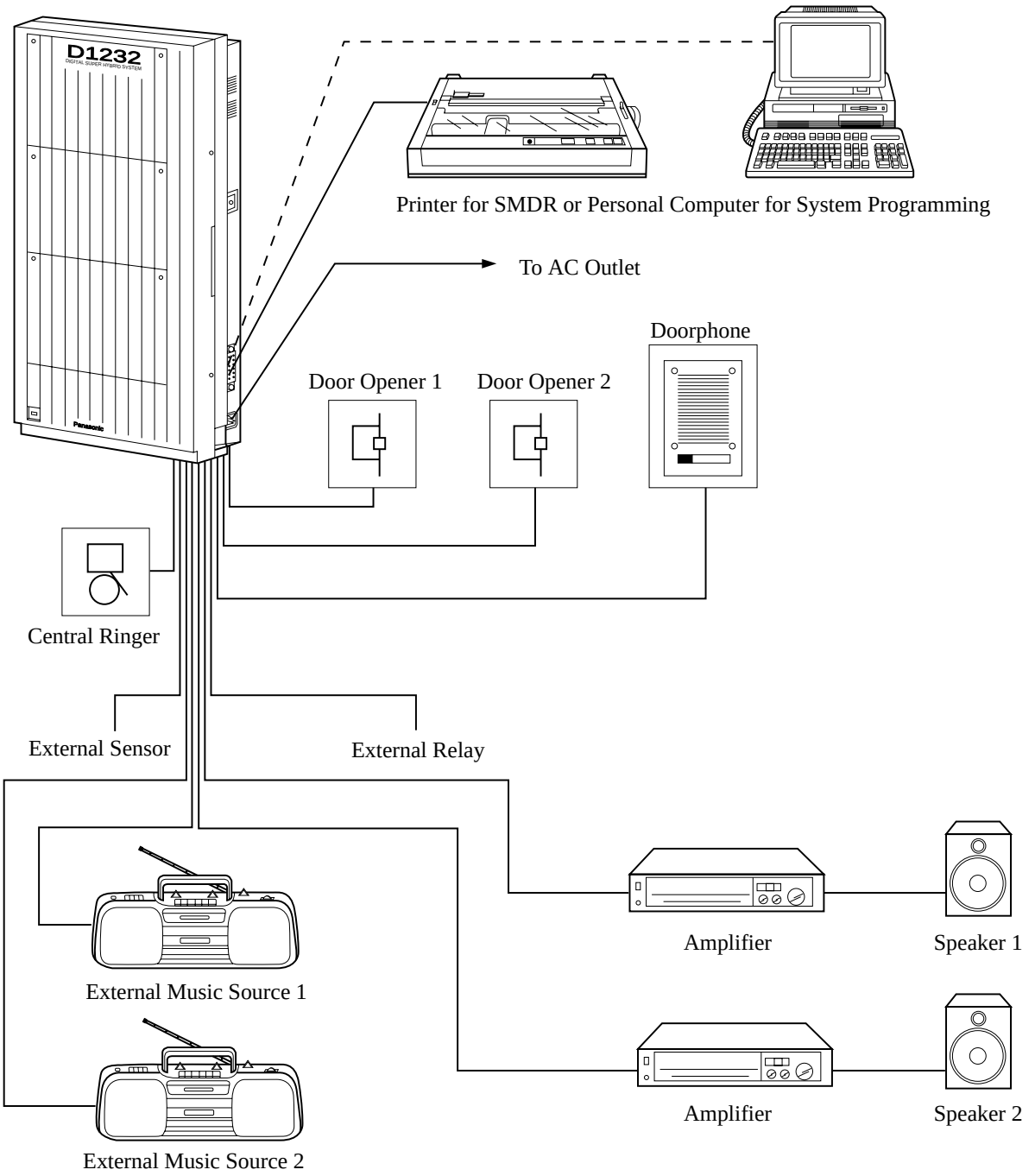


Note

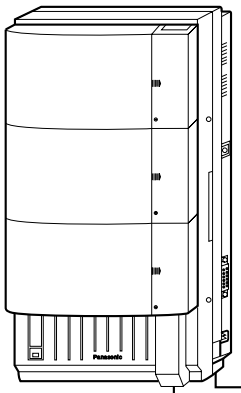
Two screws are attached to the front cover with springs so that they will not be lost.

2.3 Connection

2.3.1 System Connection Diagram



Note: The KX-TD1232 is illustrated as a main unit.



(CO Lightning Protectors)

KX-TD816 : to CO's 1 through 8
KX-TD1232: to CO's 1 through 12

ISDN SO Lines

KX-TD816 : 16 Extensions (8 extensions – initial, 8 extensions – additional)
KX-TD1232: 32 Extensions (16 extensions – initial, 16 extensions – additional)

It is recommended that extension of jack 1 is a display proprietary telephone.

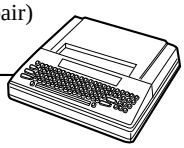
(one pair)

Single Line Telephone

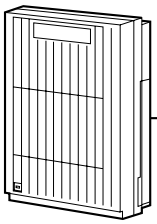
(one pair)

Cordless Phone

(one pair)



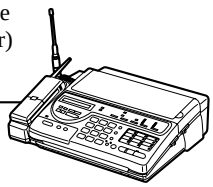
Data Terminal



(one pair)

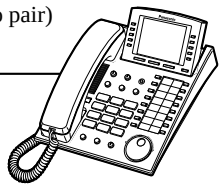
Voice Processing System

(one pair)



Telephone Answering Machine with Facsimile

(two pair)

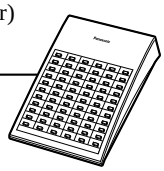


KX-T7500 series digital proprietary telephones

(two pair)

KX-T7200 series digital proprietary telephones

(two pair)



Digital DSS/Attendant consoles (KX-T7540/ KX-T7541/KX-T7240)

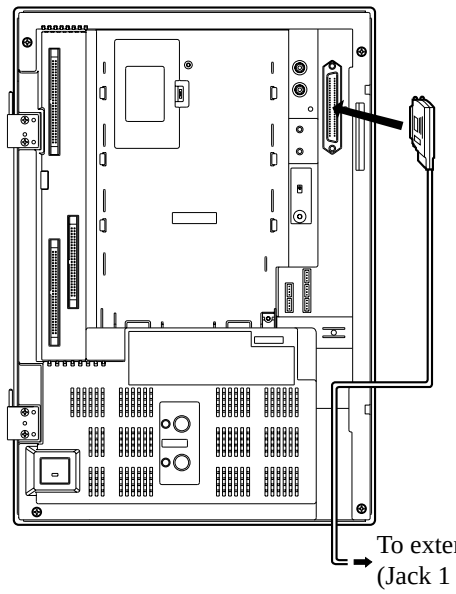
: needs Optional Cards or Units.

- Parallel connection of telephone is possible. Refer to Section 2.3.4 "Parallelled Telephone Connection."
- The KX-TD1232 is illustrated as a main unit.

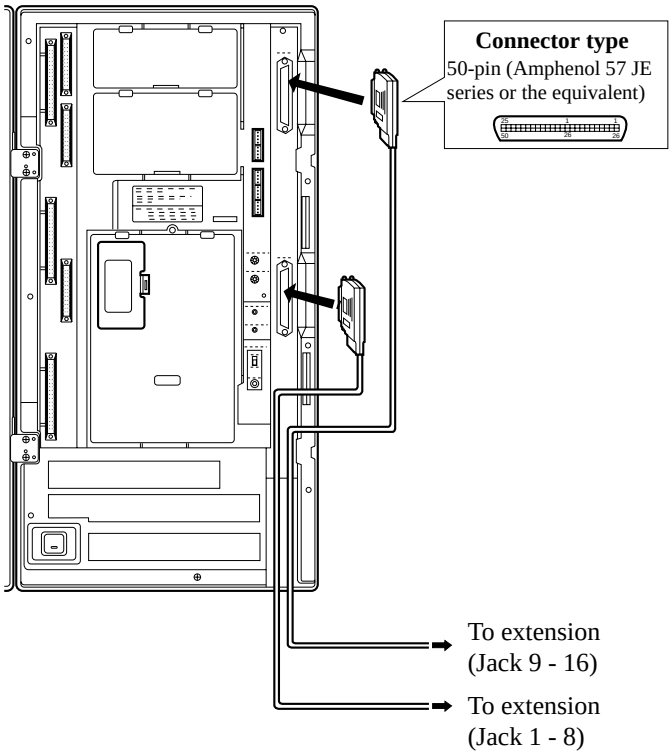
2.3.2 Extension Connection for Proprietary Telephones, Single Line Telephones and Consoles

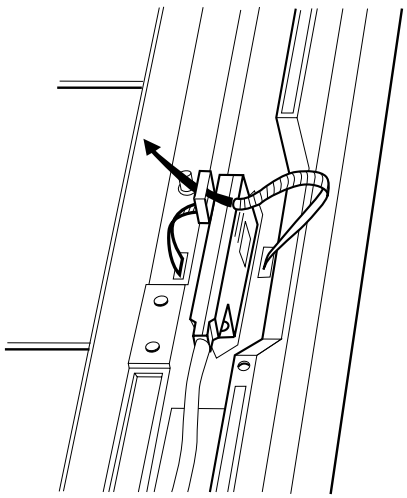
To connect extension jacks, insert the connector(s) to the system as shown.
Refer to Page 40.

KX-TD816



KX-TD1232

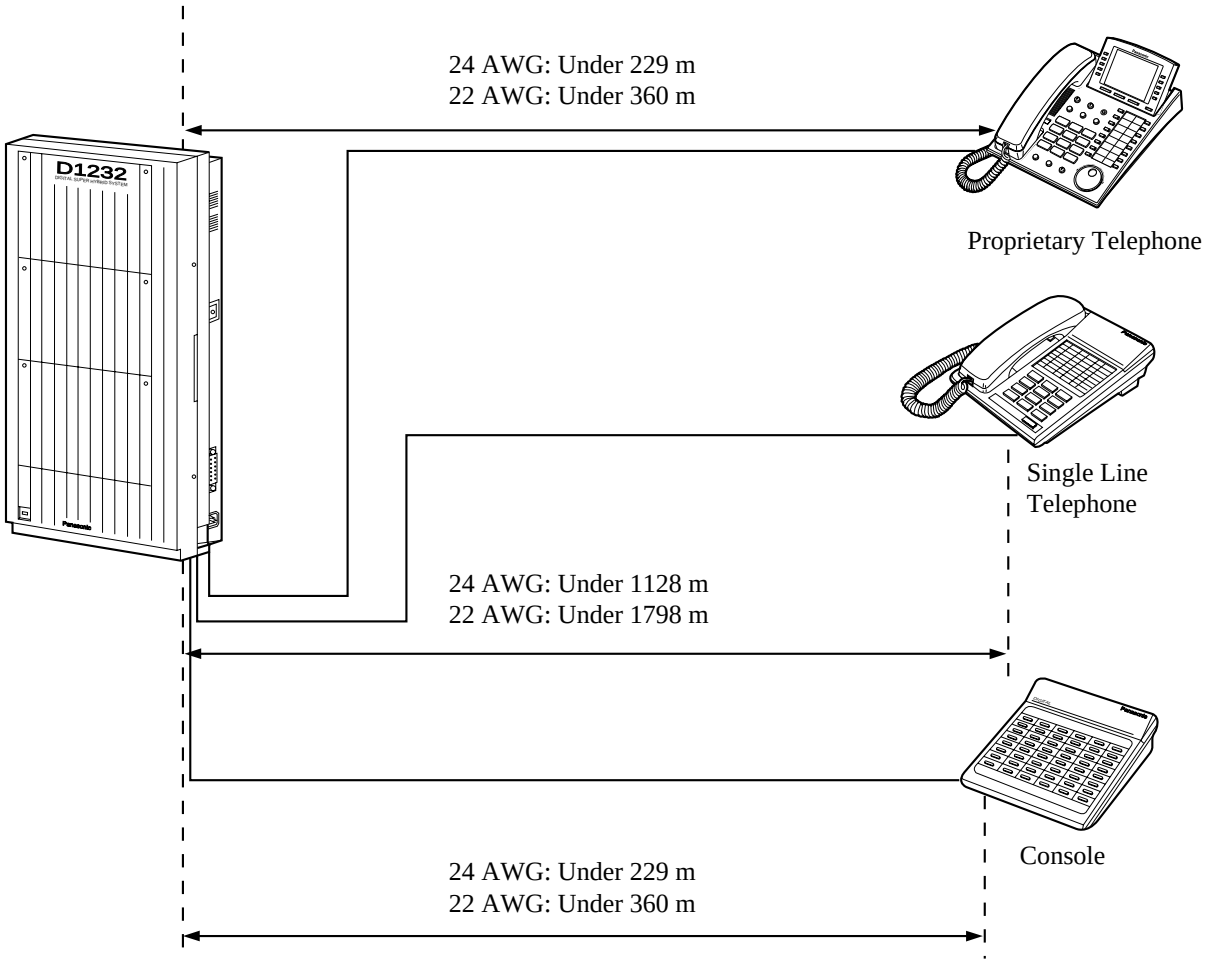




After inserting the connector, fasten the connector with the nylon tie.

Maximum cabling distance of the extension line cord (twisted cable)

The maximum length of the extension line cord (twisted cable) that connects the main unit and the extension is shown below:



Note

The KX-TD1232 is illustrated as a main unit.

Cable Pin Numbers to Be Connected

CONN. PIN	CABLE COLOR	CLIP NO.	EXTN. 1-8		EXTN. 9-16 8EXTN*1		8EXTN*2		8EXTN*2	
26	WHT-BLU	1		T		T		T		T
1	BLU-WHT	2	Jack	R	Jack	R	Jack	R	Jack	R
27	WHT-ORN	3	No.1	D1	No.9	D1	No.17	D1	No.25	D1
2	ORN-WHT	4		D2		D2		D2		D2
29	WHT-BRN	7		T		T		T		T
4	BRN-WHT	8	Jack	R	Jack	R	Jack	R	Jack	R
30	WHT-SLT	9	No.2	D1	No.10	D1	No.18	D1	No.26	D1
5	SLT-WHT	10		D2		D2		D2		D2
32	RED-ORN	13		T		T		T		T
7	ORN-RED	14	Jack	R	Jack	R	Jack	R	Jack	R
33	RED-GRN	15	No.3	D1	No.11	D1	No.19	D1	No.27	D1
8	GRN-RED	16		D2		D2		D2		D2
35	RED-SLT	19		T		T		T		T
10	SLT-RED	20	Jack	R	Jack	R	Jack	R	Jack	R
36	BLK-BLU	21	No.4	D1	No.12	D1	No.20	D1	No.28	D1
11	BLU-BLK	22		D2		D2		D2		D2
38	BLK-GRN	25		T		T		T		T
13	GRN-BLK	26	Jack	R	Jack	R	Jack	R	Jack	R
39	BLK-BRN	27	No.5	D1	No.13	D1	No.21	D1	No.29	D1
14	BRN-BLK	28		D2		D2		D2		D2
41	YEL-BLU	31		T		T		T		T
16	BLU-YEL	32	Jack	R	Jack	R	Jack	R	Jack	R
42	YEL-ORN	33	No.6	D1	No.14	D1	No.22	D1	No.30	D1
17	ORN-YEL	34		D2		D2		D2		D2
44	YEL-BRN	37		T		T		T		T
19	BRN-YEL	38	Jack	R	Jack	R	Jack	R	Jack	R
45	YEL-SLT	39	No.7	D1	No.15	D1	No.23	D1	No.31	D1
20	SLT-YEL	40		D2		D2		D2		D2
47	VIO-ORN	43		T		T		T		T
22	ORN-VIO	44	Jack	R	Jack	R	Jack	R	Jack	R
48	VIO-GRN	45	No.8	D1	No.16	D1	No.24	D1	No.32	D1
23	GRN-VIO	46		D2		D2		D2		D2
50	VIO-SLT	49								
25	SLT-VIO	50								

Note

- "8EXTN*1" in the table indicates an extension expansion area for KX-TD816. There are two expansion areas on the main unit. Up to one station line unit can be installed to any area. It is required to designate which is Station Line Unit by System Programming.

- "8EXTN*2" in the table indicates an extension expansion area for KX-TD1232. There are three expansion areas on the main unit. Up to two station line units can be installed to any area. It is required to designate which is Station Line Unit 1 and which is 2 by System Programming.
- If a telephone or answering machine with an A-A1 relay is connected to the main unit, set the A-A1 relay switch of the telephone or answering machine to OFF position.
- Mis-connection may cause the system to operate improperly.

Connection of a Digital Proprietary Telephone, KX-T7531, KX-T7533, KX-T7536, KX-T7550, KX-T7230, KX-T7235 or KX-T7250

4-conductor wiring is required for each extension.
Connect pins "D1" and "D2" only.
If the Method 2 in Section 2.3.4 "Parallelled Telephone Connection" and in Section 2.3.5 "EXtra Device Port (XDP)" is used for parallel connection of a DPT and a standard telephone, connect pins "T" "R" "D1" and "D2."

Connection of a Single Line Telephone,

2-conductor wiring is required for each extension.
Connect pins "T" and "R."

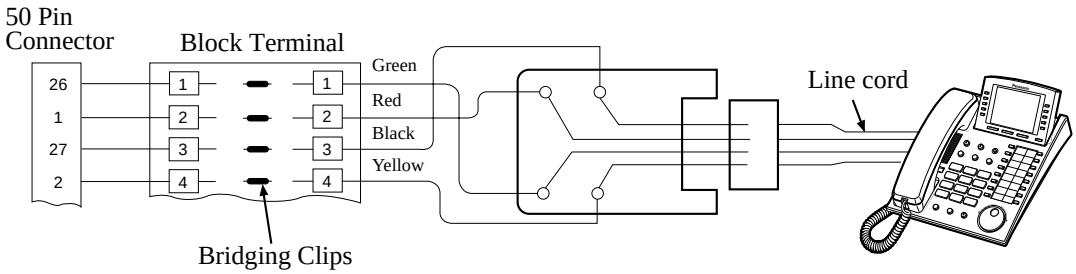
Connection of a Console, KX-T7540, KX-T7541 or KX-T7240

4-conductor wiring is required for each extension.
Connect pins "D1" and "D2" only. ("T" and "R" are not necessary.)

Note

- Up to four Consoles can be installed for KX-TD816. Up to eight Consoles can be installed for KX-TD1232 per system. As the Console itself cannot work alone, it always requires a proprietary telephone used in pair. Place the Console and the paired telephone side by side on your desk.
- It is necessary to designate the jack numbers of paired Consoles and the proprietary telephones by System Programming.

Station Wiring (2-pair twisted cabling):



Programming References

[007] Console Port and Paired Telephone Assignment

[109] Expansion Card / Unit Type

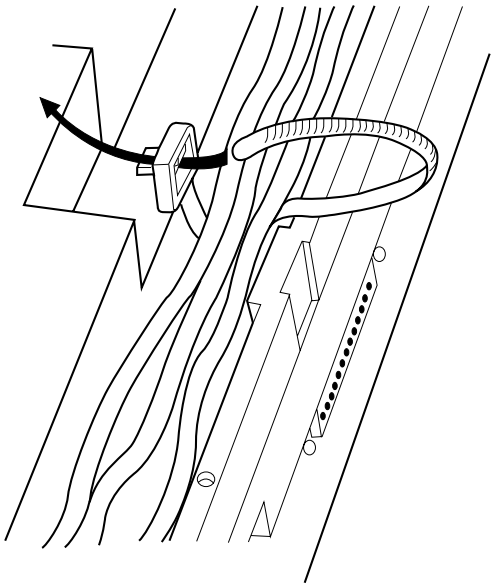
Feature References

Console

Module Expansion

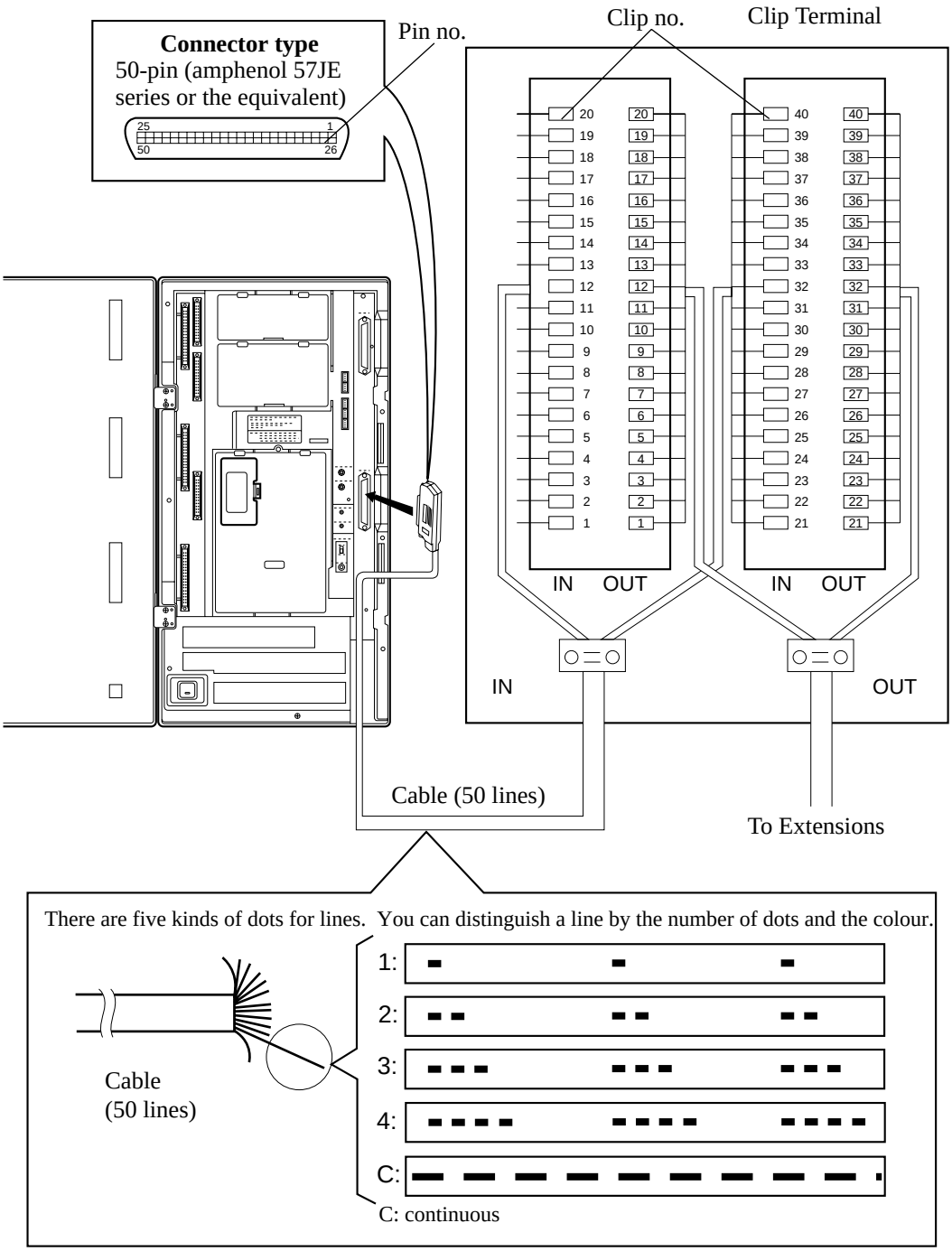
Note

After completing all the required inside cabling, including ISDN S0 lines, extensions, external pagers, external music sources and so on, fasten the cables with the nylon tie (included) as shown.



2.3.3 Optional Extension Connection of Clip Terminal*1

If you use the Clip Terminal to connect eight extensions, connect a cable shown below to the clip terminal as follows. Refer to Page 44 on the following page.



*1 Available for KX-TD1232 only.

Connection Chart

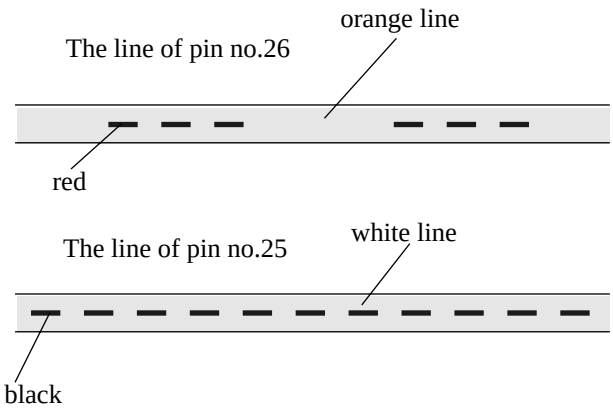
This chart is used for the Panasonic cable KX-A204 only.

