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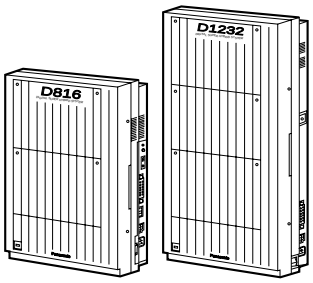
51/500 หมู่บ้านเสนา 88 ซอย 9 ซอยนวลจันทร์ 17 แขวงนวลจันทร์
เขตบึงกุ่ม กรุงเทพฯ 10240
ปรึกษา / สอบถาม / แจ้งซ่อม: Hotline: 089-1454237
E-mail: tawintra.kawintra@gmail.com www.tenpabx.com

Panasonic



Digital Super Hybrid System

Installation Manual

Model KX-TD816 KX-TD1232

Thank you for purchasing this Panasonic Model KX-TD816/KX-TD1232, Digital Super Hybrid System.
Please read this manual before connecting the 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)
Telephone	KX-T7425	Digital proprietary telephone
	KX-T7433	Digital proprietary telephone with 3-line display
	KX-T7436	Digital proprietary telephone with 6-line display
	KX-T7450	Digital proprietary telephone
	KX-T7220	Digital proprietary telephone
	KX-T7230	Digital proprietary telephone with 2-line display
	KX-T7235	Digital proprietary telephone with 6-line display
	KX-T7250	Digital proprietary telephone
	KX-T7130	Proprietary telephone with 1-line display
	KX-T7020	Proprietary telephone
	KX-T7030	Proprietary telephone with 1-line display
	KX-T7033	Proprietary telephone with 1-line display
	KX-T7050	Proprietary telephone
	KX-T7055	Proprietary telephone

System Components Table

	Model	Description
Optional Equipment	KX-T7440	Digital DSS Console
	KX-T7441	DSS Console for Attendant
	KX-T7240	Digital DSS Console
	KX-T7040	DSS Console
	KX-TD160	Doorphone Card
	KX-TD170	8-Station Line Unit
	KX-TD174	16 SLT Line Circuit Unit
	KX-TD180	4-CO Line Unit
	KX-TD184	E&M (TIE) Line Unit
	KX-TD185	4-DID Line Unit
	KX-TD188*2	E1 Unit
	KX-TD190*1	DISA Unit
	KX-TD191*2	DISA Card
	KX-TD192*2	System Inter Connection Card (two cards with Connection Cable)
	KX-TD193	Caller ID Card
	KX-TD194	SLT Message Waiting Lamp Adaptor Unit
	KX-TD196*2	Remote Card
	KX-TD197	High Speed Remote Card
	KX-TD198*1	Remote Unit
	KX-TD199*1	DISA Card
	KX-TD280	2-ISDN S0 Line Unit
	KX-TD286	6-ISDN S0 Line Unit
	KX-TD290*2	Primary Rate Interface ISDN Expansion Unit
	KX-T30865	Doorphone
	KX-T30890	Headset (Earphone type)
	KX-T7090	Headset (Headphone type)
	KX-A46	Battery Adaptor
	KX-A216	Backup Battery and Adaptor Card

*1 Can be installed in the KX-TD816 only.

*2 Can be installed in the KX-TD1232 only.

Note

- In this manual, the suffix of each model number are omitted.
- If your main unit is the KX-TDN1232, refer to the information of the KX-TD1232 in this manual.

Important Information

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

a) Read and understand all instructions.

b) Follow all warnings and instructions marked on the product.

c) Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

d) Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.

e) Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

f) Slots and openings in the cabinet and the back or bottom are provided for ventilation, to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on the bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

g) This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.

h) This product is equipped with a three wire grounding type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding type power outlet. 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 safety purpose of the grounding type plug.

i) Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by people walking on it.

j) Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.

k) Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.

l) To reduce the risk of electric shock, do not disassemble this product, but take it to a qualified serviceman when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.

m) Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

1) When the power supply cord or plug is damaged or frayed.

2) If liquid has been spilled into the product.

3) If the product has been exposed to rain or water.

4) If the product does not operate normally by following the operating instructions. Adjust only those controls, that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

5) If the product has been dropped or the cabinet has been damaged.

6) If the product exhibits a distinct change in performance.

n) Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

o) Do not use the telephone to report a gas leak in the vicinity of the leak.

Attention

- Keep the unit away from heating appliances and electrical noise generating devices such as fluorescent lamps, motors and televisions. 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.
- The ISDN Line Unit (e.g. KX-TD280) 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 the Features Guide may not work properly. (e.g. Charge Fee Reference, CLIP, COLP, etc.)
- The primary Rate Interface ISDN Expansion Unit (KX-TD290) is working in PCM30 mode only.
- 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.
- To use the KX-TD170 or KX-TD174 with the KX-TD188 or KX-TD290, the number on the name plate, which is on the back of the unit, must be ② or later.