Pin no.	Cable Colour	Clip no.	Number of Dot	Jack no.	
26	orange-red	1	1	T	1, 9, 17 or 25
1	orange-black	2	1	R	
27	yellow-red	3	1	D1	
2	yellow-black	4	1	D2	
29	grey-red	7	1	T	2, 10, 18 or 26
4	grey-black	8	1	R	
30	white-red	9	1	D1	
5	white-black	10	1	D2	
32	yellow-red	13	2	T	3, 11, 19 or 27
7	yellow-black	14	2	R	
33	green-red	15	2	D1	
8	green-black	16	2	D2	
35	white-red	19	2	T	4, 12, 20 or 28
10	white-black	20	2	R	
36	orange-red	21	3	D1	
11	orange-black	22	3	D2	
38	green-red	25	3	T	5, 13, 21 or 29
13	green-black	26	3	R	
39	grey-red	27	3	D1	
14	grey-black	28	3	D2	
41	orange-red	31	4	T	6, 14, 22 or 30
16	orange-black	32	4	R	
42	yellow-red	33	4	D1	
17	yellow-black	34	4	D2	
44	grey-red	37	4	T	7, 15, 23 or 31
19	grey-black	38	4	R	
45	white-red	39	4	D1	
20	white-black	40	4	D2	

Pin no.	Cable Colour	Clip no.	Number of Dot	Jack no.	
47	yellow-red	43	C	T	8, 16, 24 or 32
22	yellow-black	44	C	R	
48	green-red	45	C	D1	
23	green-black	46	C	D2	
50	white-red	49	C	T	
25	white-black	50	C		

C : continuous

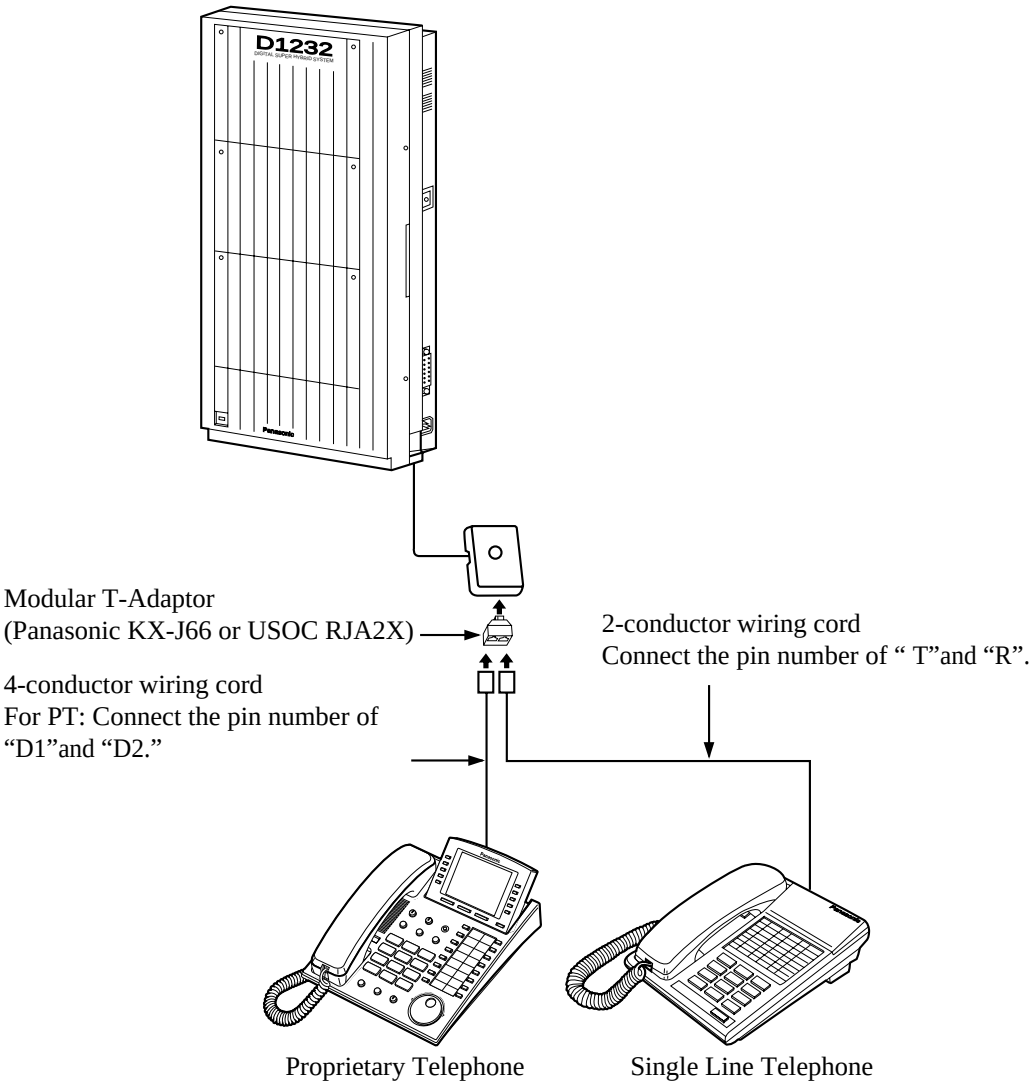
EXAMPLE:



2.3.4 Parallelled Telephone Connection for a Proprietary Telephone and a Single Line Telephone

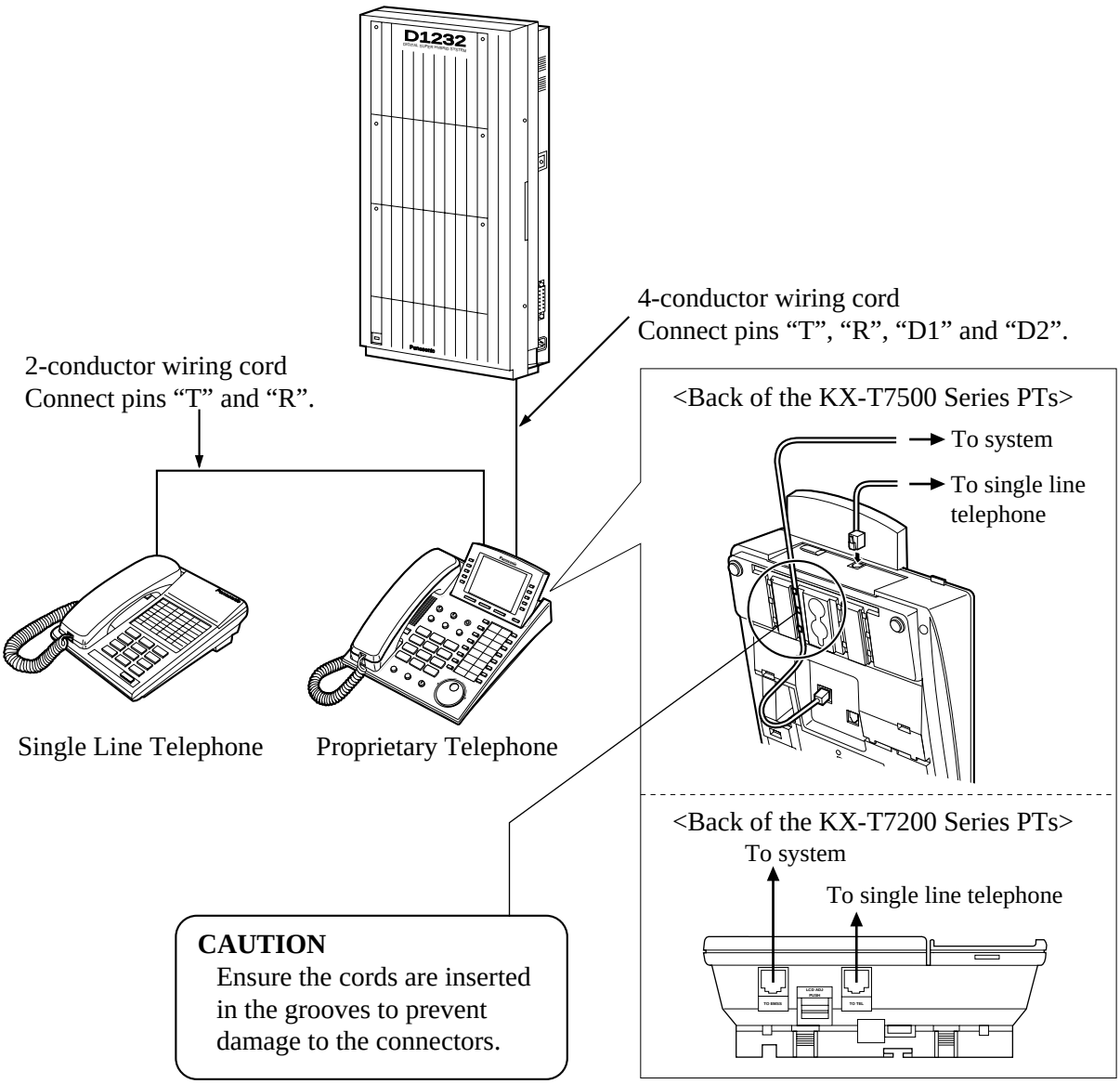
Any single line telephone can be connected in parallel with a proprietary telephone as follows:

Method 1: Using a Modular T-Adaptor



Note
The KX-TD1232 is illustrated as a main unit.

Method 2: Using a PT Jack



Note

- Not only a single line telephone but a single line device such as an answering machine, a facsimile or modem (personal computer) etc. can be connected in parallel with a proprietary telephone.
- The KX-TD1232 is illustrated as a main unit.

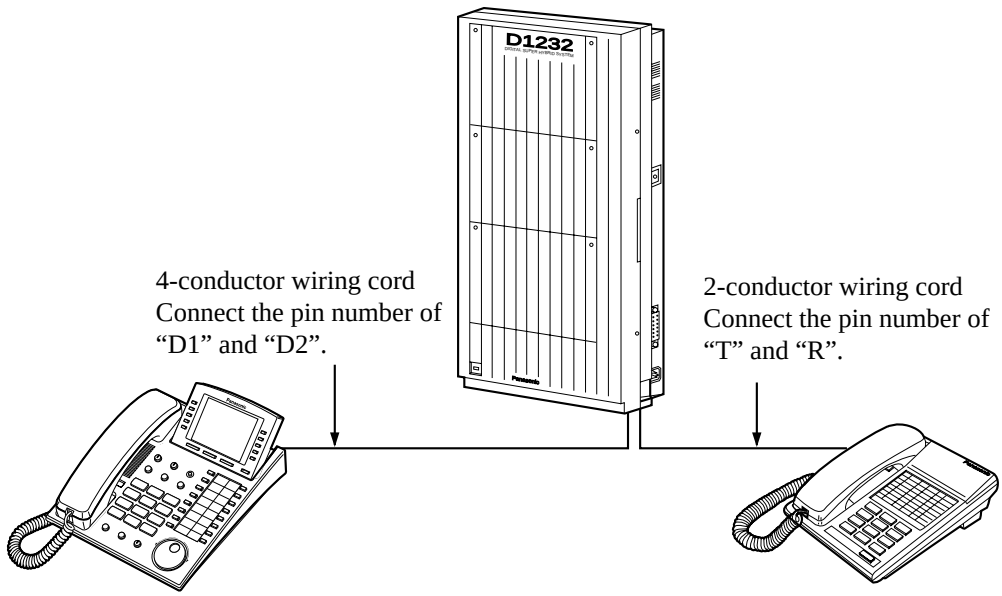
Feature References

Parallelled Telephone

2.3.5 EXtra Device Port (XDP) Connection for a Digital Proprietary Telephone and a Single Line Telephone

A proprietary telephone (KX-T7531, KX-T7533, KX-T7536, KX-T7550, KX-T7230, KX-T7235 or KX-T7250) and a single line telephone can be connected to the same extension jack yet have different extension numbers (eXtra Device Port feature). System Programming is required.

Method 1



Method 2

2.3.4 Parallelled Telephone Connection for a Proprietary Telephone and a Single Line Telephone, Method 2: Using a PT Jack" is also available for XDP connection.

Note

The KX-TD1232 is illustrated as a main unit.

Programming References

[600] EXtra Device Port

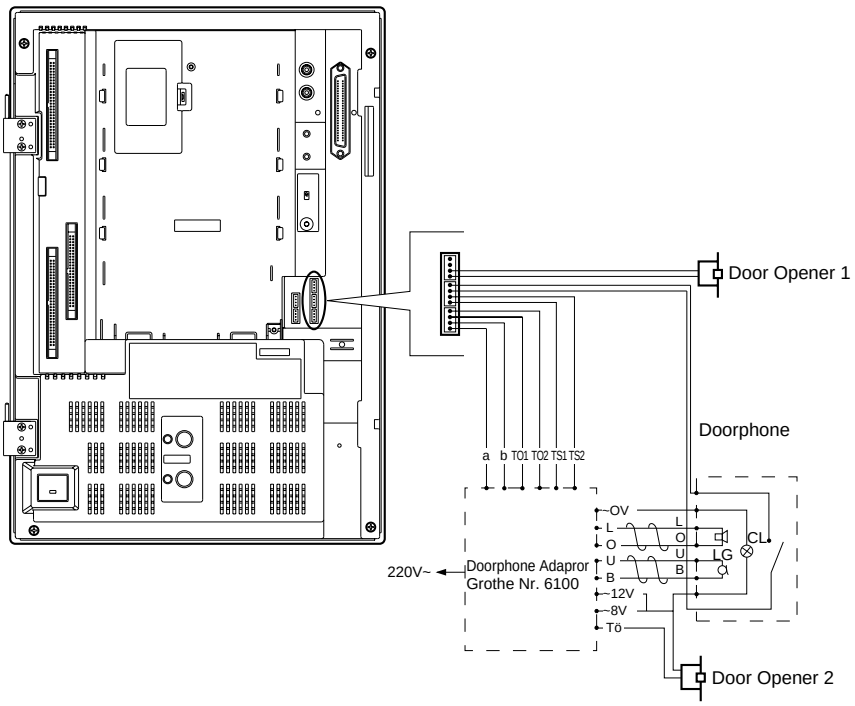
Feature References

EXtra Device Port (XDP)

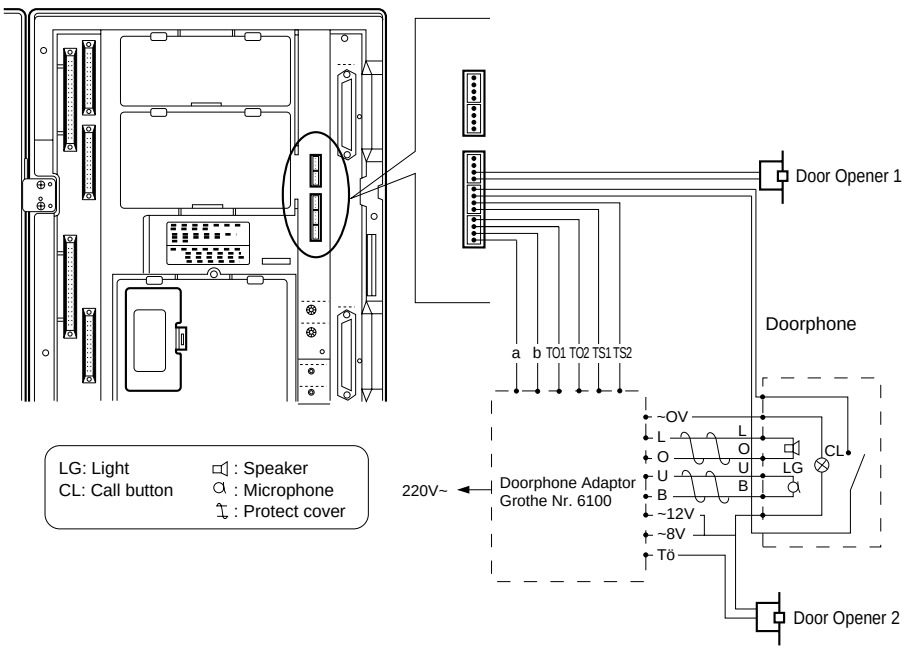
2.3.6 Doorphone and Door Opener Connection

A maximum of one doorphone can be connected per system. A maximum of two door openers can be connected per system. They are user-supplied devices.

KX-TD816

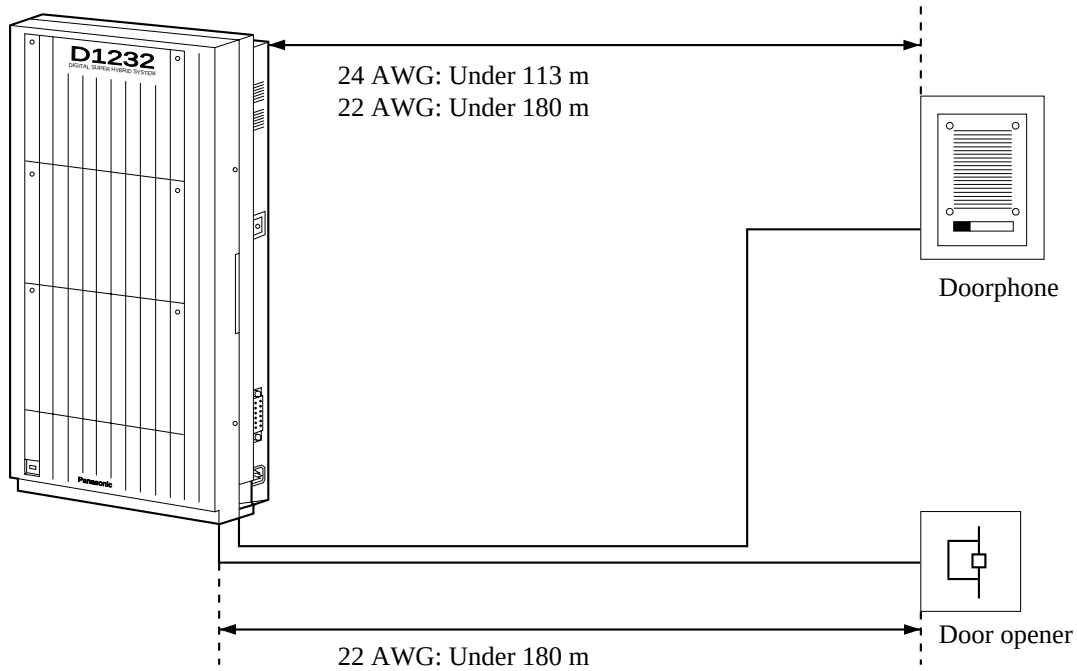


KX-TD1232



Maximum cabling distance of the doorphone and the door opener line

The maximum length of the doorphone and door opener line that connects to the main unit is shown below:



Note

The KX-TD1232 is illustrated as a main unit.

Programming References

[122] Automatic Door Open Assignment

[511] Door Opener Access

[607-608] Doorphone Ringing Assignment — Day / Night

Feature References

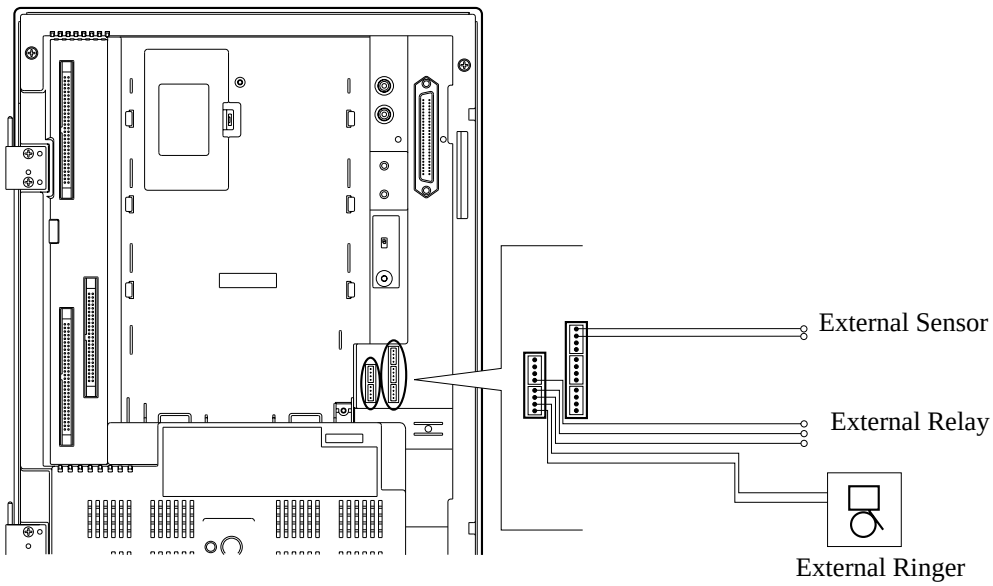
Door Opener

Doorphone Call

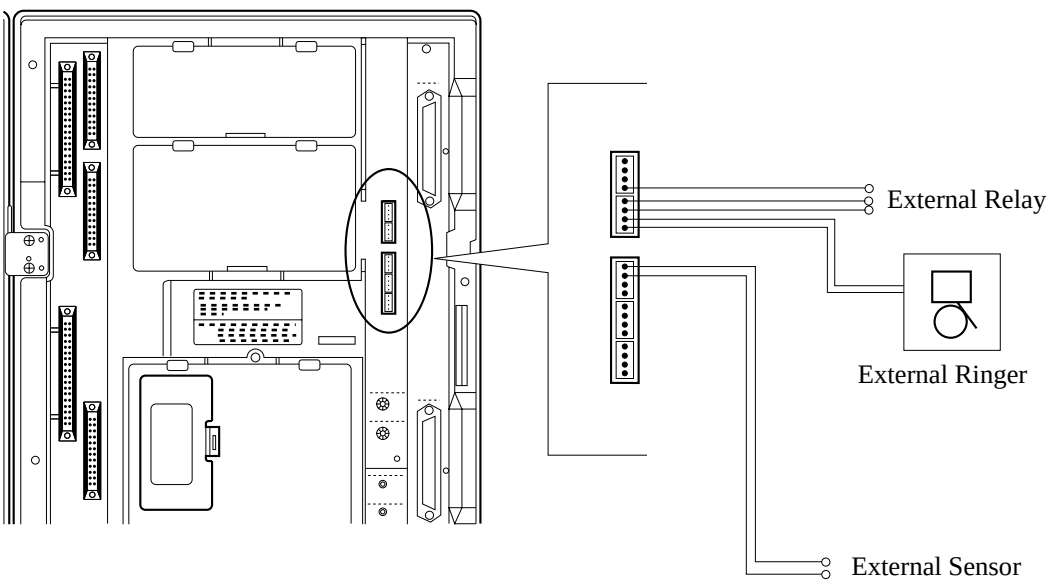
2.3.7 External Relay, External Ringer and External Sensor Connection

A maximum of one user-supplied external relay, external ringer and/or external sensor can be connected per system.

KX-TD816



KX-TD1232



Note

System Connection*1 permits a maximum of two of each device.

*1 Available for the KX-TD1232 only.

— External Relay

Programming References

[213] External Relay Connecting Time

[512] External Relay Access

Feature References

External Relay

— External Ringer

Programming References

[213] External Relay Connecting Time

[813] Floating Number Assignment

Feature References

External Ringer

— External Sensor

Programming References

No programming required.

Feature References

External Sensor

2.3.8 External Pager (Paging Equipment) Connection

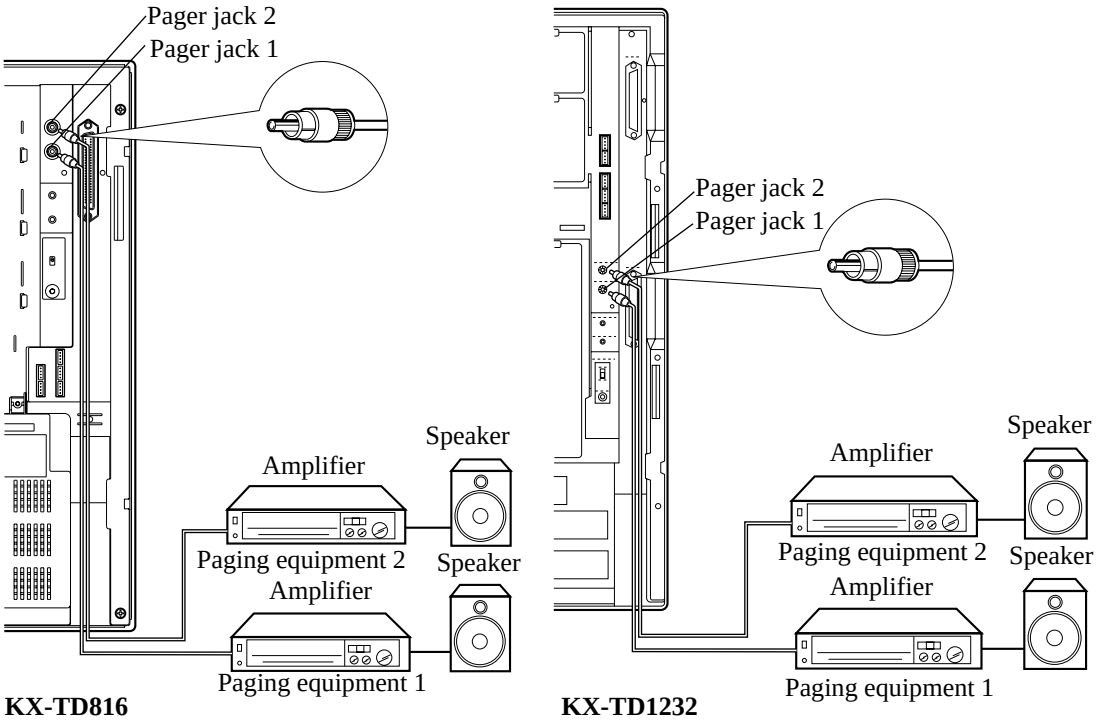
A maximum of two pagers (user-supplied) can be connected per system as illustrated below.

Use an RCA connector and shielded cable.

- Output impedance: 600 Ω

Maximum length of Cable

18-22 AWG, under 10 m



Note

- System Connection permits a maximum of four external pagers.
- It is programmable that which external pager will send background music and whether all the pagers will generate confirmation tone.
- To adjust the sound level of the pagers, use the volume control on the amplifiers.

Programming References

[804] External Pager BGM

[805] External Pager Confirmation Tone

[813] Floating Number Assignment

Feature References

Background Music (BGM) - External

Paging - All
Paging - External
Trunk (CO Line) Answer From Any Station (TAFAS)

2.3.9 External Music Source Connection

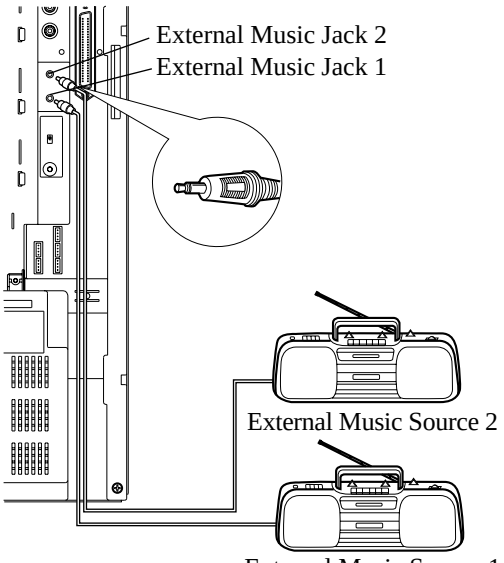
Up to two music sources such as a radio (user-supplied) can be connected per system as illustrated below.

Insert the plug to the earphone / headphone jack on the external music source. Use a two-conductor plug {3.5 mm in diameter}.

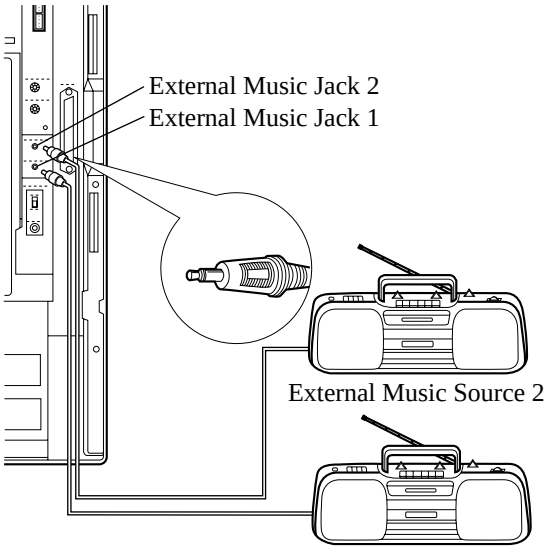
- Input impedance: 8 Ω

Maximum length of Cable

18-22 AWG, under 10 m



KX-TD816



KX-TD1232

- System Programming of music sources used for Music on Hold and Background Music is required.
- To adjust the sound level of the Music on Hold, use the volume control on the external music source.
- The system is provided with an internal music source. By default setting, internal music source is used as Music Source 1 for the systems. System Programming is required to select internal music source.

Programming References

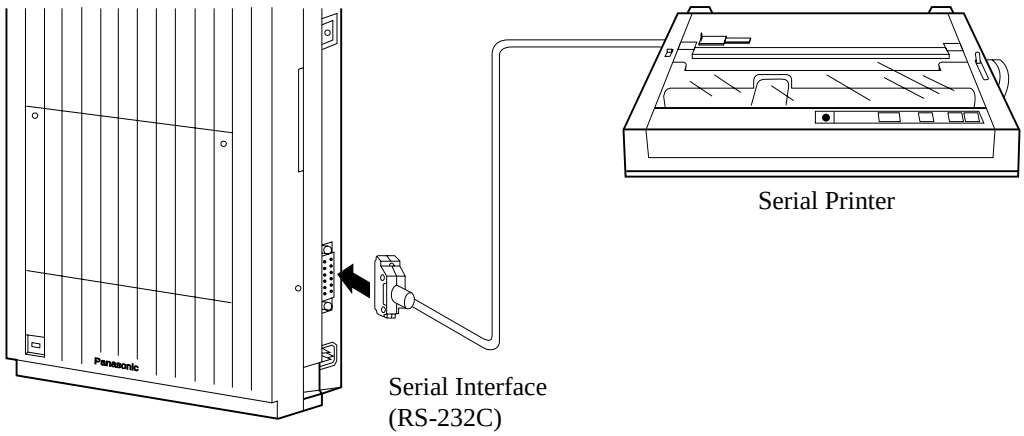
[803] Music Source Use
[804] External Pager BGM
[990] System Additional Information

Feature References

Background Music (BGM)
Background Music (BGM) - External
Music on Hold

2.3.10 Printer Connection

A user-supplied printer can be connected to the Serial Interface (RS-232C) Connector on the main unit. The printer is used to print out SMDR call records and system programming data. Connect the Serial Interface (RS-232C) connector of the printer to the Serial Interface Connector. Cables must be shielded and the maximum length is 2 m.



Note
The KX-TD1232 is illustrated as a main unit.

The pin configuration of Serial Interface (RS-232C) Connector is as follows:

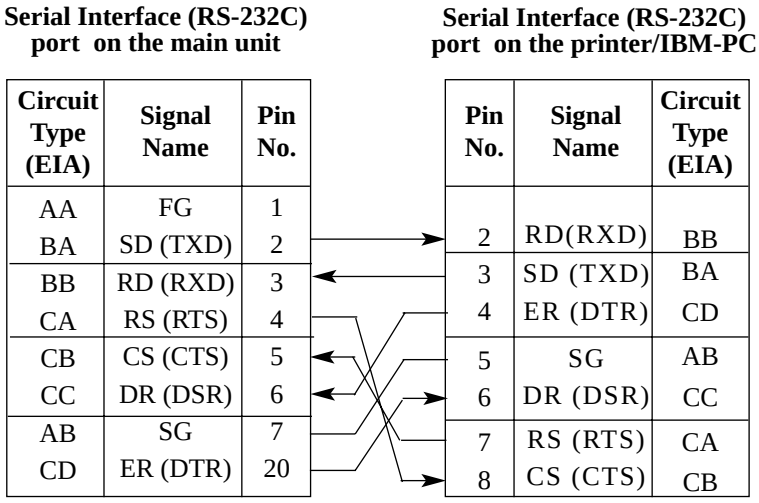
Pin No.	Signal Name		Circuit Type	
			EIA	CCITT
1	FG	Frame Ground	AA	101
2	SD (TXD)	Transmitted Data	BA	103
3	RD (RXD)	Received Data	BB	104
4	RS (RTS)	Request To Send	CA	105
5	CS (CTS)	Clear To Send	CB	106
6	DR (DSR)	Data Set Ready	CC	107
7	SG	Signal Ground	AB	102
8	CD (DCD)	Data Carrier Detect	CF	109
20	ER (DTR)	Data Terminal Ready	CD	108.2

Connection Chart for Printer / Personal Computer (25-pin)

Serial Interface (RS-232C) port on the main unit			Serial Interface (RS-232C) port on the printer/PC		
Circuit Type (EIA)	**Signal Name**	**Pin No.**	**Pin No.**	**Signal Name**	**Circuit Type (EIA)**
AA	FG	1	1	FG	AA
BA	SD (TXD)	2	3	RD (RXD)	BB
BB	RD (RXD)	3	2	SD (TXD)	BA
CB	CS (CTS)	5			
CC	DR (DSR)	6	20	ER (DTR)	CD
AB	SG	7	7	SG	AB
CD	ER (DTR)	20	5	CS (CTS)	CB
			6	DR (DSR)	CC
			8	CD (DCD)	CF

Connection Chart for IBM Personal Computer (9-pin)

If you connect an IBM-PC to your system, see the chart below.



Circuit Type (EIA)	Signal Name	Pin No.	Pin No.	Signal Name	Circuit Type (EIA)
AA	FG	1			
BA	SD (TXD)	2	2	RD(RXD)	BB
BB	RD (RXD)	3	3	SD (TXD)	BA
CA	RS (RTS)	4	4	ER (DTR)	CD
CB	CS (CTS)	5	5	SG	AB
CC	DR (DSR)	6	6	DR (DSR)	CC
AB	SG	7	7	RS (RTS)	CA
CD	ER (DTR)	20	8	CS (CTS)	CB

Note

Please read your printer manual and connect the first EIA pin (FG) of this unit to the printer cable.

Serial Interface (RS-232C) Signals

Frame Ground: FG

Connects to the unit frame and the earth ground conductor of the AC power cord.

Transmitted Data: SD (TXD) : (output)

Conveys signals from the unit to the printer. A "Mark" condition is held unless data or BREAK signals are being transmitted.

Received Data: RD (RXD) : (input)

Conveys signals from the printer.

Request to Send: RS (RTS) : (output)

This lead is held ON whenever DR (DSR) is ON.

Clear To Send: CS (CTS) : (input)

An ON condition of circuit CS (CTS) indicates that the printer 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.

Data Set Ready: DR (DSR) : (input)

An ON condition of circuit DR (DSR) indicates the printer is ready. Circuit DR (DSR) ON does not indicate that communication has been established with the printer.

Signal Ground: SG

Connects to the DC ground of the unit for all interface signal.

Data Terminal Ready: ER (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. It is switched OFF when the unit is OFF LINE.

Data Carrier Detect: CD (DCD) : (input)

The ON condition is an indication to data terminal (DTE) that the carrier signal is being received.

Programming References

[800] SMDR Incoming / Outgoing Call Log Printout

[801] SMDR Format

[802] System Data Printout

[806-807] Serial Interface (RS-232C) Parameters — Port 1 / Port 2

Feature References

Station Message Detail Recording (SMDR)

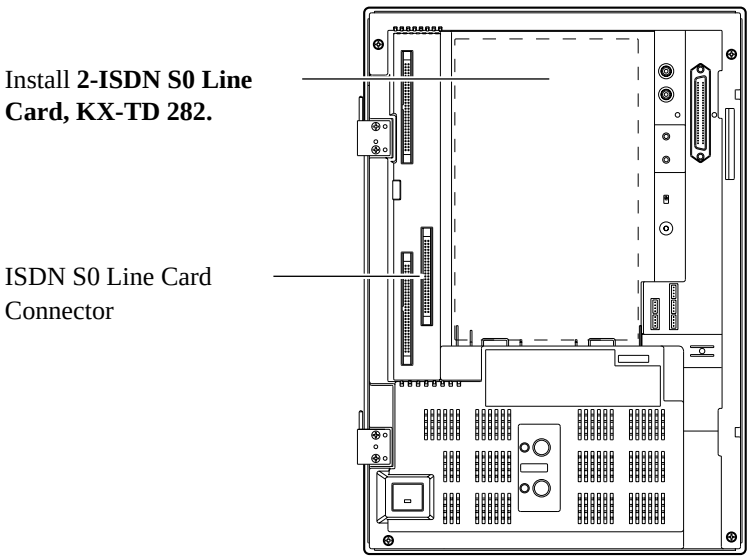
System Programming and Diagnosis with Personal Computer

2.4 Optional Cards and Units Installation

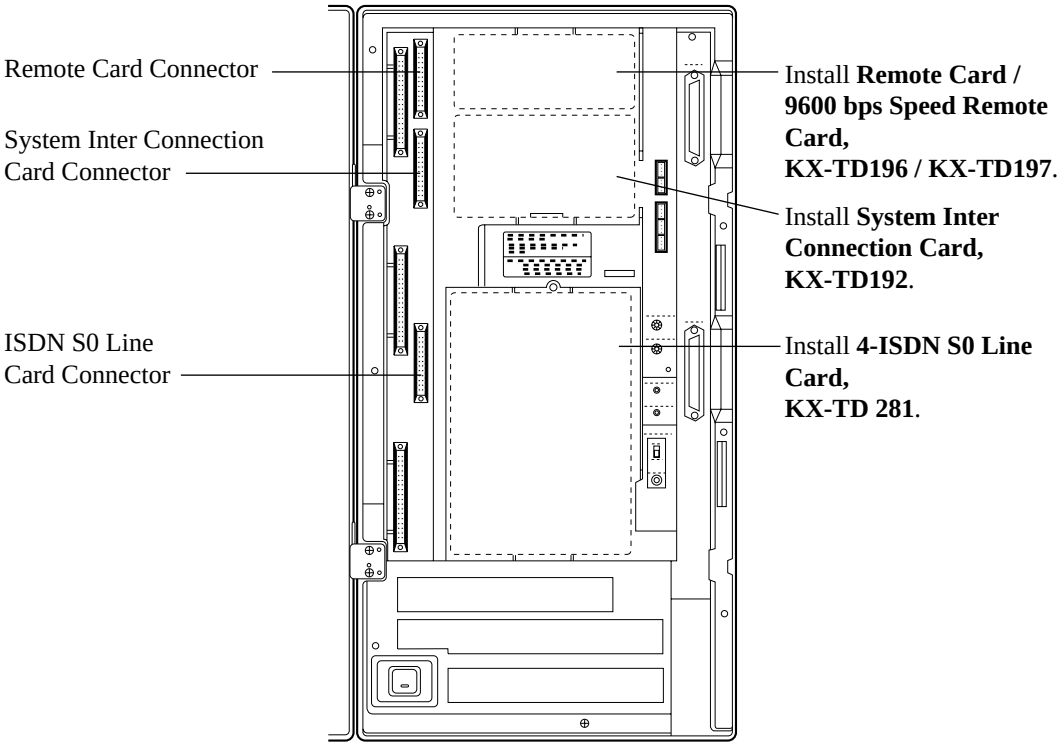
2.4.1 Location of Optional Cards and Units

ISDN S0 Line Card for KX-TD816

KX-TD816



ISDN S0 Line/Remote/System Inter Connection Card for KX-TD1232



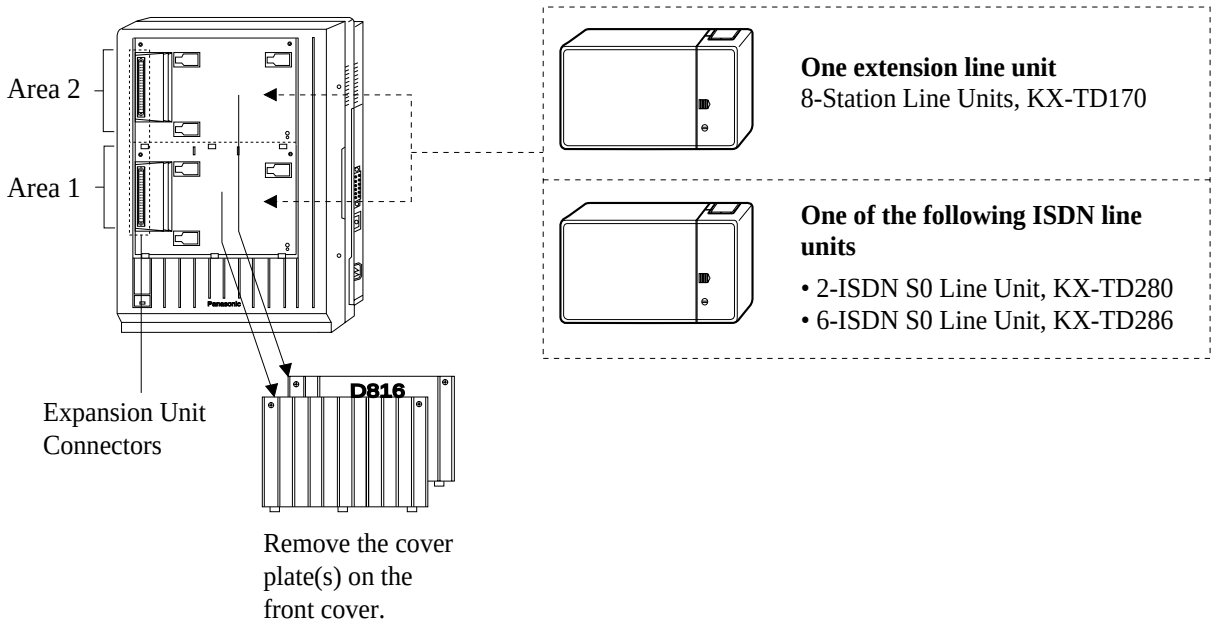
Precautions

To protect the printed circuit boards (P-boards) from static electricity, do not touch parts on the P-boards in the main unit and on the optional units.
ISDN unit (KX-TD280, KX-TD286, KX-TD290) installation;
The ISDN unit should not be installed only to the Slave system under the System connection[*1].

Expansion Unit for KX-TD816

One 8-Station Line Units (KX-TD170) and/or one ISDN Line Unit (KX-TD280, KX-TD286) can be installed to any expansion area.

The locations of the optional units are shown below.



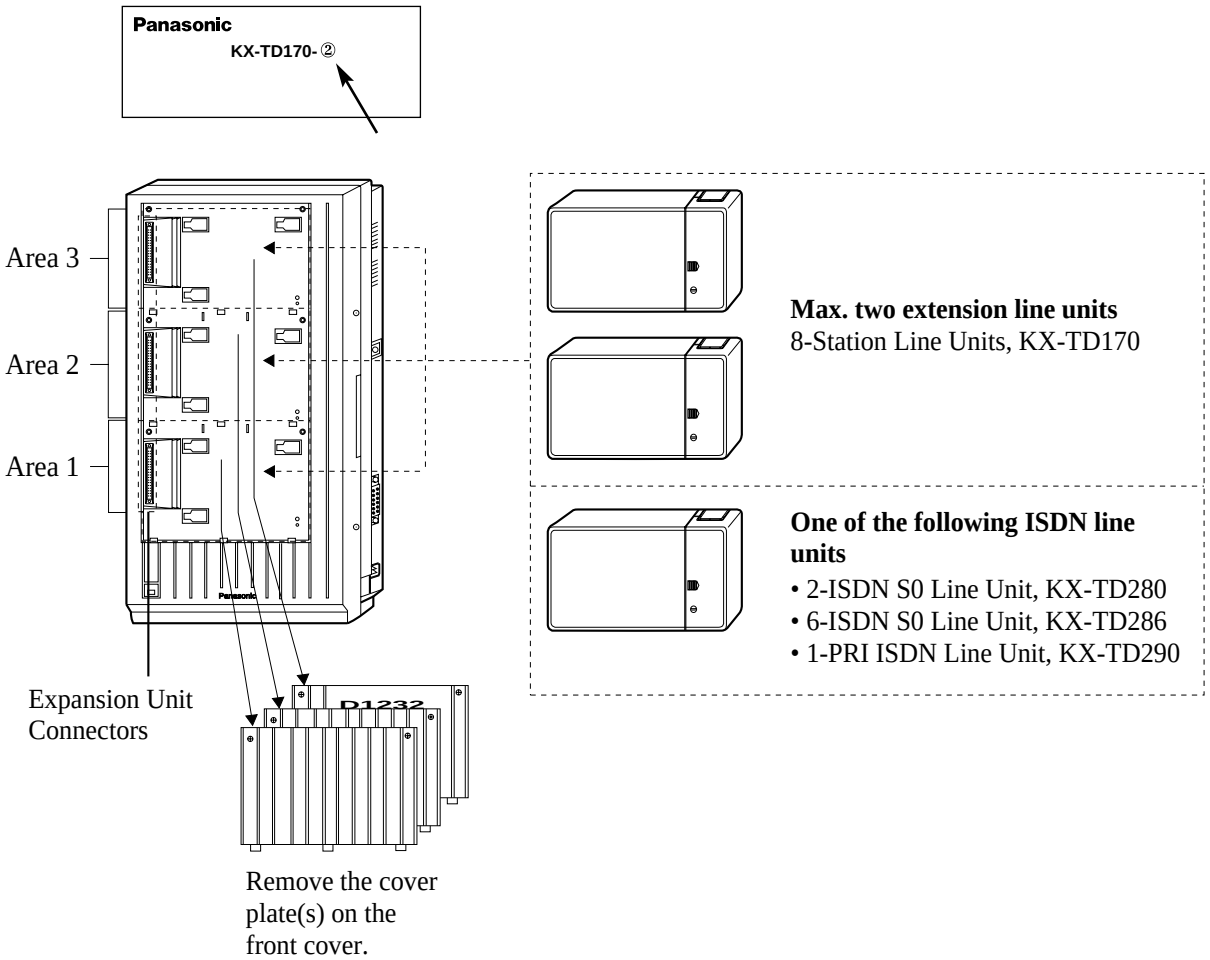
Note

- When starting the system for the first time or performing System Data Clear, the location application will use the actual installation settings instead of the system default settings.
- System Programming is required for location identification.
  Refer to [109] Expansion Card / Unit Type.
  Default:
  KX-TD816: Area 1= 2-ISDN S0 Line Unit, Area 2= 8-Station Line Unit

[*1] Available for KX-TD1232 ONLY.

Expansion Unit for KX-TD1232

A maximum of two 8-Station Line Units (KX-TD170) and/or one CO Line/ISDN Line Unit (KX-TD280, KX-TD286, KX-TD290) can be installed to any expansion area. You must use the KX-TD170- ② when you install the KX-TD290. The former KX-TD170 does not work properly with the KX-TD290. Please see the back of the unit and check "KX-TD170- ② " is marked.



Note

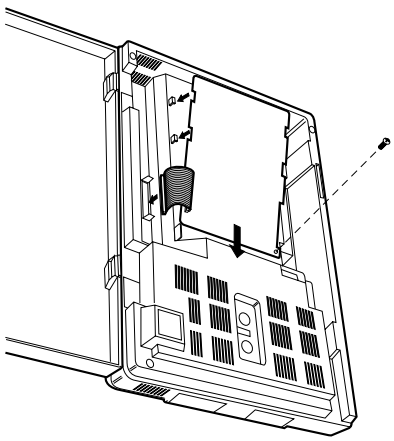
- When starting the system for the first time or performing System Data Clear, the location application will use the actual installation settings instead of the system default settings.
- System Programming is required for location identification.
  Refer to program [109] Expansion Card / Unit Type.
  Default:
  KX-TD1232: Area 1= 2-ISDN S0 Line Unit, Area 2, 3= 8-Station Line Unit

2.4.2 ISDN S0 Line Connection (Optional Card)

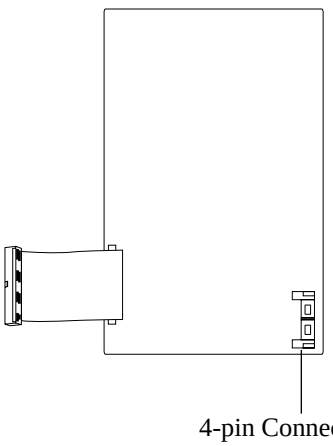
Card Installation for KX-TD816

To connect two ISDN S0 Line (CO01 through CO04), install the optional 2-ISDN S0 Line Card (KX-TD282).

1. Align the indentations of the card with the hooks on the main unit.
2. Slide down the card.
3. Fix the card with an accessary screw at the lower-right corner.
4. Connect the cord to the connector.



2-ISDN S0 Line Card

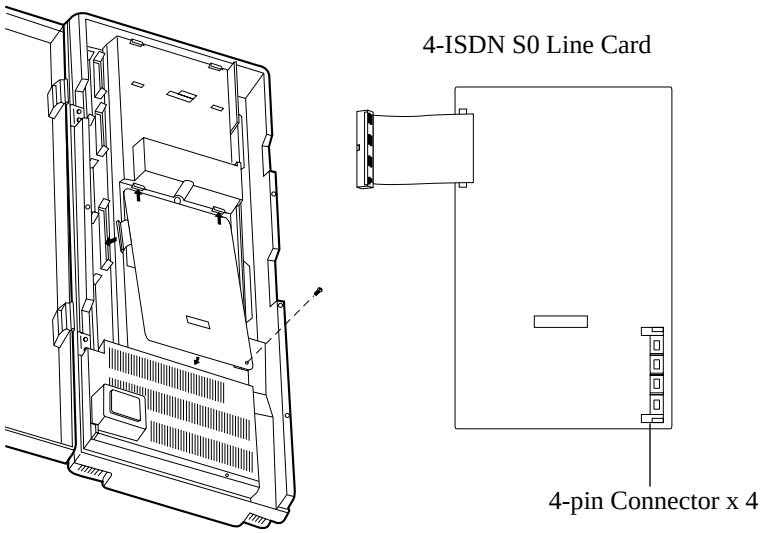


4-pin Connector x 2

Card Installation for KX-TD1232

To connect four ISDN S0 Line (CO01 through CO08), install the optional 4-ISDN S0 Line Card (KX-TD281).

1. Insert the upper end of the ISDN S0 Line Card into the two hooks on the main unit.
2. Press the two corners at the lower end of the Card.
3. Fix the card with an accessory screw at the lower-right corner.
4. Connect the cord to the connector.



Wire Specifications

In making a line connection, use twisted pair cable for installation. The wire specifications for ISDN S0 lines are as follows:

Wire	Solid wire
Diameter of conductor	ø 0.4 – ø 0.65 mm
Diameter including coating	ø 0.66 – ø 1.05 mm

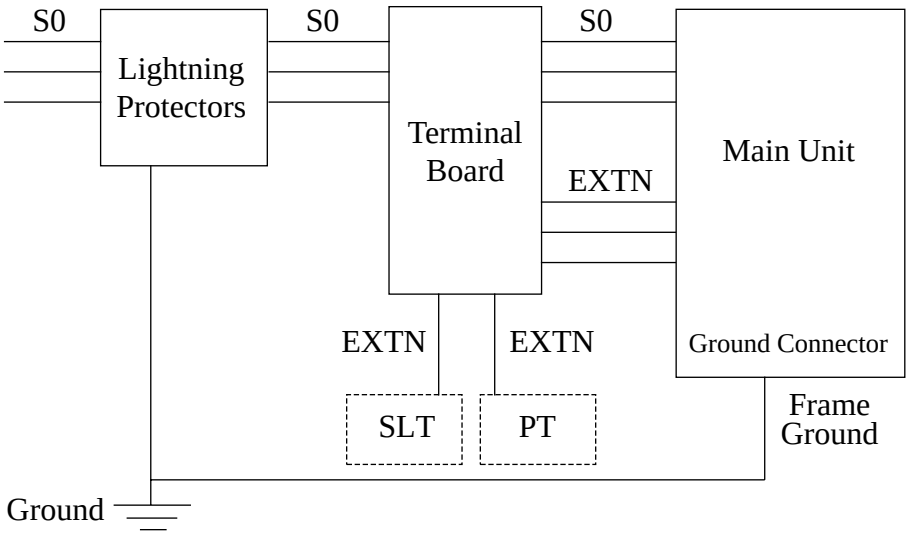
Notice

Be sure to screw the card at Step 3 for prevention of lightning damage.

2.4.3 Lightning Protector Installation

A lightning protector is a device to be installed on an ISDN S0 line to prevent a dangerous surge from entering the building and damaging equipment.
A dangerous surge can occur if a telephone line comes in contact with a power line. Troubles due to lightning surges have been showing a steady increase with the development of electronic equipment.
In many countries, there are regulations requiring the installation of a lightning protector. A lightning strike to a telephone cable which is 10 m above ground can be as high as 200,000 volts.
This system should be installed with lightning protectors. In addition, grounding (connection to earth ground) is very important for the protection of the system.

Installation Diagram



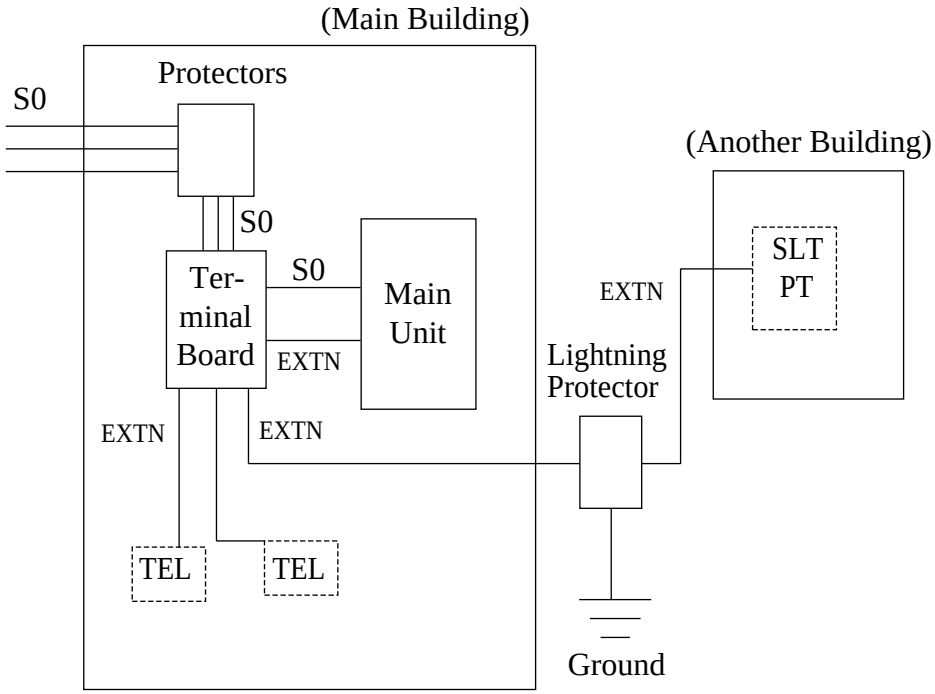
SLT : Single line telephone
PT : Proprietary telephone

Outside Installation Diagram

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

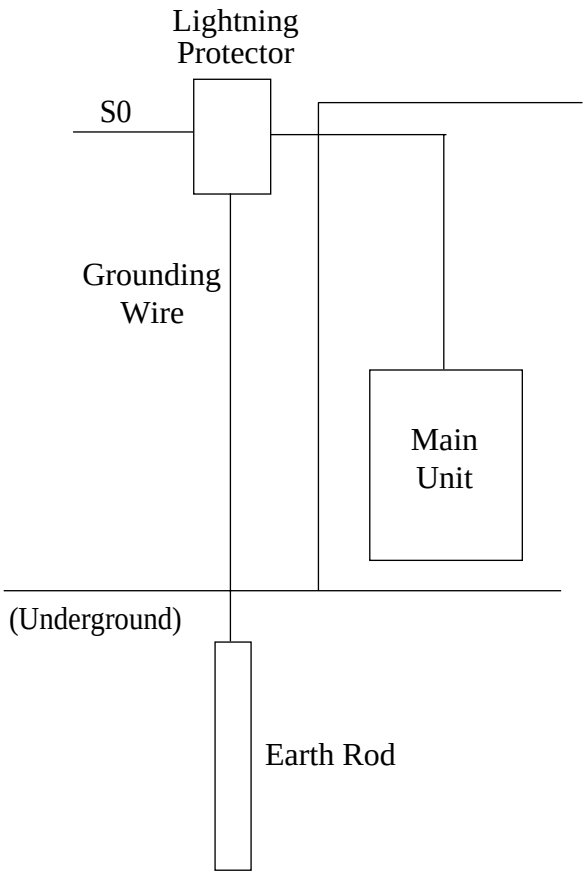
1. Install the extension wire underground.

2. Use a conduit to protect the wire.



Earth Rod Installation Diagram

The length of earth rod and the required depth depend on the composition of the soil. Consider the following recommendations:



1. Installation location of the earth rod : Near the protector

2. Check obstructions : None

3. Composition of the earth rod : Metal

4. Depth of the earth rod : More than 50 cm

5. Size of the grounding wire : Thickness is more than 1.6 mm

2.4.4 ISDN S0 Line Connection (Optional Unit)

To add two ISDN S0 lines (KX-TD816: CO05 through CO08, KX-TD1232: CO 09 through CO 12), use the optional 2-ISDN S0 Line Unit (KX-TD280).

To add six ISDN S0 lines, use the optional ISDN 6-S0 Line Unit (KX-TD286). When the KX-TD286 is installed in the KX-TD816, only four ISDN S0 lines are available for outside lines and the other ports are for extension lines (ISDN extensions).

To add one PRI ISDN line, use the Primary Rate Interface (PRI) ISDN Expansion Unit (KX-TD290).*1
When this unit is installed to the system, the maximum number of available CO lines is limited to 38.
One PRI ISDN line adds 30 CO lines (CO 25 through CO 54) to the system.
This unit can be only installed to the KX-TD1232 Master system.

One of these units can be installed in any of the expansion areas provided on the front of the main unit.

For Unit Installation, see 2.4.6 Installing Expansion Unit.

*1 Available for the KX-TD1232 only.

2.4.5 Extension Connection (Optional Unit)

To add eight extensions (KX-TD816: jack numbers 9 through 16, KX-TD1232: jack numbers 17 through 24), use the optional 8-Station Line Unit (KX-TD170).
To add 16 extensions (jack numbers 17 through 32)[*1], use two Station Line Units.
This unit can be installed to any of the expansion areas provided on the front of the main unit.
For Unit Installation, see 2.4.6 Installing Expansion Unit.

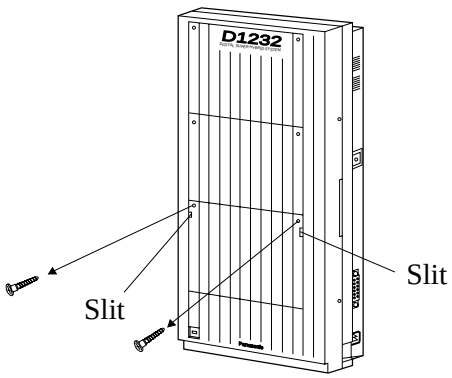
[*1] Available for the KX-TD1232 only.

2.4.6 Installing Expansion Unit

The following procedures can be used to install either Extension Unit (KX-TD170), ISDN S0 Line Unit (KX-TD280, KX-TD286 or ISDN PRi Unit (TD290)[*1]). There are two expansion areas on the KX-TD816 and three expansion areas on KX-TD1232.
One KX-TD170 for KX-TD816 and a maximum of two KX-TD170 for KX-TD1232 can be installed. One of the Units, KX-TD280, KX-TD286 or KX-TD290 can be installed.
System Programming is required for unit location indication. (Default : KX-TD816: bottom = 2-S0 Line Unit, top = 8-Station Line Unit, KX-TD1232: bottom= 2-S0 Line Unit, middle and top = 8-Station Line Unit)

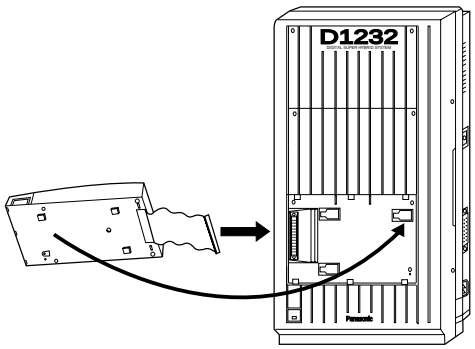
Note
The KX-TD1232 is illustrated as a main unit.

1. Loosen two screws on the cover plate. Insert fingers into the slits to remove the cover plate.



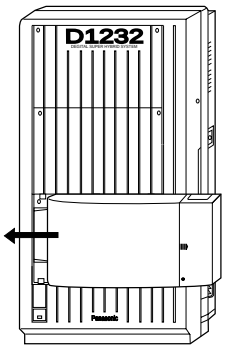
Note
Any of the cover plates can be removed, as needed.

2. Connect the cord coming from the cabinet to the connector in the main unit firmly.

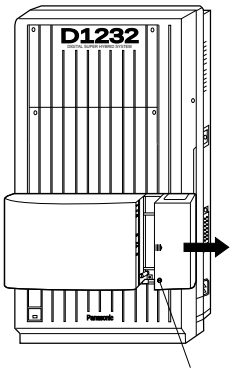


[*1] Available for the KX-TD1232 only.

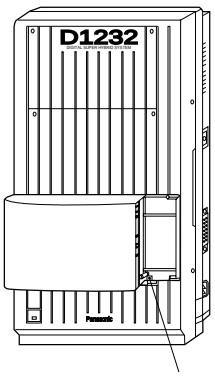
3. Hook the unit on the main unit and slide the unit leftward until it is fixed.



4. Loosen the outside screw and slide the cover rightward to remove.



5. Secure the inside screw (included) to fix the cabinet to the main unit.



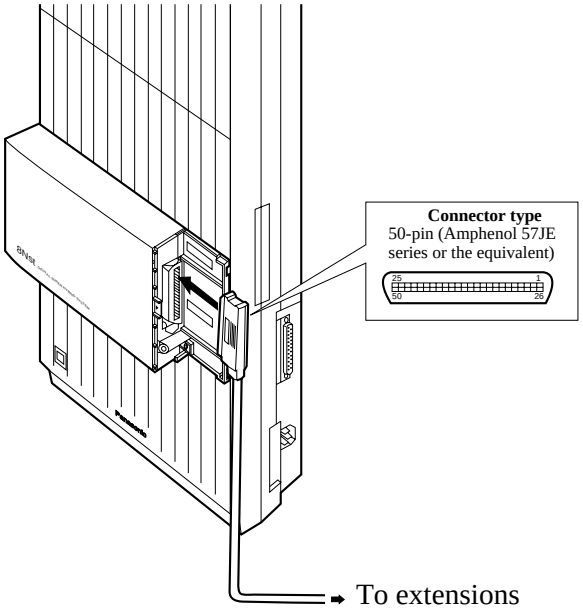
Note

Be sure to fix the inside screw to the main unit, or the unit may not work properly.

6.

a) If a KX-TD170 is to be installed:

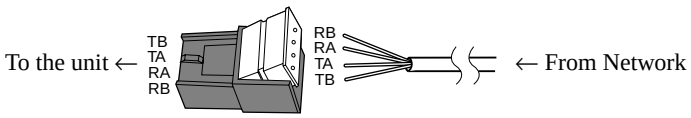
Insert the connector into the jack.



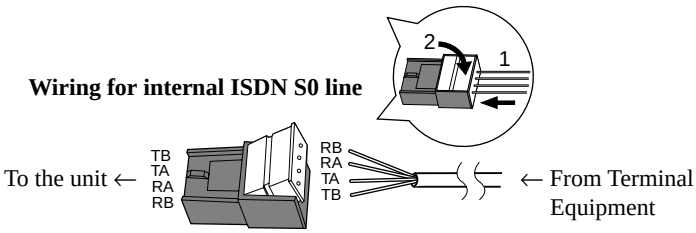
b) If a KX-TD280 / KX-TD286 is to be installed:

1) Prepare the required plugs. Two 4-pin plugs are included in KX-TD280 and six 4-pin plugs are included in KX-TD286 to connect ISDN S0 lines.

Wiring for external ISDN S0 line

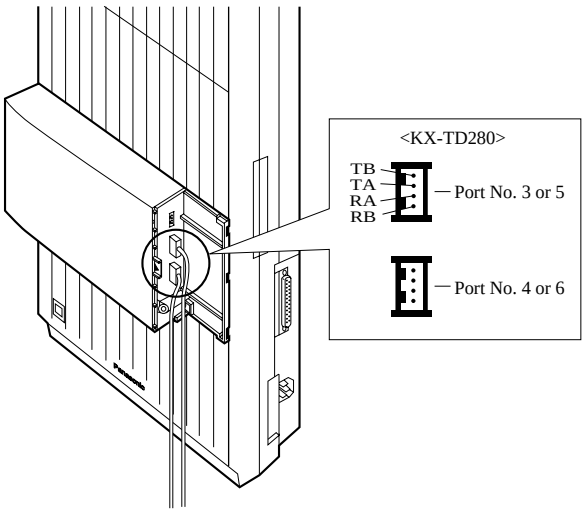


Wiring for internal ISDN S0 line



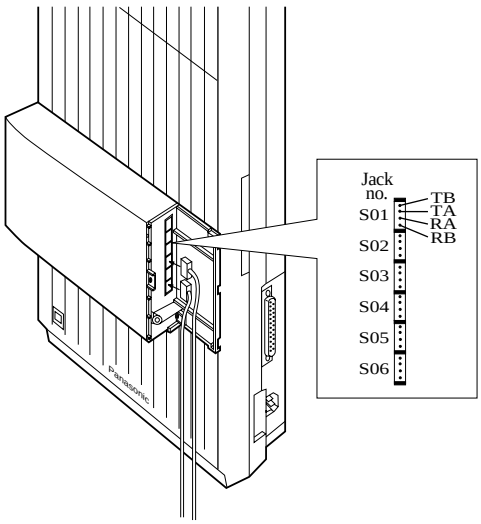
2) Insert the plug into a jack on the unit. Connect an earth wire to the earth terminal on the KX-TD280 or KX-TD286.

KX-TD280



To Terminal Board or Modular Jacks from the Central Office

KX-TD286



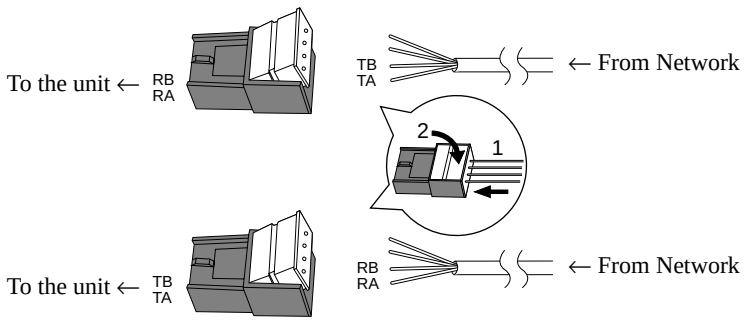
To Terminal Board or Modular Jacks from the Central Office

Note

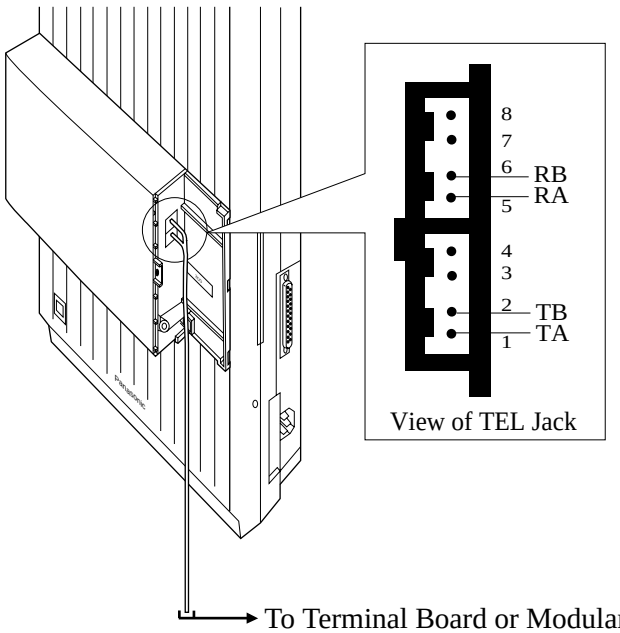
For the KX-TD816, jack numbers S05 and S06 of the KX-TD286 are fixed as extension lines and for the KX-TD1232, all ports can be either for CO line or extension line. To connect internal ISDN lines, refer to 2.4.7 ISDN S0 Line Connection.

c) If a KX-TD290 is to be installed (KX-TD1232 only):

1) Prepare the required plugs. Two 4-pin plugs are included with the KX-TD290.



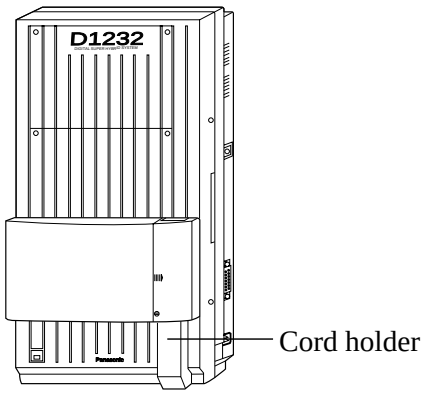
2) Insert the plug into a jack on the unit.
Connect an earth wire to the earth terminal on the extension expansion unit.



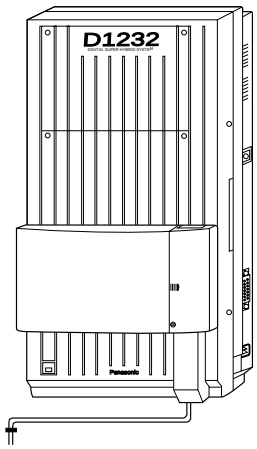
Note

For the KX-TD816, Jack numbers S05 and S06 are fixed as extension lines and for the KX-TD1232, all ports can be either for CO line or extension line.

7. Tie up all the cords into a bundle. If other cords are coming from the upper units, tie them, too.
8. Close the unit cover and secure the outside screw.
9. Cover the cords with the cord holder (included).

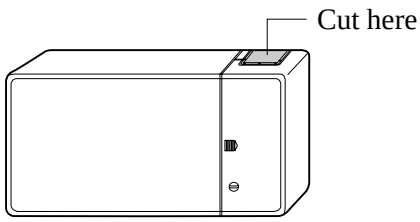


10. Fix the cords to the wall at the shown position so that the front cover can be opened.



Note

If two or three expansion units are installed, cut the unit cover(s) on the lower unit(s) to let the cords from upper unit go down through the unit cover(s). To guard the cords, smooth the cut edge.



Programming References

[109] Expansion Card / Unit Type

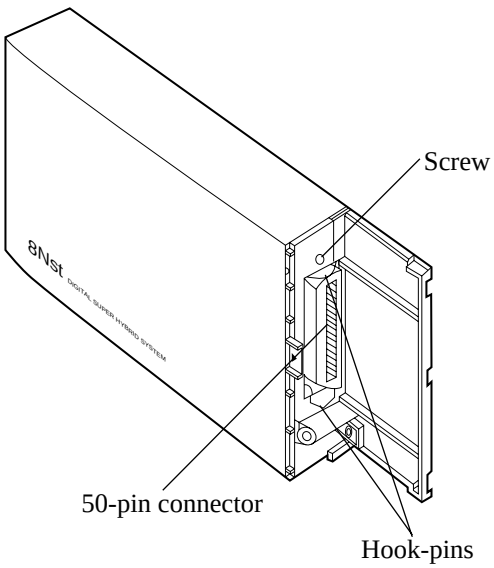
Feature References

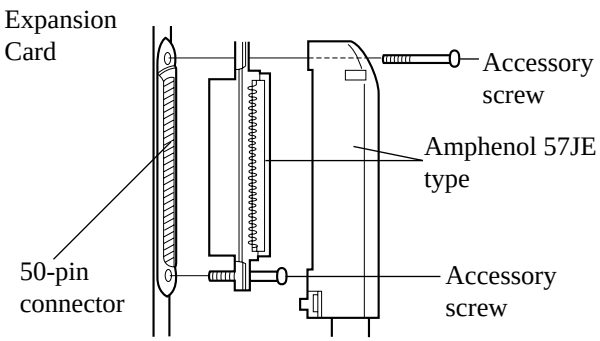
Module Expansion

Amphenol 57JE Type (screw-attach-type 50-pin connector) Connection

To fix the Amphenol 57JE type (screw-attach type 50-pin connector) to the Extension Expansion Card, follow the procedures below.

1. The 50-pin connector (Jack) on the Expansion Card has two hook-pins. Remove the upper hook-pin, taking out the screw.

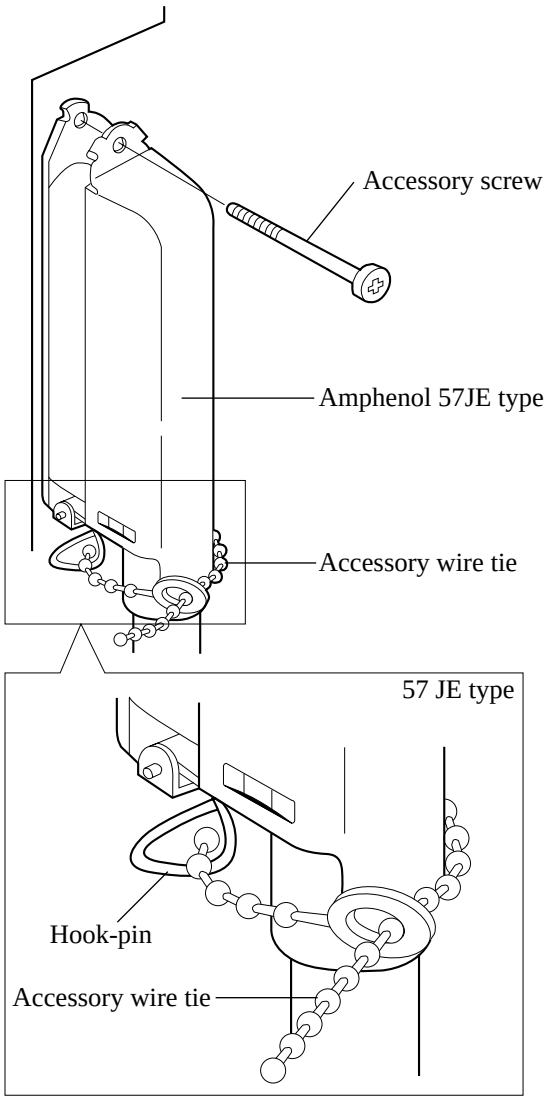




Note

When connecting a connector of the type shown above, unscrew the lower hook-pin, too. Then drive both accessory screws.

2. To attach the Amphenol 57JE type (Plug) to the connector, drive the accessory screw at the upper part.
Fasten the accessory wire tie around the lower hook-pin and the Amphenol 57JE type, as shown.


Accessory screw
Amphenol 57JE type
Accessory wire tie
57 JE type
Hook-pin
Accessory wire tie

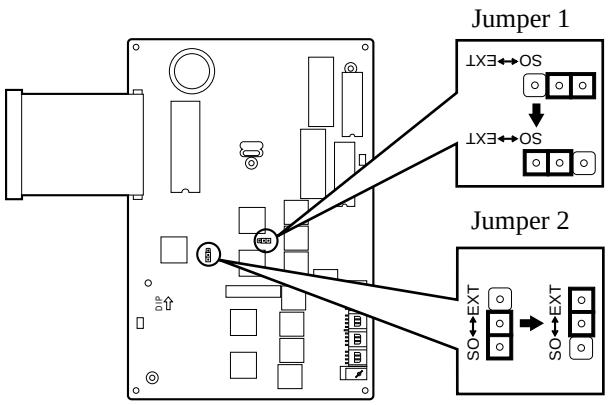
2.4.7 ISDN S0 Line Connection

In the case of KX-TD816, the Port numbers 01 through 04 can be used as either external or internal ISDN S0 lines. In the case of KX-TD1232, the Port numbers 01 and 02 are fixed as external ISDN S0 Lines and the Port numbers 03, 04, 05, and 06 can be used as either external or internal ISDN S0 Lines. Some System Programmings and hardware changes are required to use the S0 bus as internal ISDN S0 lines beforehand.

Preparation

For KX-TD281 only

1. Take the appropriate jumper cover out of the first and second pins from the left on the jumper of the P-board ("S0" side).
   Jumper 1 for Port number 03 Jumper 2 for Port number 04
2. Cover the jumper cover on the first and second pins from the right on the jumper of the P-board ("EXT" side).

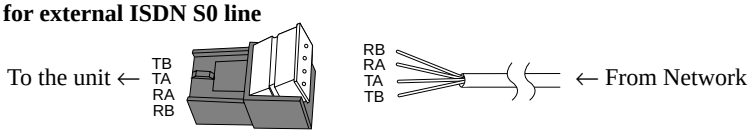


Connection

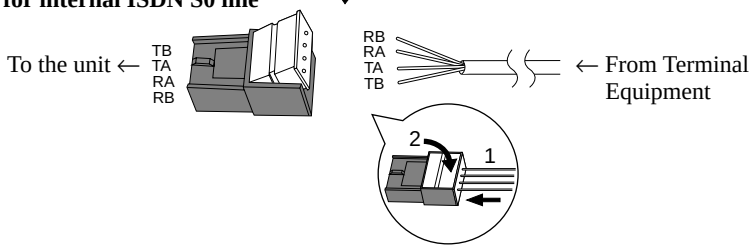
Use 4-pin plugs (included) to connect ISDN S0 lines. A single plug is able to connect one ISDN S0 line. Mis-connection may cause the system to operate improperly.

1. Re-arrange telephone wires in reverse order of the plug.

Wiring for external ISDN S0 line

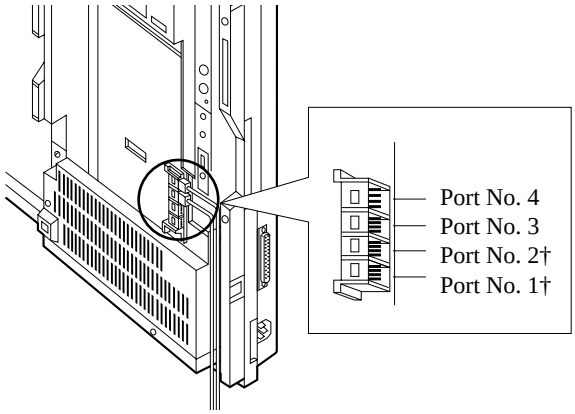


Wiring for internal ISDN S0 line



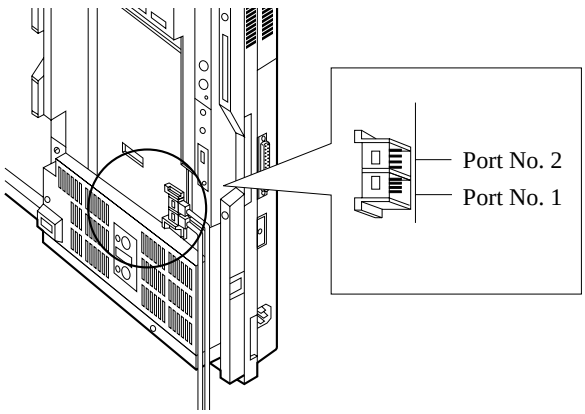
2. Insert the plug into a ISDN S0 port on the unit.

KX-TD281



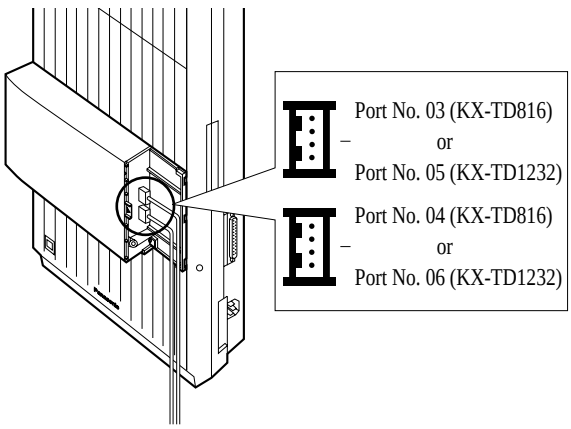
To ISDN equipment

KX-TD282



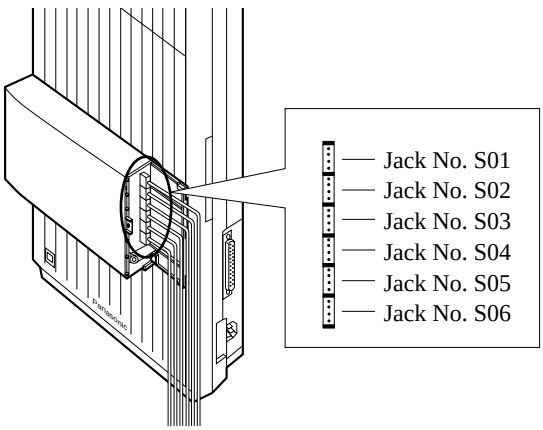
To ISDN equipment

KX-TD280



To ISDN equipment

KX-TD286



To ISDN equipment

Note

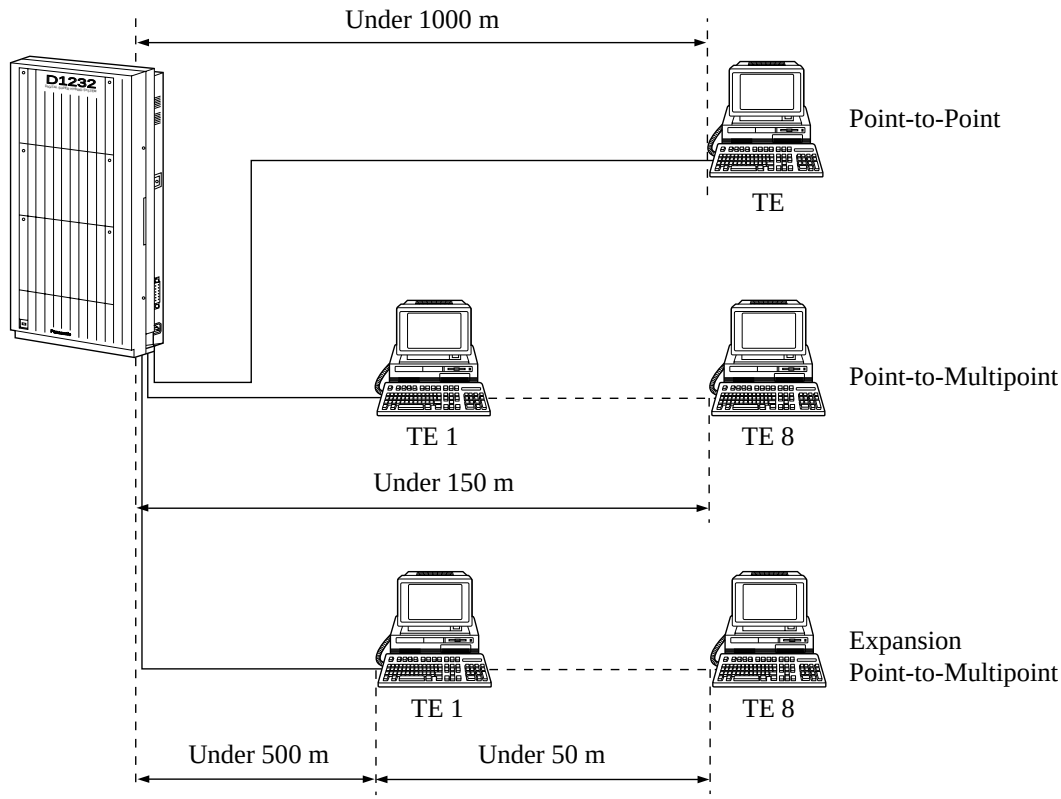
- For installing the KX-TD280, KX-TD281, KX-TD282 and KX-TD286 to main unit, refer to 2.4.6 Installing Expansion Unit and 2.4.2 ISDN S0 Line Connection (Optional Card) respectably.
- The KX-TD1232 is illustrated as a main unit for KX-TD280 and KX-TD286.

†: Available for external ISDN S0 Line only.

3. Connect the lines between the ISDN board and the ISDN device.
4. Plug the AC power cord into the system and an AC outlet.
5. Programme "[422] ISDN Port Type" or "[440] TD286 ISDN Port Type" and other required programmings in System Programming.
6. Press the Reset Button with a pointed tool on the main unit.

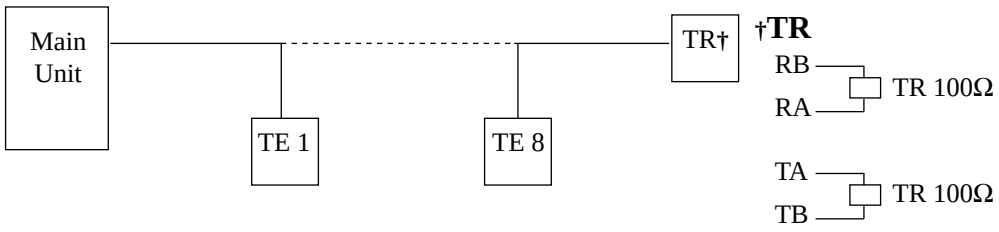
Maximum cabling distance of S0 bus connection

The maximum length of the extension line cord that connects the main unit and the ISDN terminal equipment (TE) is shown below:



Wiring with Terminating Resistors (TR)

The ISDN S0 bus should be terminated with two100 Ω terminating resistors (TR).

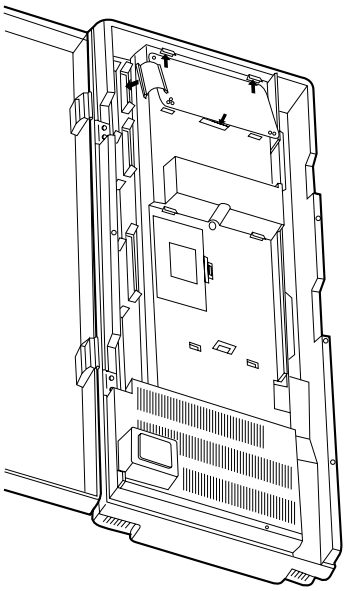


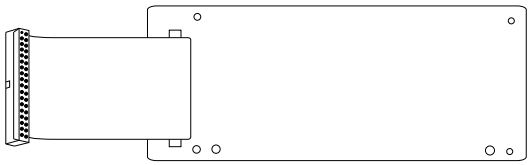
Power Supply for ISDN Terminal Equipment (TE)

The system does not provide a power supply to terminal equipment (TE). Depending on the type of TE's, the external power supply is required on ISDN S0 line to operate.

2.4.8 Remote Card Installation*1

1. Insert upper side of the Remote Card into two hooks on the main unit.
2. Press two corners of the lower side of the Remote Card.
3. Connect the cord to the Remote Card Connector.





Remote Card

*1 Available for the KX-TD1232 only.

Programming References

[107] System Password

[813] Floating Number Assignment

[814] Modem Standard

Feature References

System Programming and Diagnosis with Personal Computer

2.4.9 9600bps Speed Remote Unit*1 / Message Unit Installation

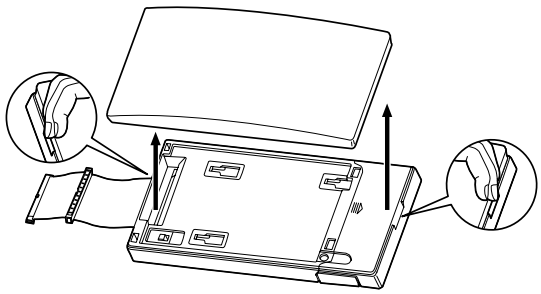
Preparation

The following preparations are necessary before installing the 9600bps Speed Remote Unit (KX-TD198) or Message Unit (KX-TD190).

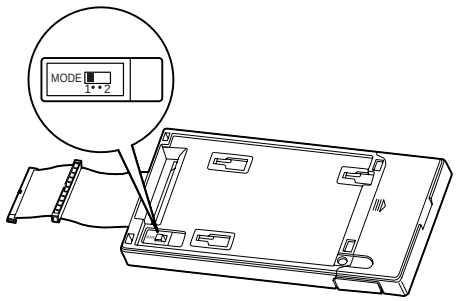
KX-TD198 (KX-TD816 only)

It is necessary to set the MODE switch before installing the Remote Unit to the KX-TD816.

1. Remove the front cover of the Remote Unit.



2. Set the MODE switch to 1.

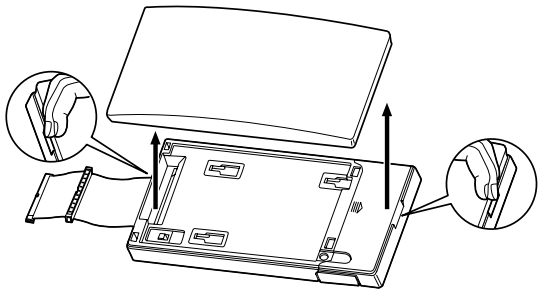


*1 Available for the KX-TD816 only.

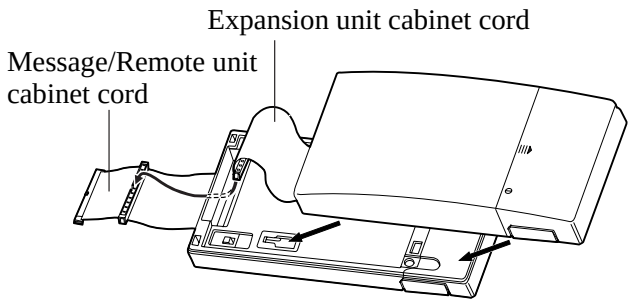
KX-TD190 / KX-TD198

It is possible to attach another expansion unit to the Message or Remote Unit and install them to the system. In this case, the following procedures are necessary.

1. Remove the front cover of the Message or Remote Unit.



2. Attach the expansion unit to the Message or Remote Unit as shown below. Be sure to connect the cabinet cords by inserting the expansion unit cabinet cord through the slot in the Message or Remote Unit.



Note

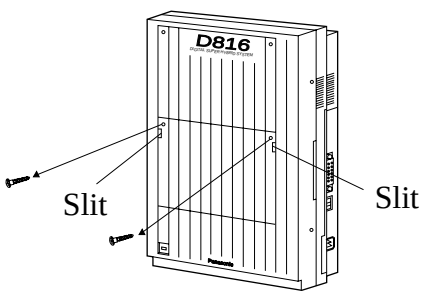
The KX-TD198 users must set the MODE switch to 1.

Installation

The following procedures can be used to install the Message or 9600bps Speed Remote Unit. If it is attached to another expansion unit, refer to the installing procedures of the expansion unit.

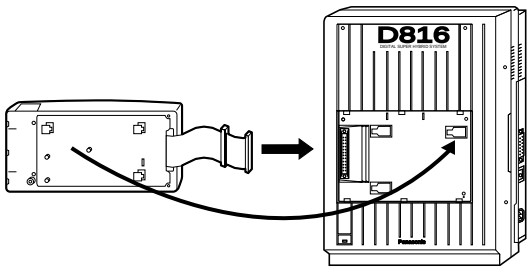
The KX-TD816 is illustrated as the main unit.

1. Loosen the two screws on the cover plate. Insert fingers into the slits to remove the cover plate.

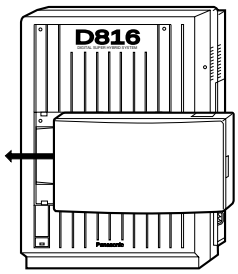


Note
Any of the cover plates can be removed, as needed.

2. Connect the cabinet cord to the connector in the main unit firmly.



3. Hook the cabinet on the main unit and slide the cabinet to the left until it is secured.

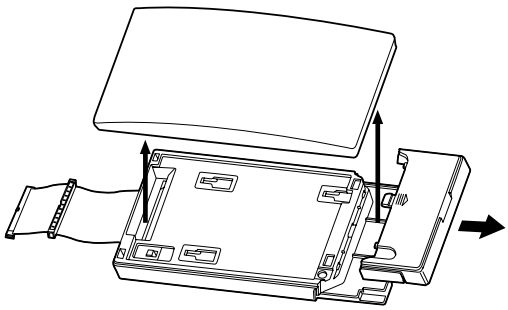


2.4.10 9600bps Speed Remote Card / Message Card*1 Installation

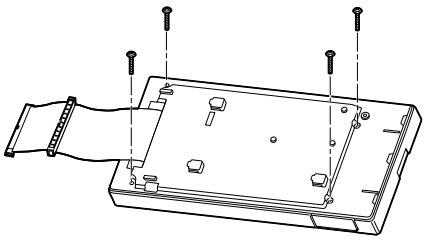
The KX-TD816 user can install the 9600bps Speed Remote Card (KX-TD197) to the Message Unit (KX-TD190), and the Message Card (KX-TD199) to the 9600bps Speed Remote Unit (KX-TD198).
The KX-TD1232 user can install the 9600bps Speed Remote Card (KX-TD197) in the main unit.

KX-TD816

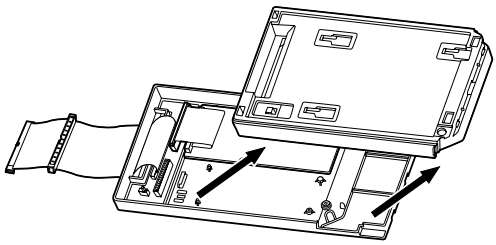
1. Open the front cover of the unit, slide the side cover to the right and remove it.



2. Turn over the unit and remove the four screws.



3. Turn over the unit again and remove the inside cover.

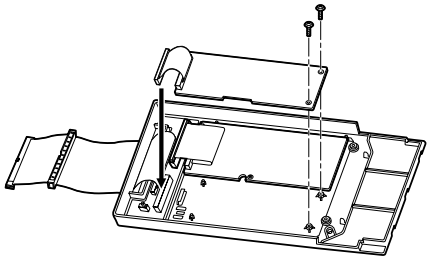


Note
The KX-TD190 is illustrated as an example.

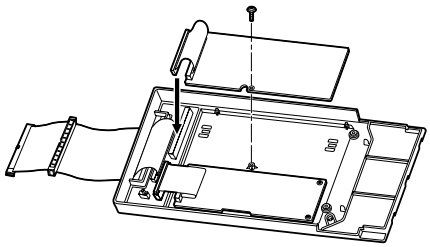
4. Install the card, secure the screw(s) (included with the KX-TD190 or KX-TD198) and connect the cable to the connector.

*1 Available for the KX-TD816 only.

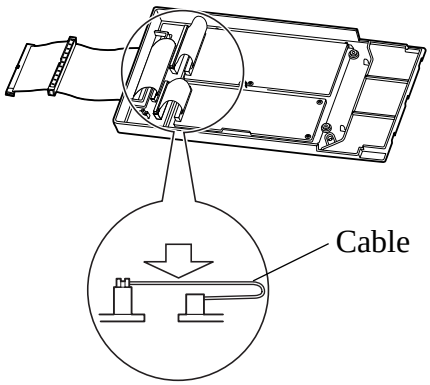
To install the KX-TD197 to the KX-TD190



To install the KX-TD199 to the KX-TD198



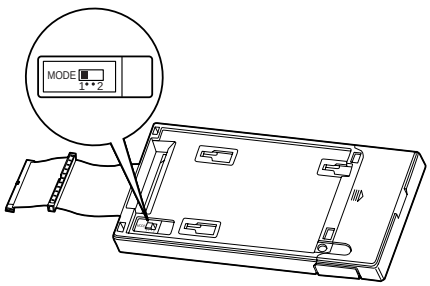
5. Flatten the cable to replace the inside cover properly.



Side View

6. Replace the inside cover and secure the four screws on the back.
Also, replace the side cover.

7. Set the MODE switch to 1.

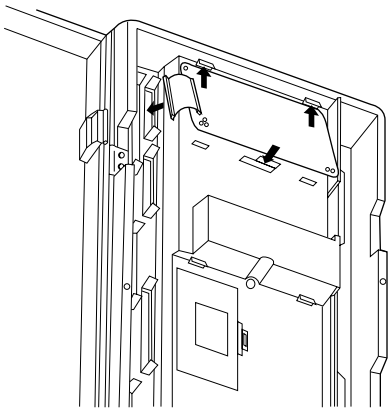


8. Replace the front cover.

9. Install the unit to the main unit.
Refer to 2.4.9 9600bps Speed Remote Unit / Message Unit Installation for installation.

KX-TD1232

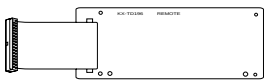
1. Open the front cover.



2. Insert the top side of the Remote card into the two hooks on the main unit.

3. Press down on the two corners of the bottom side of the Remote card.

4. Connect the cord to the Remote card connector.



9600bps Speed Remote Card

Programming Reference

[817] TD197 Baud Rate Set

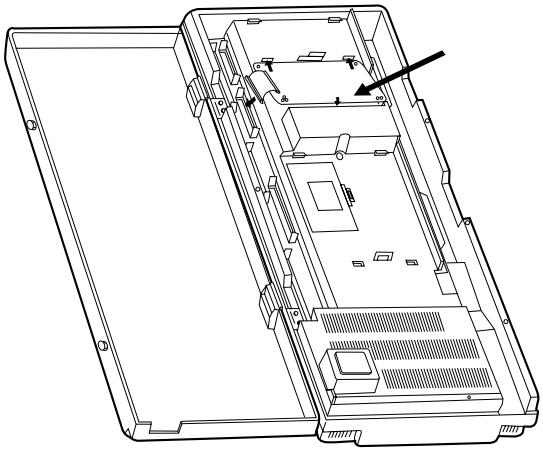
Feature Reference

System Programming and Diagnosis with Personal Computer

2.4.11 System Connection*1

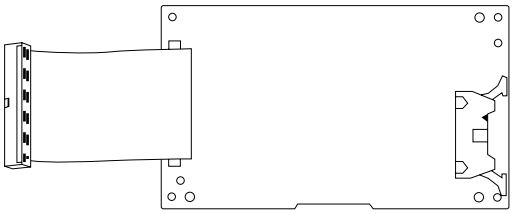
To connect two main units, use the optional System Inter Connection Cards (two) and the Connection Cable (included in the cards).

1. Insert upper side of the System Inter Connection Card into two hooks on the main unit (Master System).



2. Press two corners of the lower side of the System Inter Connection Card.

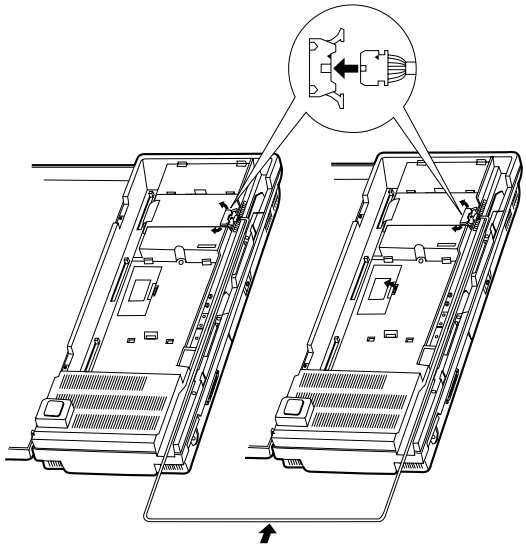
3. Connect the cord to the System Inter Connection Card connector.



System Inter Connection Card

4. Open the latch on the card.

*1 Available for the KX-TD1232 only.

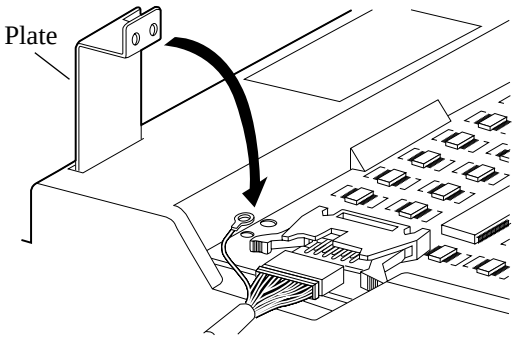


Connection Cable

5. Repeat steps 1 through 4 for the Slave System, using the other card.

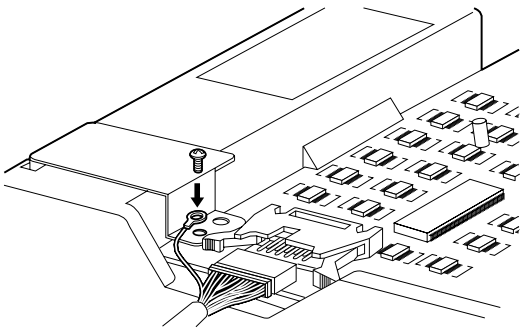
6. Insert one Connection Cable end to the Master System and insert the other end to the Slave System.

7. Close the latches on both systems.

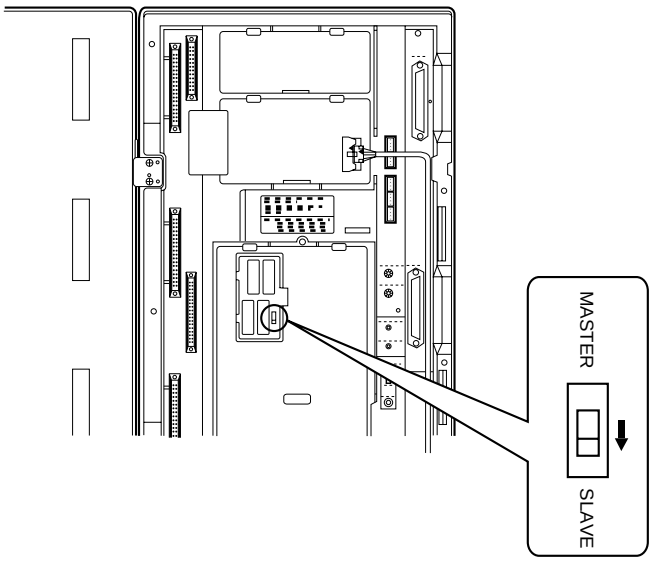


8. Insert the plate which is included with the KX-TD192 to the main unit for both systems.

9. Secure the screw to connect the plate to Connection Cable and the main unit for both systems.



10. Open the ROM Cover in the Slave System and set the Master/Slave Switch on the CPU Card to "Slave" position.



11. Plug the system.

Note

- System Connection may take a while (5 to 15 min. depending on your software version) to be completed after the power is turned on.
  Confirm the connection between the systems by making a call from a Master Unit extension to a Slave Unit extension.
- To plug the system for the first time, refer to 2.5.1 Starting the System for the First Time.

Programming References

[115] Adjust Time

Feature References

System Connection

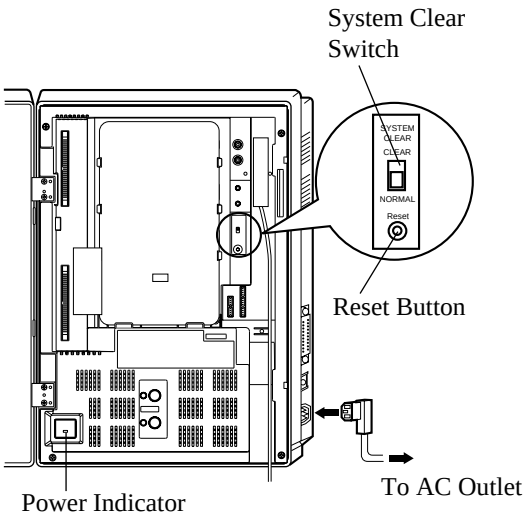
2.5 Starting the System for the First Time

2.5.1 Starting the System for the First Time

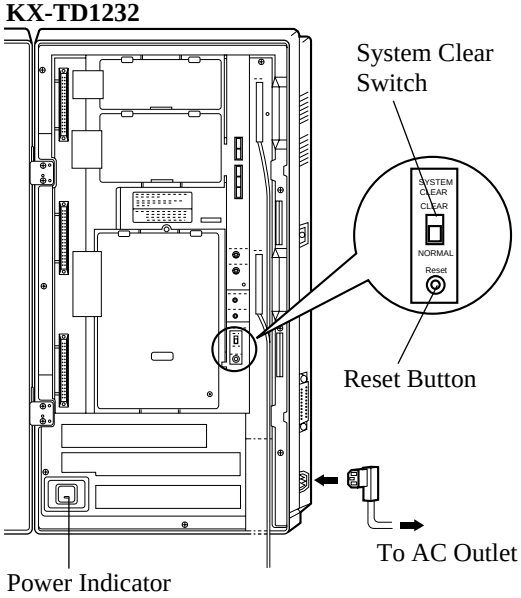
1. Set the System Clear Switch to the "CLEAR" position.
2. Plug the AC power cord into the system and an AC outlet.
3. Press the Reset Button with a pointed tool.
   (The power indicator will flash.)
4. *Slide the System Clear Switch to the "NORMAL" position while the power indicator is flashing (approximately within 10 seconds).*

The system will be initialized with default values. The system will also check the CO lines, extensions, and optional cards and units.

KX-TD816



KX-TD1232



Notice

- After pressing the Reset Button, slide the System Clear Switch to the "NORMAL" position at step 4 while the power indicator is flashing (approximately within 10 seconds). Otherwise, the system does not start up with the default values.
- Use only supplied AC power cord for the purpose of applying the EMC standard, if the KX-TD1232 is connected.

CAUTION

Once you start up the system and if you unplug the system, do not perform the above procedures to start the system again. Otherwise, your programmed data is cleared. To start the system, just plug the system.

2.6 System Restart

2.6.1 System Restart

If after checking the system features you determine that the system is not operating properly, restart the system.
Keep in mind that the following features are cleared when you restart the system:

- Camp-On
- Call Park

The following features are cancelled when you restart the system:

- Calls on Hold
- Calls on Exclusive Hold
- Calls in progress

a) Make sure that the system clear switch is set to "NORMAL" position.

b) Press the Reset button with a pointed tool.

Notice

If the system clear switch is set to "CLEAR" position, do not slide the system clear switch to "NORMAL" position within 20 seconds of pressing the Reset button. If you do, the system programming data is reset to the default values. (Refer to 2.7.1 System Data Clear.) Wait over 30 seconds after pressing the Reset button so that the system does not start up with the default value. And then slide the system clear switch to "NORMAL" position.

If the system still does not operate properly, please see 3.1.4 Using Reset Button.

2.7 System Data Clear

2.7.1 System Data Clear

After storing or changing the system programming data, you can clear your programming data stored in the system. The system will restart with the default settings.

1. Slide the System Clear Switch to the "CLEAR" position.
2. Press the Reset button with a pointed tool.
3. Return the System Clear Switch to the "NORMAL" position while the Power indicator is flashing (approximately within 10 seconds).

Notice

After pressing the Reset Button, return the System Clear Switch to the "NORMAL" position at step 3 while the power indicator is flashing (approximately within 10 seconds). Otherwise, the system is not cleared.

Section 3

Troubleshooting

This section provides information for system and telephone troubleshooting.

3.1 Troubleshooting

3.1.1 Installation

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
Extension does not operate.	Bad printed circuit board (Extension Card).	Exchange printed circuit board for another printed circuit board.
	Bad connection between the system and extension.	Take that extension and plug it into the same extension port using a short telephone cord. If the telephone does not work, connection between the system and the extension must be repaired.
	Bad extension.	Take that extension and plug it into another extension port that is working. If the telephone does not work, replace the phone.
Improper reset operation.		Press the Reset Button.
Noise in external paging.	Induced noise on the wire between the system and the amplifier.	Use a shielded cable as the connection wire between the system and amplifier. A short shielded cable is recommended.
Volume distortion from external music source.	Excessive input level from external music source.	Decrease the output level of the external music source by using the volume control on the music source.
Speed Dialling or One-Touch Dialling does not function.	Bad programming.	Enter the CO line access number (0, 81 through 88) into programming.
ISDN Line does not operate properly.	ISDN Line is installed only in the Slave system.	Move the ISDN card to master system.

3.1.2 Connection

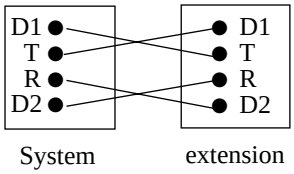
Can you dial an extension?

No

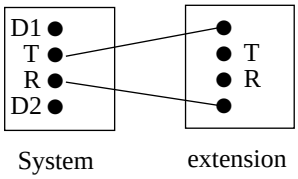
Yes

(Continued to the following page.)

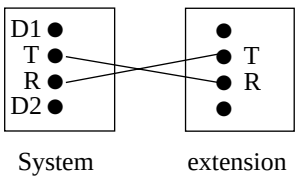
Connection between the system and a proprietary telephone:

CAUSE	SOLUTION
The T/R is connected to the D1/D2.  	Use the correct cord (inner 2 wires are for T/R and the outer 2 wires are for D1/D2).

Connection between the KX-TD1232 and a single line telephone:

CAUSE	SOLUTION
The T/R is connected to the D1/D2.  	Use the correct cord (inner 2 wires are for T/R).

Connection between the KX-TD1232 and a single line telephone that is polarity-sensitive:

CAUSE	SOLUTION
The “T” is connected to the “R.”  	Reverse the connections of the T/R.

3.1.3 Operation

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
• When using the speakerphone mode with a digital proprietary telephone, nothing is audible.	• The "HEADSET" mode is selected by Station Programming,"Handset/ Headset Selection."	• When the headset is not used, select the "HANDSET" mode by Station Programming.
• The unit does not ring.	• The Ringer Volume Selector is set to "OFF."	• Set to "HIGH" or "LOW."
• During system connection operation for KX TD1232, originating an intercom/ outside call from a system to the other system is not possible. • The indicators "System Link Down" is displayed on the proprietary telephone of Operator 1.	• Interface between the systems is disconnected.	• Connect the interface between the systems and press the Reset Button on both systems.
• Originating an outside call, Call Transfer, or Conference cannot be performed.	• The corresponding CO button does not exist on the proprietary telephone.	• Programme the CO button. See [005] Flexible CO Button Assignment.

3.1.4 Using Reset Button

If the system does not operate properly, use the Reset Button.
(If Master and Slave Systems are in operation by System Connection for KX-TD1232, reset both systems.)
Before using the Reset Button, try the system feature again to confirm whether there definitely is a problem or not.

Notes:

1. When the System Clear Switch is set to "NORMAL," pressing the Reset Button causes the following:
   - **a)** Camp-On is cleared.
   - **b)** Calls on Hold are terminated.
   - **c)** Calls on Exclusive Hold are terminated.
   - **d)** Calls in progress are terminated.
   - **e)** Call Park is cleared.

   Other data stored in memory except the above are not cleared.
2. When the System Clear Switch is set to the "CLEAR" position, you must press the Reset Button with caution, because all data stored in memory will be cleared by the following operation: pressing the Reset Button and setting the System Clear Switch to the "NORMAL" position while the Power Indicator is flashing (approximately within 10 seconds).

Operation

1. If the system does not operate properly,
   - **a)** Make sure that the System Clear Switch is set to the "NORMAL" position.
   - **b)** Press the Reset Button with a pointed tool.
2. If the system still does not operate properly,
   - **a)** Set the System Clear Switch to the "CLEAR" position.
   - **b)** Press the Reset Button with a pointed tool.
   - **c)** Return the System Clear Switch to the "NORMAL" position while the Power Indicator is flashing (approximately within 10 seconds).

     Note

     As a result of this measure, all the programmed data will be cleared.
3. If the system still does not work, unplug the system and plug it again after five minutes.
4. If the system still does not work,
   - **a)** Unplug the system.
   - **b)** Set the System Clear Switch to the "CLEAR" position.
   - **c)** Plug the system.
   - **d)** Press the Reset Button with a pointed tool.

e) Set the System Clear Switch to the "NORMAL" position while the Power Indicator is flashing (approximately within 10 seconds).

5. If the system still does not work, unplug the system. Then consult an authorized service person.

Section 4

DECT Portable Station

This section provides general information, features and system programming of DECT Portable Station.

4.1 Wireless System Outline

4.1.1 System Capacity

Extension Line

Connectable Number of Cell Station (KX-TD142)

Main Unit / Interface Unit	KX-TD816	KX-TD1232	KX-TD1232 × 2
KX-TD144	2	2	2
KX-TD144 × 2	—	4	4
KX-TD146	6	6	6
KX-TD146 × 2	—	12	12
KX-TD144 + KX-TD146	—	8	8

Connectable Number of Cell Station (KX-TD142)

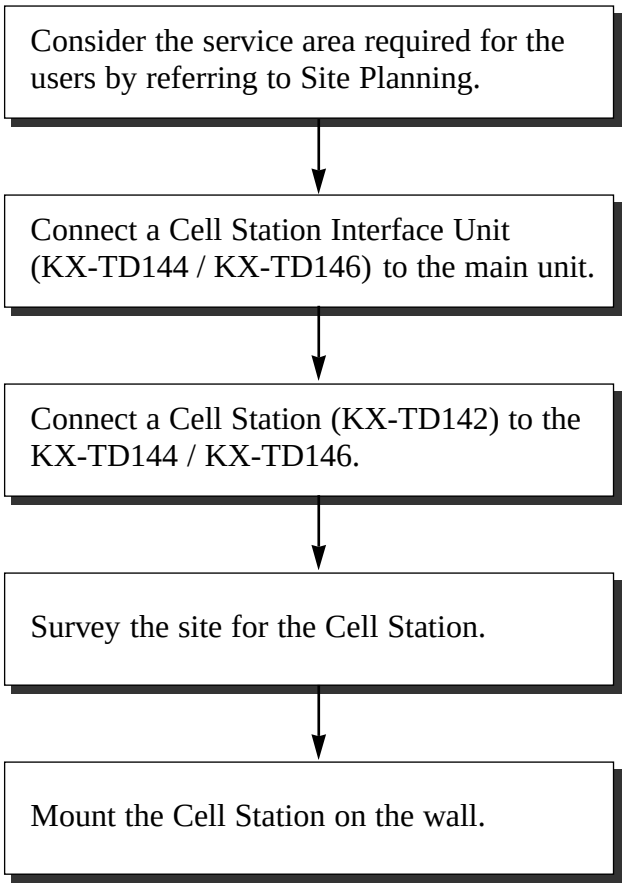
	KX-TD816	KX-TD1232	KX-TD1232 × 2
PS (Portable Station)	16	64	64

4.1.2 RF Specifications

Item	Description
Radio Access Method	Multi Carrier TDMA-TDD
Frequency Band	1.881 – 1.907 MHz
Number of Carriers	10
Carrier Spacing	1.728 MHz
Gross Bit Rate	1.152 bps
Carrier Multiplex	TDMA, 24 (T × 12, R × 12) sliots per frame
Frame Length	10 msec
Modulation Scheme	GFSK
	Roll-off factor = 0.5 50% roll-off in the transmitter
Data Coding for Modulator	Differential Coding
Voice CODEC	32 Kbps ADPCM (CCITT G.721)
Transmission Output	Max. 250 mW

4.2 Procedure Flow Chart

4.2.1 Procedure Flow Chart



(See pages 107 through 110.)
(See pages 111 through 116.)
(See pages 117 through 121.)
(See pages 124 through 134.)
(See page 135.)

Note

- The master CS number must be assigned before using a Cell Station.
  <SYS PRG [680]>

4.3 Site Planning

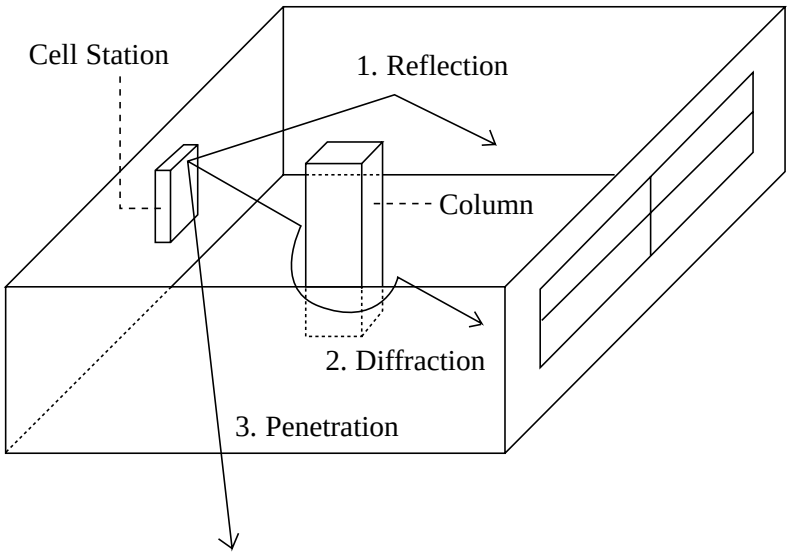
4.3.1 Site Planning

Choosing the best site for the Cell Station (KX-TD142) requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Please read the following information before you install the unit.

4.3.2 Characteristics of Radio Waves

The transmission of radio waves and the operating range 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 portable station.

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



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

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

3. Radio waves penetrate objects such as those made of glass.

4.3.3 The Relationship between Radio Waves and Building Structure and Materials

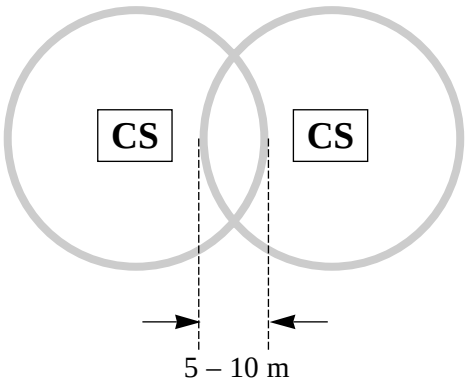
- The transmitting range is affected more by the building materials and thickness of the material than the number of obstacles.
- Radio waves tend to be reflected or diffracted by conductive objects and rarely penetrate them.
- Radio waves tend to penetrate insulated objects and are rarely reflected by them.
- Radio waves penetrate thin objects more than thick objects.
- The table below shows the transmission tendency of radio waves when they reach objects made from various materials.

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

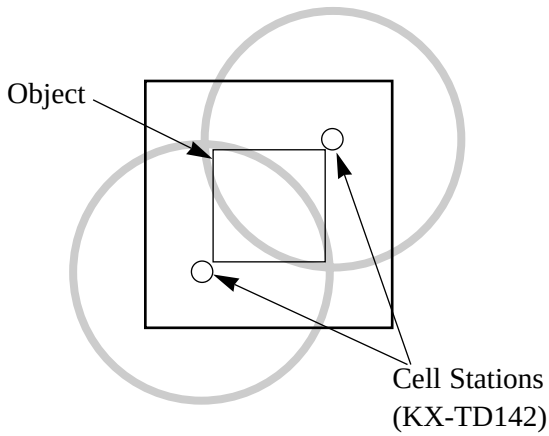
4.3.4 Installation Preparation

1. Prepare a drawing of the building where you want to install the Cell Station (CS). (A drawing which shows the size or main structural material of the wall, partition wall or ceiling is preferable.)
2. Consider the service area required for the users.
3. Examine the service area on the drawing.
   - **a)** Make a circle around the installable area by determining the radio transmission range (inside: 25 - 50 m, outside: 70 - 100 m). Note that a CS cannot be installed outside a building.
   - **b)** If more than one CS is required, the radio transmission ranges should overlap. The overlapping range should be at least 5 to 10 meters.

<Basic location>



<Location example for a building which has an object in the center.>



4.3.5 Precautions

- The Cell Station should be kept free of dust, moisture, high temperature (more than 40°C), low temperature (less than 5°C), vibration, and should not be exposed to direct sunlight.
- Keep distance between the equipment listed below in order to prevent noise, interference or the disconnection of a conversation.

Equipment	Distance
Cell Station and office equipment such as a computer, telex, fax, etc., or microwaves.	more than 1.8 meters
Cell Station and portable station	more than 1 meter
Two portable stations	more than 0.5 meter
Portable station and proprietary wired telephone	more than 1 meter
The system and Cell Station	more than 2 meters

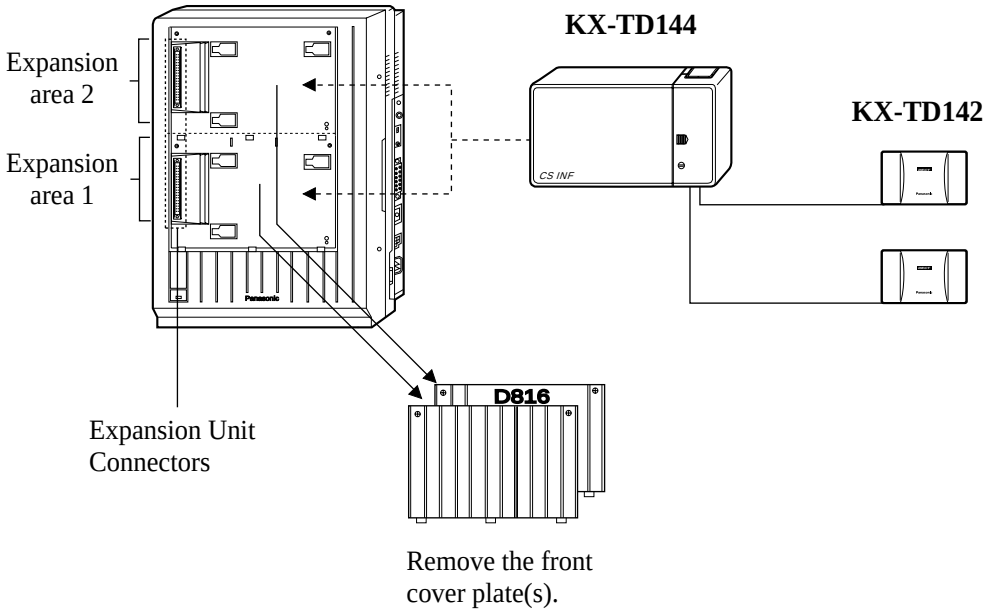
Note

- In Cell Station overlap areas, if the signal from one Cell Station becomes weak, the portable station will start Call handover to the next Cell Station. However if there is no free channel for call handover, the portable station will remain with its current Cell Station until out of range and the call is lost.
- Too many Cell Station in a small area can cause problems due to conflicts over which signal channels each Cell Station can use.
  Ideally Cell Stations should be a minimum of 25 to 40 meters apart.

4.4 Location of the Unit

4.4.1 KX-TD816 with the KX-TD144

One Cell Station Interface Unit KX-TD144 can be connected to either of the two expansion areas on the main unit KX-TD816. Up to two Cell Stations (KX-TD142) can be connected to the KX-TD144.



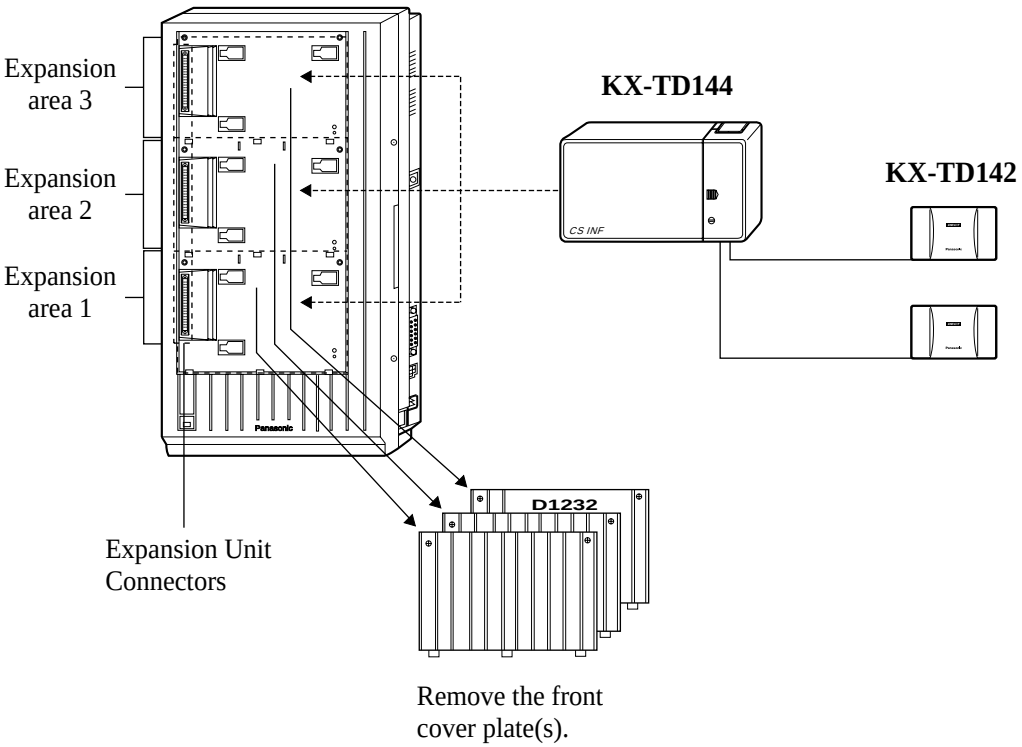
Note

System Programming is required for expansion unit location. Refer to Program [109] Expansion Card / Unit Type in PS System Programming Conditions and in the KX-TD816/KX-TD1232 Programming Guide

Default : Area 1 = S0 Line Unit
Area 2 = Station Line Unit

4.4.2 KX-TD1232 with the KX-TD144

Up to two Cell Station Interface Units, KX-TD144s can be connected to any of the three expansion areas on the main unit KX-TD1232. Up to two Cell Stations (KX-TD142) can be connected to the KX-TD144.

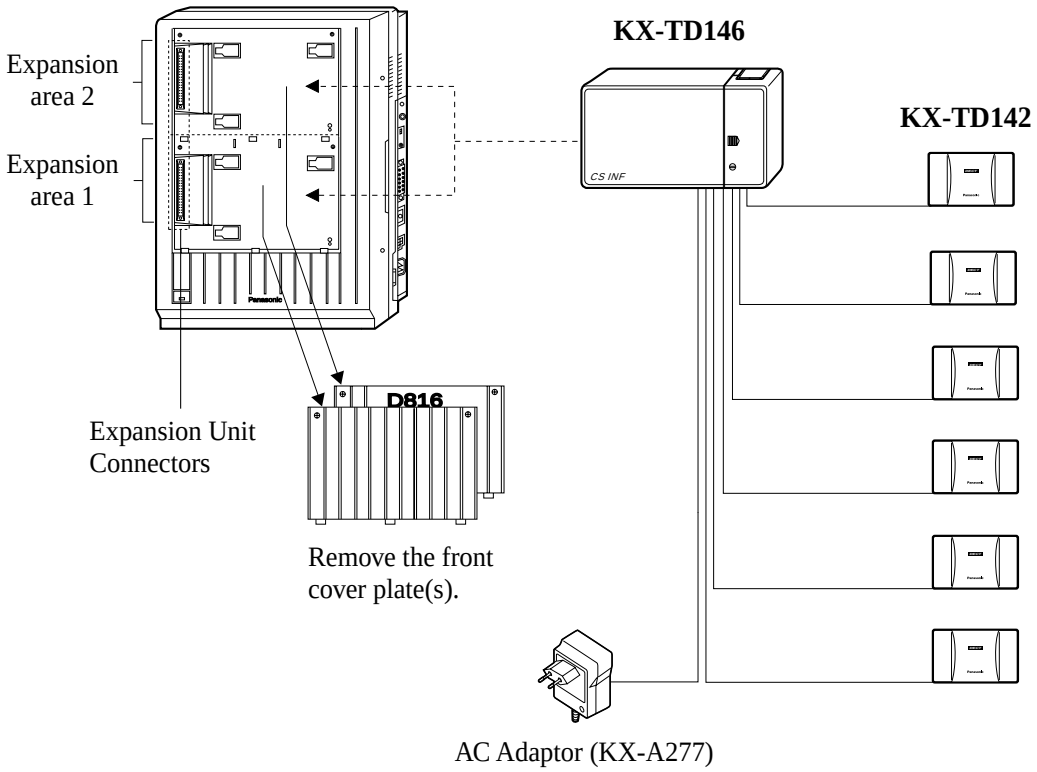


Note

- System Programming is required for expansion unit location. Refer to Program [109] Expansion Card / Unit Type in PS System Programming Conditions and in the KX-TD816/KX-TD1232 Programming Guide
  Default : Area 1 = S0 Line Unit
  Areas 2 and 3 = Station Line Unit
- KX-TD144 and KX-TD142 can only be connected to the Master System.

4.4.3 KX-TD816 with the KX-TD146

One Cell Station Interface Unit, KX-TD146 can be connected to either of the two expansion areas on the main unit KX-TD816. Up to six Cell Stations (KX-TD142) can be connected to the KX-TD146.

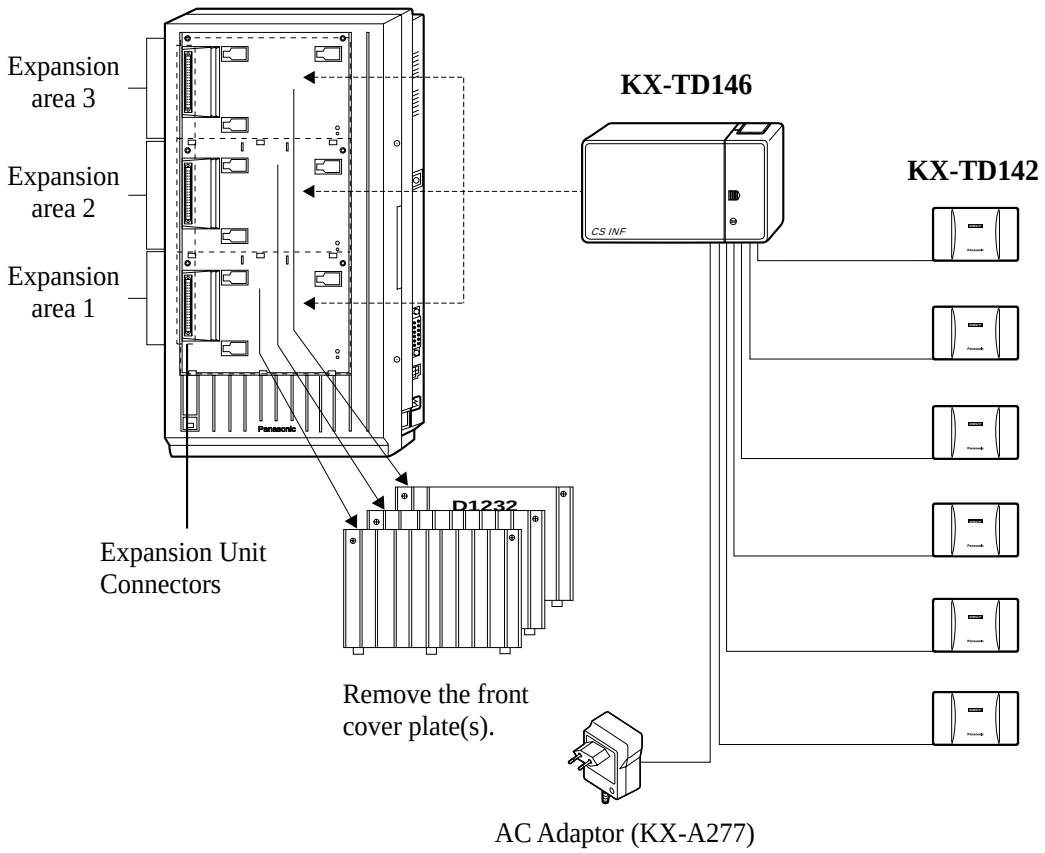


Note

- System Programming is required for expansion unit location. Refer to Program [109] Expansion Card / Unit Type in PS System Programming Conditions and in the KX-TD816/KX-TD1232 Programming Guide
  Default : Area 1 = S0 Line Unit
  Area 2 = Station Line Unit
- The AC adapter (KX-A277) is necessary.

4.4.4 KX-TD1232 with the KX-TD146

Up to two Cell Station Interface Units, KX-TD146 can be connected to any of the three expansion areas on the KX-TD1232. Up to six Cell Stations (KX-TD142) can be connected to the KX-TD146.



Note

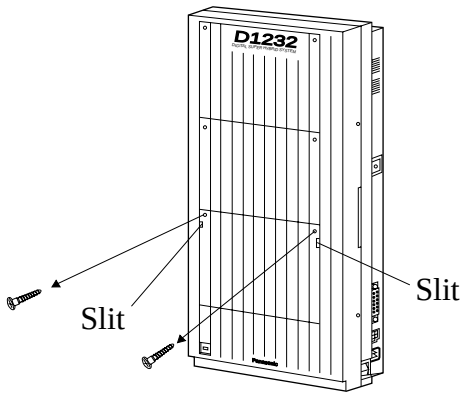
- System Programming is required for expansion unit location. Refer to Program [109] Expansion Card / Unit Type in PS System Programming Conditions and in the KX-TD816/KX-TD1232 Programming Guide
  Default : Area 1 = S0 Line Unit
  Areas 2 and 3 = Station Line Unit
- An AC adapter (KX-A277) is necessary.
- KX-TD146 and KX-TD142 can only be installed to the Master system.

4.5 Installing the Unit

4.5.1 Installing the Unit

The following procedures can be used to connect a Cell Station Interface Unit (KX-TD144 / KX-TD146) to the main unit, and then the Cell Station (KX-TD142) to the Cell Station Interface Unit.
The main unit in the illustrations is the KX-TD1232.

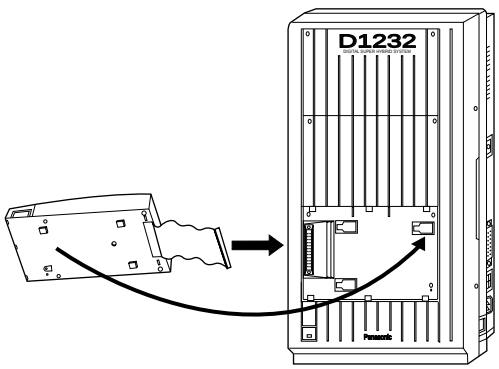
1. Loosen the two screws on the cover plate. Insert your fingers into the slits to remove the cover plate(s).



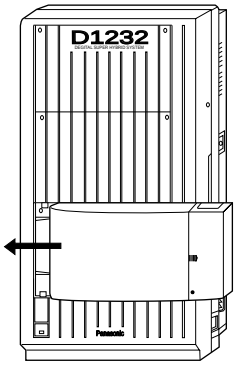
Note

Any of the cover plates can be removed as required.

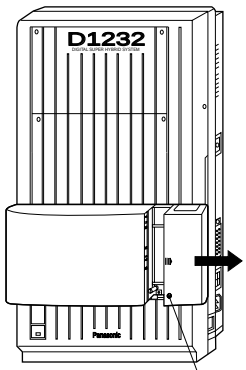
2. Connect the cabinet cord of the Cell Station Interface Unit (KX-TD144 / KX-TD146) to the connector in the main unit firmly.



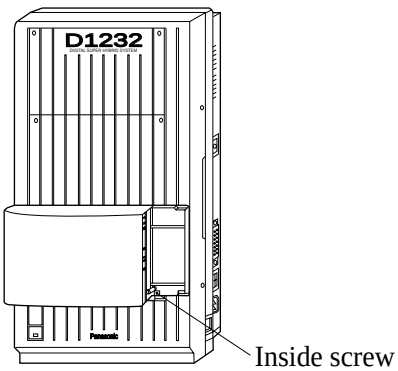
3. Hook the cabinet on the main unit and slide the cabinet to the left until it is secured.



4. Loosen the outside screw and slide the cover to the right.



5. Secure the inside screw firmly to fix the cabinet to the main unit.



Note

Be sure to fix the inside screw to the main unit, or the unit may not work properly.

6. Wireless Extension Connection

Use a Cell Station Cord (4-conductor wiring - included) and 4-pin plug (included) to connect the cell station line. There are 2 plugs for the KX-TD144 and 6 plugs for the KX-TD146 to connect the Cell Stations.

Maximum length of the cable: AWG 24 (ø 0.6 mm): Under 1 km

a) Insert the wires of the 4-conductor wiring cord into the holes in the plug to connect pins "D1", "D2", "V1" and "V2".

D1: Data 1 V1: Voltage +

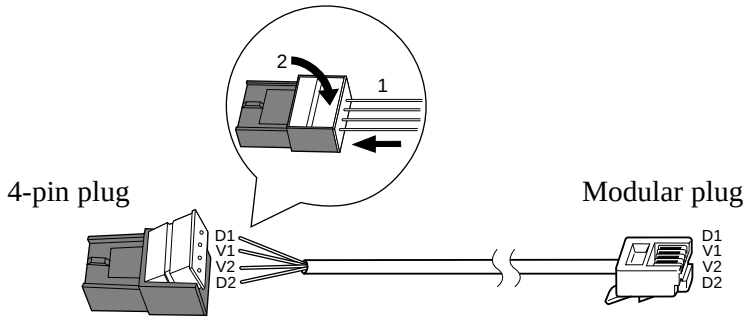
D2: Data 2 V2: Voltage -

Press the transparent part into the black part.

Insert the other end of the wires into the modular plug.

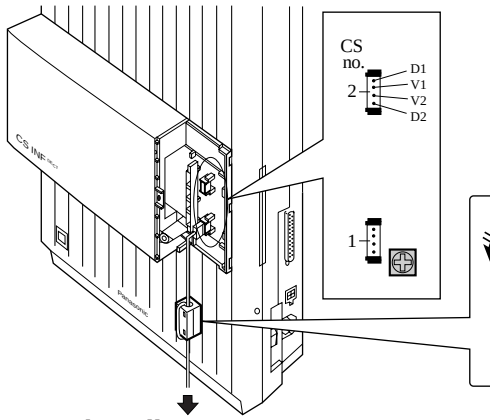
Note

Do not peel off the wire coating. Insert the wires all the way.



b) Insert the 4-pin plug into a cell station jack on the unit, and attach the ferrite core (included) to the plug cord.

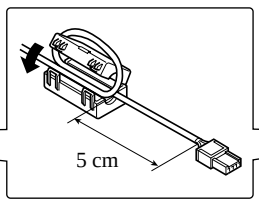
KX-TD144



To the Cell Station

Connect the ground terminal to ground.

Note: If other expansion units are installed, the frame ground connection is required for only one unit.

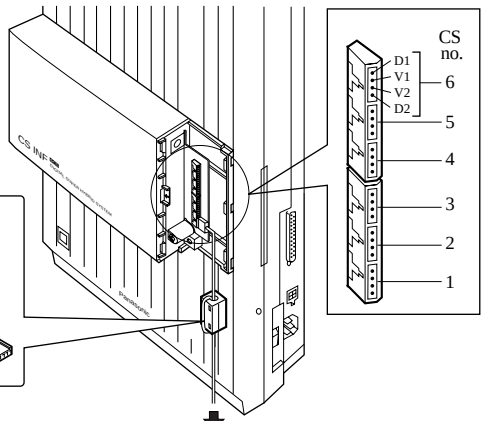


Ferrite Core

Roll the cord once around the ferrite core and close the core.

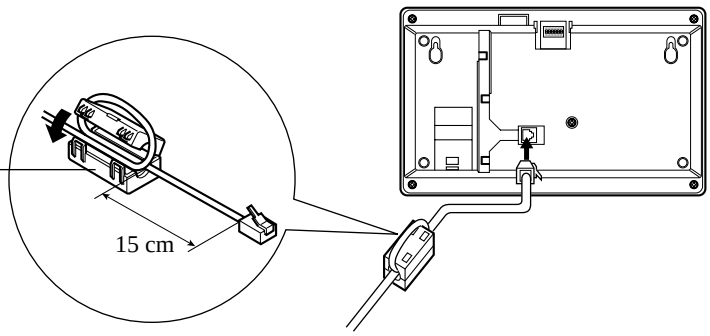
Note: Put it in the cabinet when closing the cabinet cover.

KX-TD146



To the Cell Station

c) Insert the modular plug into the Cell Station, and attach the ferrite core (included) to the plug cord.

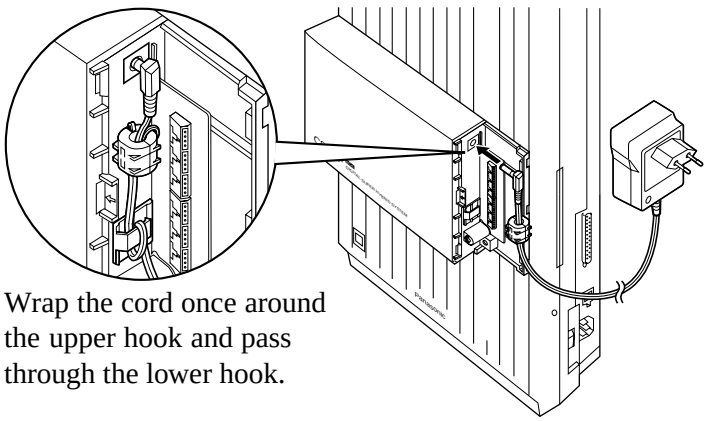


Ferrite Core
Roll the cord once around the ferrite core and close the core.

d) Survey the site for the Cell Station by testing the radio signal. Refer to the Section 4.7 Site Survey.

Note

- System Programming is required to assign an extension number to each portable station.
- For the KX-TD146, an AC adapter is necessary.
  The same AC outlet should be used for the main PBX unit and a Cell Station Interface Unit.



Wrap the cord once around the upper hook and pass through the lower hook.

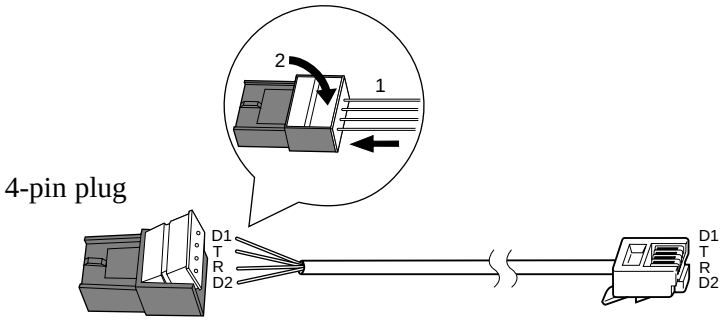
7. Wired Extension Connection (KX-TD144 only)

A Cell Station Interface Unit can support four wired extensions as well as wireless extensions. Use 4-pin plugs to connect the wired extensions.

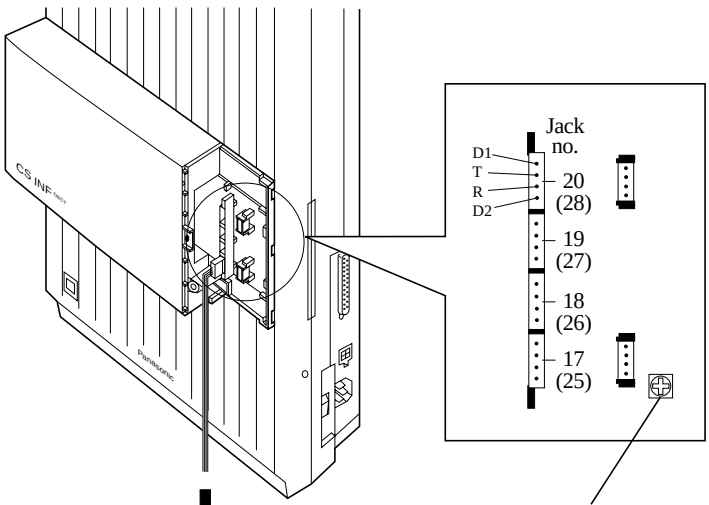
a) Insert the required telephone wires into the holes in the plug. Press the transparent part into the black part.

Note

Do not peel off the wire coating. Insert the wires all the way.



b) Insert the plug into a jack on the unit.

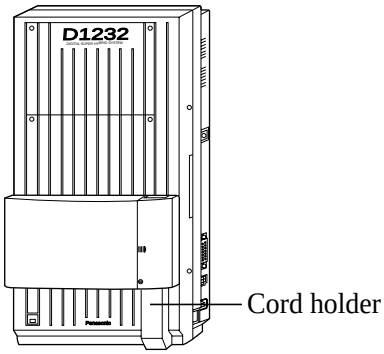


Connect the ground terminal to ground.
Note: If other expansion units are installed, the frame ground connection is required for only one unit.

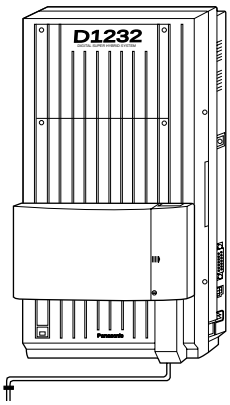
8. Tie all of the cords into a bundle. If other cords are exposed in the upper cabinet, tie them also.

9. Close the cabinet cover and secure the outside screw.

10. Cover the cords with the cord holder (included).

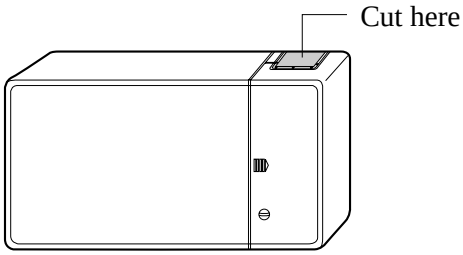


11. Fix the cords to the wall as shown so that the front cover can be opened.



Note

If two expansion units are installed, cut the cabinet cover(s) on the lower cabinet(s) to allow the cords from the upper cabinet to go down through the cabinet cover(s). To protect the cords, smooth any cut edges.



SAFETY CAUTION (for KX-TD144 only)

The small cover which provides access to connectors CN402, CN403, CN404 and CN405 shall not have its cable knock-out section removed, unless another expansion unit is mounted above which would prevent finger access via the cable knock-out opening. This safety requirement is necessary to protect users from network voltages.

Programming References

[650] PS Registration
[653] PS Extension Name Set
[671] PS Extension Number Set
[672] PS Password Set
[681] PS Radio System ID Reference

Feature References

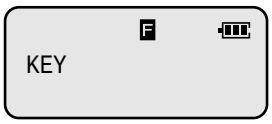
Digital Wireless Connection

4.6 Selecting the Display Language

4.6.1 Selecting the Display Language

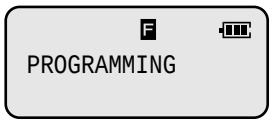
The default setting of the PS displaying language is "AUTO (English)". If German display is required, follow the procedure below.

1. Press F (Function).



2. Press (Book) 2 times.

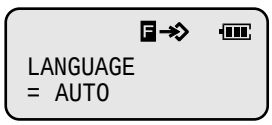
- You can also search by pressing (Next) or (Previous).



3. Press →/OK (OK).

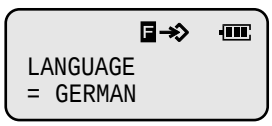
4. Press →/OK (OK).

5. Press (Next) or (Previous) repeatedly until the display for the Language Selection appears.

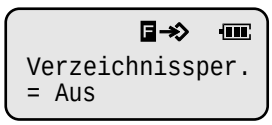


6. Press (Book) until the desired selection is displayed.

- You can also search by pressing (Next) or (Previous).



7. Press →/OK (OK).



8.To exit the PS Programming mode, press C (Cancel).

Note

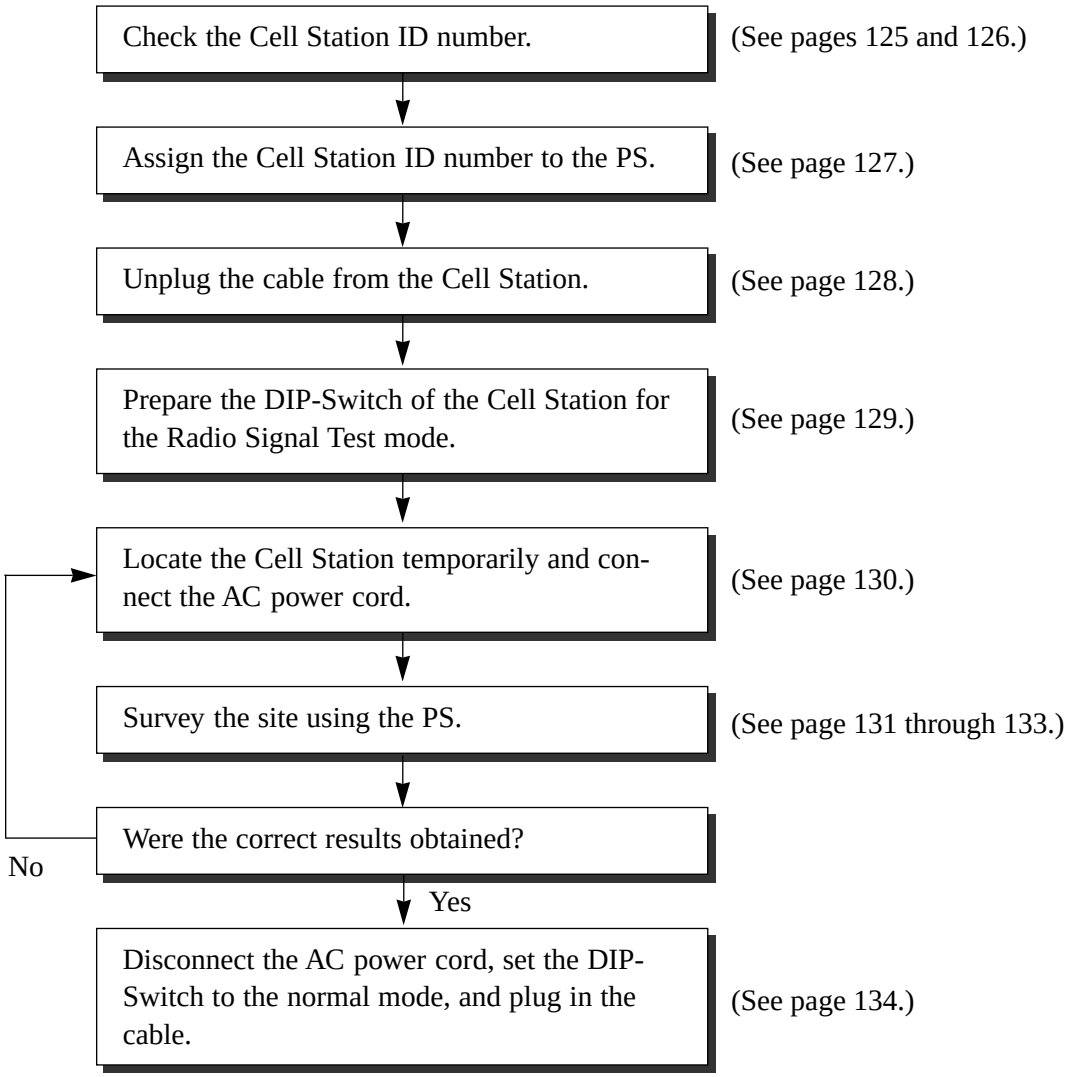
- Moreover, you can select French, Italian, Spanish or German display.
- If you are going to assign the PS to the Digital Super Hybrid System while the default setting is still "AUTO", the displaying language will depend on the setting of the system. (Programme [101] Language Assignment – Default: English).
- During the site survey, only English display is supported regardless of the setting.

4.7 Site Survey

4.7.1 Site Survey Specification

The KX-TD7500 portable station has Radio Signal Test Mode which monitors the state of link as one of the means to determine the site planning for the KX-TD142. In the mode, the frame loss and signal strength of a synchronous slot, and the signal strength of the other slots can be measured when the portable station is linking with the KX-TD142.

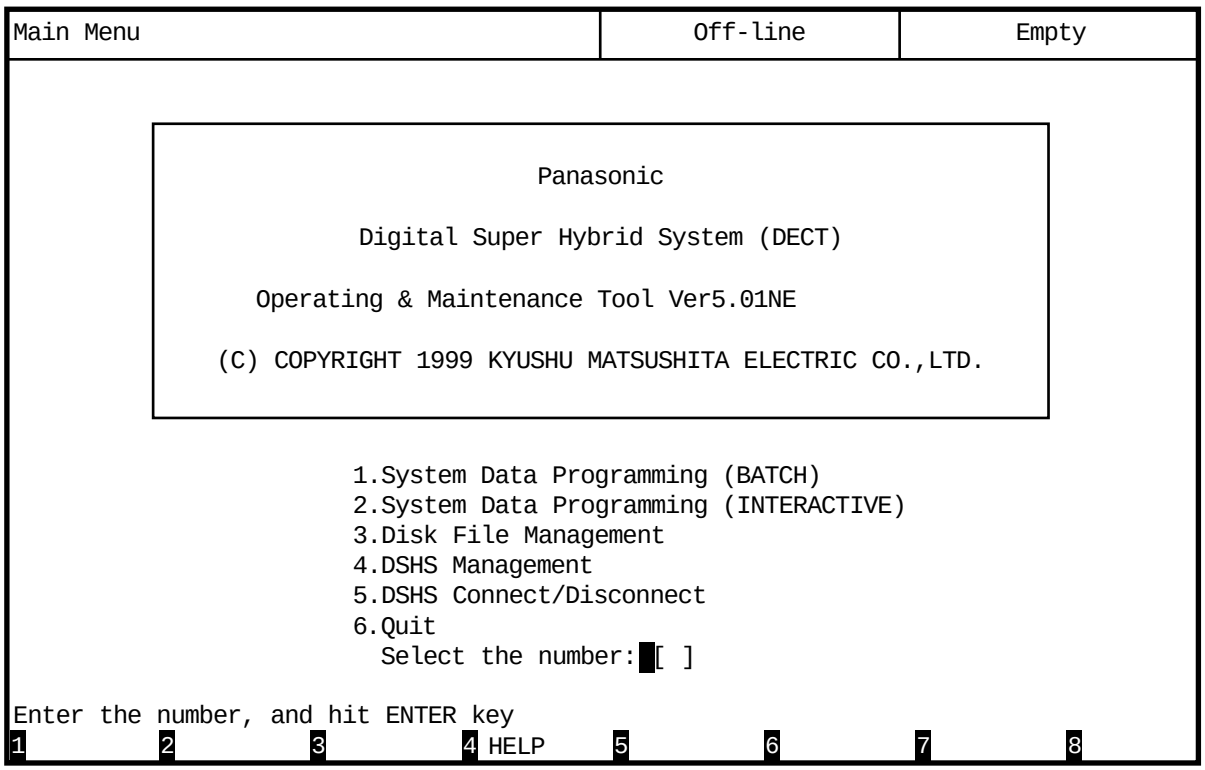
4.7.2 Flow Chart of the Site Survey



4.7.3 Checking the Cell Station ID Number

Use a personal computer to check the Cell Station (CS) ID number.
File: E1232NE.EXE

Main Menu Display



Input Format

1. **In the Main Menu Display**
   Enter **2** and press the **ENTER** key to select "`System Data Programming(INTERACTIVE)`".
2. **In the System Data Programming Main Menu Display**
   Enter **9** and press the **ENTER** key to select "`DECT`".
3. **In the Station Menu Display**
   Enter **10** and press the **ENTER** key to select "`CS Information`".
   The CS Information Display appears as shown on the next page.

CS Information Display

CS Information | On-line (RS-232C) | Empty

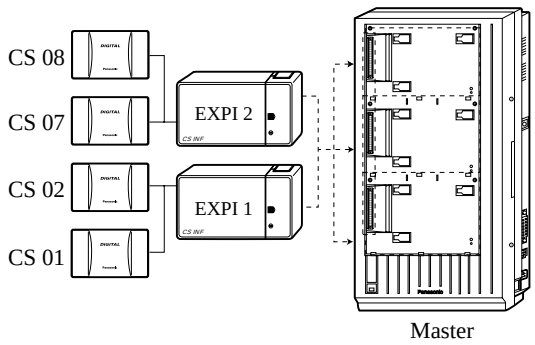
CS No.	CS-ID	Large Info.	Small Info.	ROM Version	Diag. Code	Obst. Code
01	0000 0000 0000	FALUT	FAULT	0000	00	02
02	0000 0000 0000	FALUT	FAULT	0000	00	02
03	0080 1230 1260	INS	INS	0131	00	03
04	0080 1230 0360	FALUT	INIWAI	0131	00	03
05	0000 0000 0000	FALUT	FAULT	0000	00	02
06	0000 0000 0000	FALUT	FAULT	0000	00	02
07	0000 0000 0000	OUS	FAULT	0000	00	00
08	0000 0000 0000	OUS	FAULT	0000	00	00
09	0000 0000 0000	OUS	FAULT	0000	00	00
10	0000 0000 0000	OUS	FAULT	0000	00	00
11	0000 0000 0000	OUS	FAULT	0000	00	00
12	0000 0000 0000	OUS	FAULT	0000	00	00
13	0000 0000 0000	OUS	FAULT	0000	00	00
14	0000 0000 0000	OUS	FAULT	0000	00	00
15	0000 0000 0000	OUS	FAULT	0000	00	00
16	0000 0000 0000	OUS	FAULT	0000	00	00

CS ID number (10 digits)

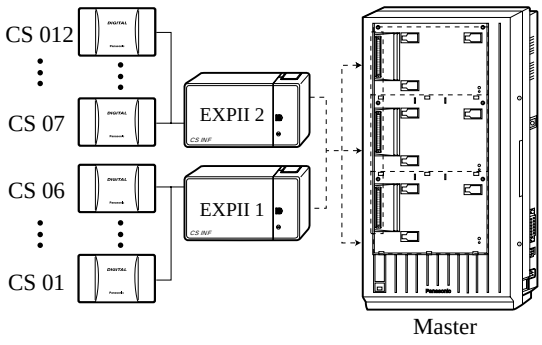
Example:
The CS ID number of CS number 03 is "8012301260".
The CS ID number of CS number 04 is "8012300360".

The location of the CS numbers are shown below.
KX-TD816: CS 01 through 06
KX-TD1232: CS 01 through 12

KX-TD144



KX-TD146



* EXPI : KX-TD144 (Cell Station Interface Unit)
EXPII: KX-TD146 (Cell Station Interface Unit)
One EXP for the KX-TD816 and a maximum of two EXPs for the KX-TD1232 can be installed per system.

4.7.4 Assigning the Cell Station ID Number to the PS

1. Set the PS **Power Switch** to **ON** while pressing (Talk), (Flash) and at the same time.

```
FUNCTION<0-4>
```

2. Press .

Example

```
CS NO?(1-8)
```

3. Enter the **Cell Station number**.

Example

```
CS ID1=
    →
```

4. Press (Talk).

Example

```
CS ID1=
    →
```

5. Enter the **Cell Station ID number**.

- To enter letters, press the following buttons.

A	(Hold)	D	(Function)
B	(OK)	E	(Redial)
C	(Book)	F	(Flash)

Example

```
CS ID1=
    →0123456789
```

6. Press (Talk).

- The assignment is completed.

Example

```
CS NO?(1-8)
```

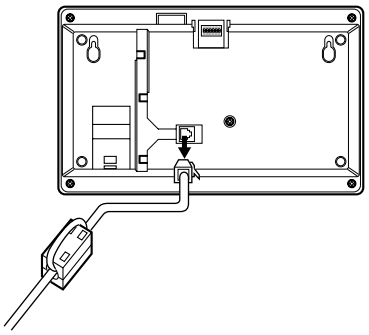
7. Repeat steps 3 through 6 to assign other Cell Station ID numbers.

8. Press (Transfer) to return to the initial display.

```
FUNCTION<0-4>
```

4.7.5 Unplugging the Cable from the Cell Station

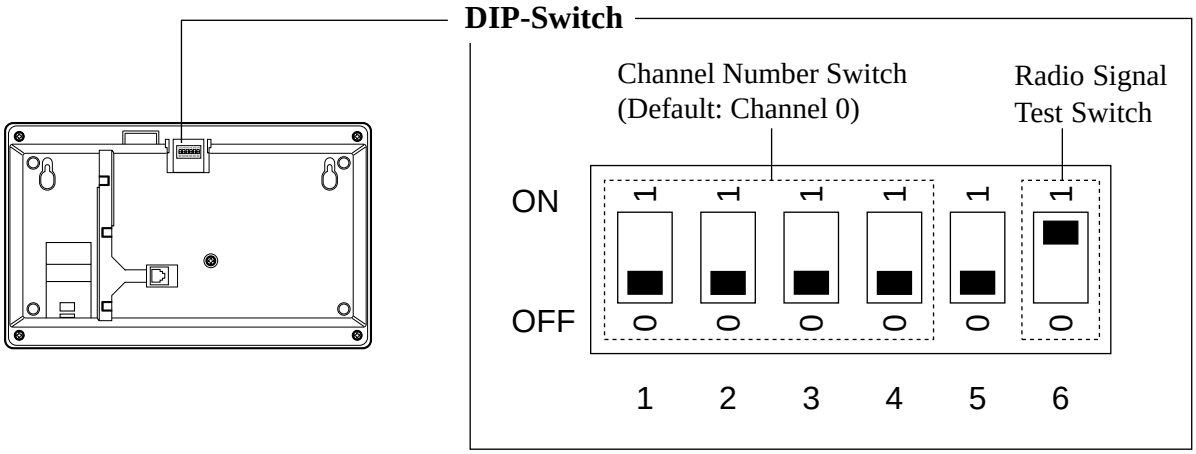
After assigning the Cell Station ID number to the PS, unplug the cable from the Cell Station once.

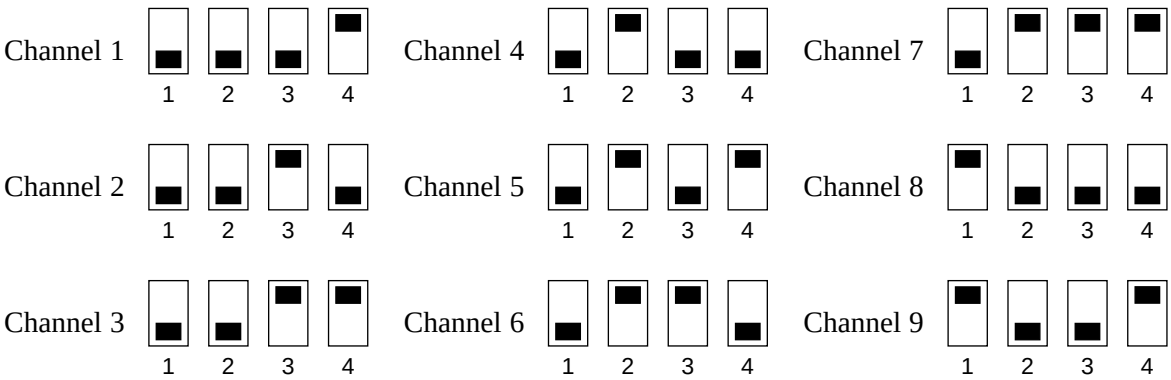


4.7.6 DIP-Switch Setting

After unplugging the Cell Station once, set the DIP-Switch as follows.

1. Switch the **Radio Signal Test Switch** from OFF to ON.
2. Set the **Channel Number Switches** as desired.



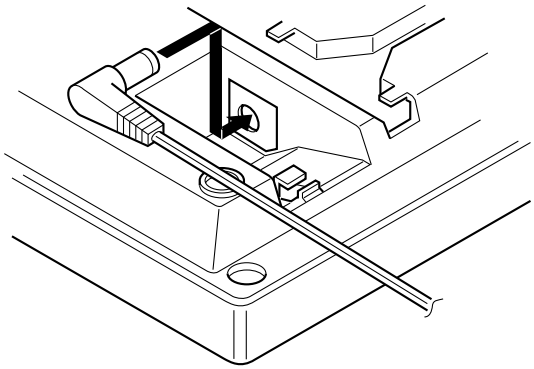


Note

- To see the signal strength of more than one Cell Station, the channel for each Cell Station needs to be set.
- Up to eight Cell Stations can be surveyed at the same time. If more than one Cell Station is in Radio Signal Test mode, each DIP-Switch channel must be different.

4.7.7 Connecting the AC Adaptor to the Cell Station

After setting the DIP-Switch, connect the AC Adaptor (KX-A11BS1: 230 ACV, 50Hz) to the Cell Station.



Note

- Only use the AC Adaptor for the Site Survey.

4.7.8 Radio Signal Test using the PS

After locating the Cell Station(s) temporarily, execute the Radio Signal Test using the PS. The PS scans whether there is a Cell Station that can link with on channel 0 right after entering the Radio Signal Test mode. The channel to be scanned can be changed by pressing the appropriate 0 through 9 keys.

1. Set the PS **Power Switch** to **ON** while pressing (Talk), (Flash) and at the same time.

```
FUNCTION<0-4>
```

2. Press .

- **To survey other slots**, scroll by pressing (Next) or (Previous).
- **To survey other channels**, enter the channel number (0 through 9).

Display example:
When synchronized

```
CH0 SLOT:06 SYNC
L:12  0000/0100
```

Abbreviation of SYNCHRONOUS

Channel number (0 – 9)

Frame counter (0000 – 9999)

Frame error (0000 – 9999)

Slot number (00 – 23)

Signal strength level (00 – 12)

When not synchronized

```
CH0 SLOT:06
L:12
```

Level:00	Out of range
Level:01	Catches noise easily or disconnects.
Level:02 – 07	May catch noise.
Level:08 – 10	Good
Level:11 – 12	Better

RECOMMENDATION

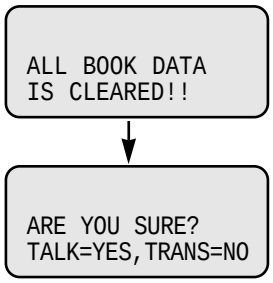
- **Frame error : 0000**
- **Signal strength level : more than level 08**

3. To record the result;

a) Press (Talk).

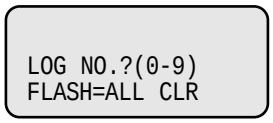
- **Attention!!**
  All directory data will be cleared.

  To return to the test result display, press (Clear).



b) Press (Talk).

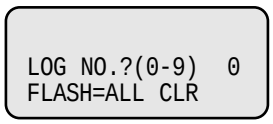
- To clear all log data, press (Flash).



c) Enter the **log number** (0 through 9).

- To clear all log data, press (Flash).

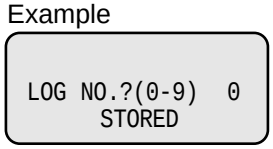
Example



d) Press (Talk).

- The result is recorded.

Example



Note

- The results of measurement for the 24 slots on the channel are saved each time a channel is set. If the same channel is set, the new results override the previous ones. Therefore, a measurement of 10 channels $\times$ 24 slots in total can be made.
- If correct results cannot be obtained (e.g., there are many error counters), change the allocation of the Cell Station and repeat the site survey to select the best location.
- When a slot is synchronised in step 2 ("SYNC" is displayed), the other slots in the same channel show "OTHER".
- Please do not use several PSs for the test simultaneously. This may cause interference problems, so that the test may not executed properly.

Referring to the recorded Radio Signal Test result

1. Set the PS **Power Switch** to **ON** while pressing (Talk), (Flash) and ✱ at the same time.

```
FUNCTION<0-4>
```

2. Press 1.

```
RESULT OF SCAN
LOG NO.?(0-9)
```

3. Enter the desired **log number** (0 through 9).

Example

```
RESULT OF SCAN
LOG NO.?(0-9)  0
```

4. Press (Talk).

- The results of channel 0 and slot 0 will be displayed.
- **To go to another slot**, scroll by pressing (Next) or ✱ (Previous).
  To go to another channel, enter the channel number (0 through 9).

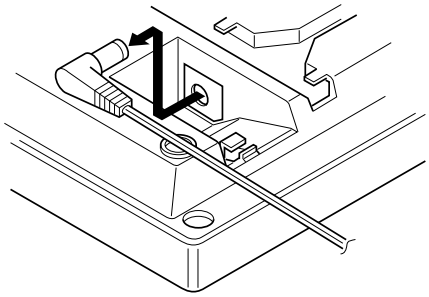
Example

```
CH0 SLOT:00 SYNC
L:12  0000/0100
```

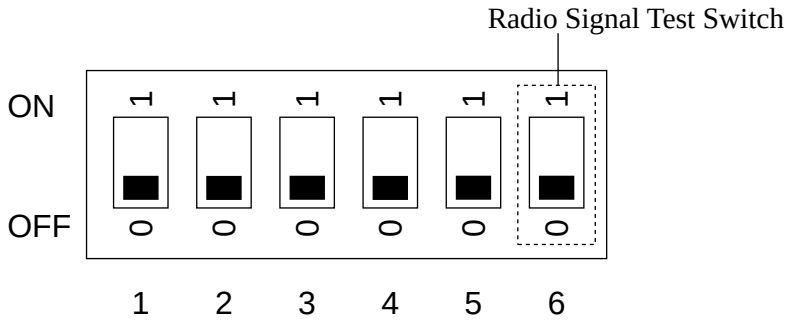
4.7.9 After the Site Survey

After obtaining the proper measurement results, the following procedures are required before mounting the Cell Station to the wall.

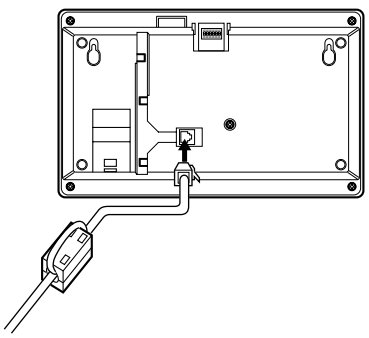
1. Disconnect the AC adaptor.



2. Switch the **Radio Signal Test Switch** of the Cell Station from ON to OFF.



3. Connect the cable from the Cell Station Interface Unit the Cell Station, and pass the cord through the groove on the unit.



4.8 Wall Mounting

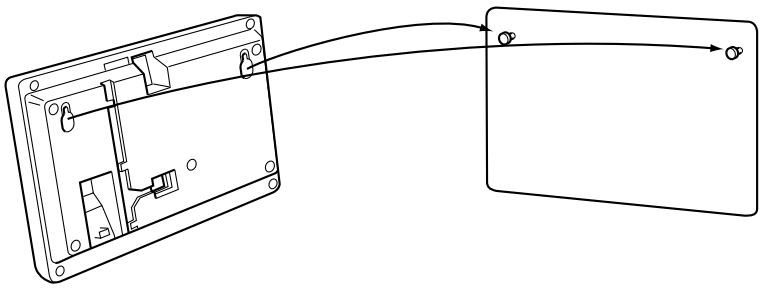
4.8.1 Wall Mounting

1. Place the template (included) on the wall to mark the two screw positions.

2. Install the two screws (included) into the wall.

3. Hook the Cell Station on the screw heads.

Mounting on Concrete or Mortar Walls
In step 2, drill two holes and drive the anchor plugs (included) with a hammer flush to the wall. Then install the screws into the anchor plugs.



This PBX fulfills the requirements of following European regulations:

CE

73/23/EEC	"Low Voltage Directive"
89/336/EEC	"Electromagnetic compatibility" (Basic EMC Publication)
92/31/EEC	"Electromagnetic compatibility" (Supplement)
93/68/EEC	"CE mark"
91/263/EEC	"Terminal Directive"

For above mentioned standards the unit is signed with the CE-mark.

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