WARNING

- **THIS UNIT 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 SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE, ENSURE THAT THE SOCKET-OUTLET IS LOCATED / INSTALLED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.**

- **TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR 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

SERIAL NO. _____
(found on the bottom of the unit)

DATE OF PURCHASE _____

NAME OF DEALER _____

DEALER'S ADDRESS _____

_____

_____

_____

DEALER'S TEL. NO. _____

Introduction

About this Installation Manual

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

Section 3, ISDN Installation
Contains the ISDN unit installation and wiring instructions.

Section 4, E1 Installation
Contains the E1 unit installation and wiring instructions.

Section 5, Troubleshooting
Provides information for system and telephone troubleshooting.

Section 6, Index
Provides the important words and phrases to help you access the required information easily.

Terms used in this Installation Manual

Programming Guide References

The related and required programming titles described in the *Programming Guide* are noted for your reference.
Programming Guide reference is also shown in the sentences as follows.
Example: *<SYS PRG [109]>*
Explanation: Refer to system programme [109] in the Programming Guide.
This helps you know the related and require programming easily for the contents of the sentences.

Features Guide References

The related feature titles described in the *Features Guide* are noted for your reference.

About the other manuals

Along with this Installation Manual, the following manuals are available to help you know the available features, programme and use the KX-TD816 / KX-TD1232 system.

Features Guide
Provides information about the system features.

Programming Guide
Provides system programming instructions.

User Manual
Provides operating instructions for the end users using proprietary telephones, single line telephones or consoles.

Table of Contents

Section 1

System Outline

1.1 System Highlights

1.1.1 System Highlights

System Maximum Capacity

Actual capacity will depend on the number or/and type of units connected to the system.

		KX-TD816	KX-TD1232	KX-TD1232 x 2
Extension	PT & SLT*1	16 (XDP*2 : 32)	32 (XDP: 64)	64 (XDP: 128)
	ISDN telephone	6 BRI (12 ch)	6 BRI (12 ch)	12 BRI (24 ch)
Outside Line	Analogue	8	12	24
	Basic Rate Interface (BRI)	4 BRI (8 ch)	6 BRI (12 ch)	12 BRI (24 ch)
	Primary Rate Interface (PRI)	—	1 PRI (30 ch)	1 PRI (30 ch)
	E1	—	1 E1 (30 ch)	1 E1 (30 ch)

*1 Proprietary telephone and single line telephone
*2 EXtra Device Port

Module Expansion

Expansion modules are used to increase the system capacity.

EXtra Device Port (XDP)

Each extension jack in the system supports the connection of a digital proprietary telephone / console and a single line device. The two devices per jack 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 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 and analogue proprietary telephones, consoles and single line devices such as single line telephones, fax machines, and data terminals.

System Connection[*1]

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

ISDN Line Service

The system can manage a call received from the ISDN line by point-to-point or point-to-multi-point configuration. To use this service, an optional unit is required.

TIE Line Service

A TIE line is a privately leased communication line between two or more PBXs, which provides cost effective communications between company at different locations. To use this service, an optional unit is required.

E1 Line Service

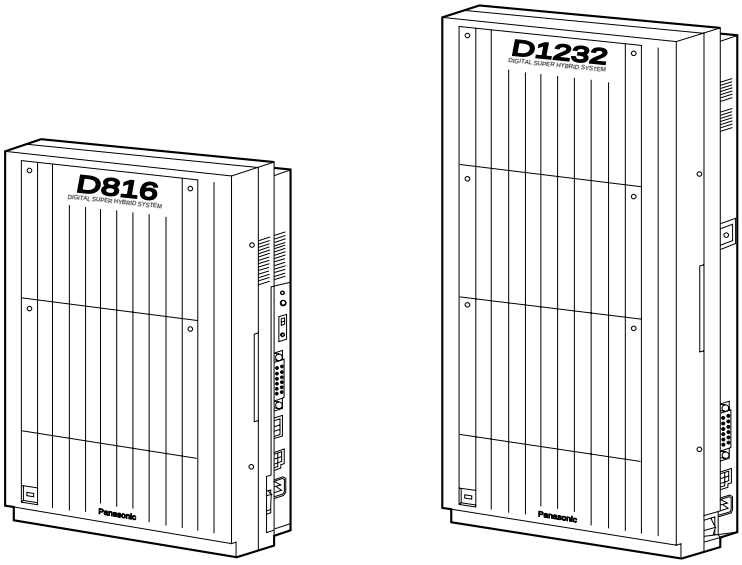
An E1 line is at the bottom of the digital transmission hierarchy. The E1 line contains 30 voice channels. Voice is digitised by Pulse Code Modulation. To use this service, an optional unit is required.

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

1.2 Basic System Construction

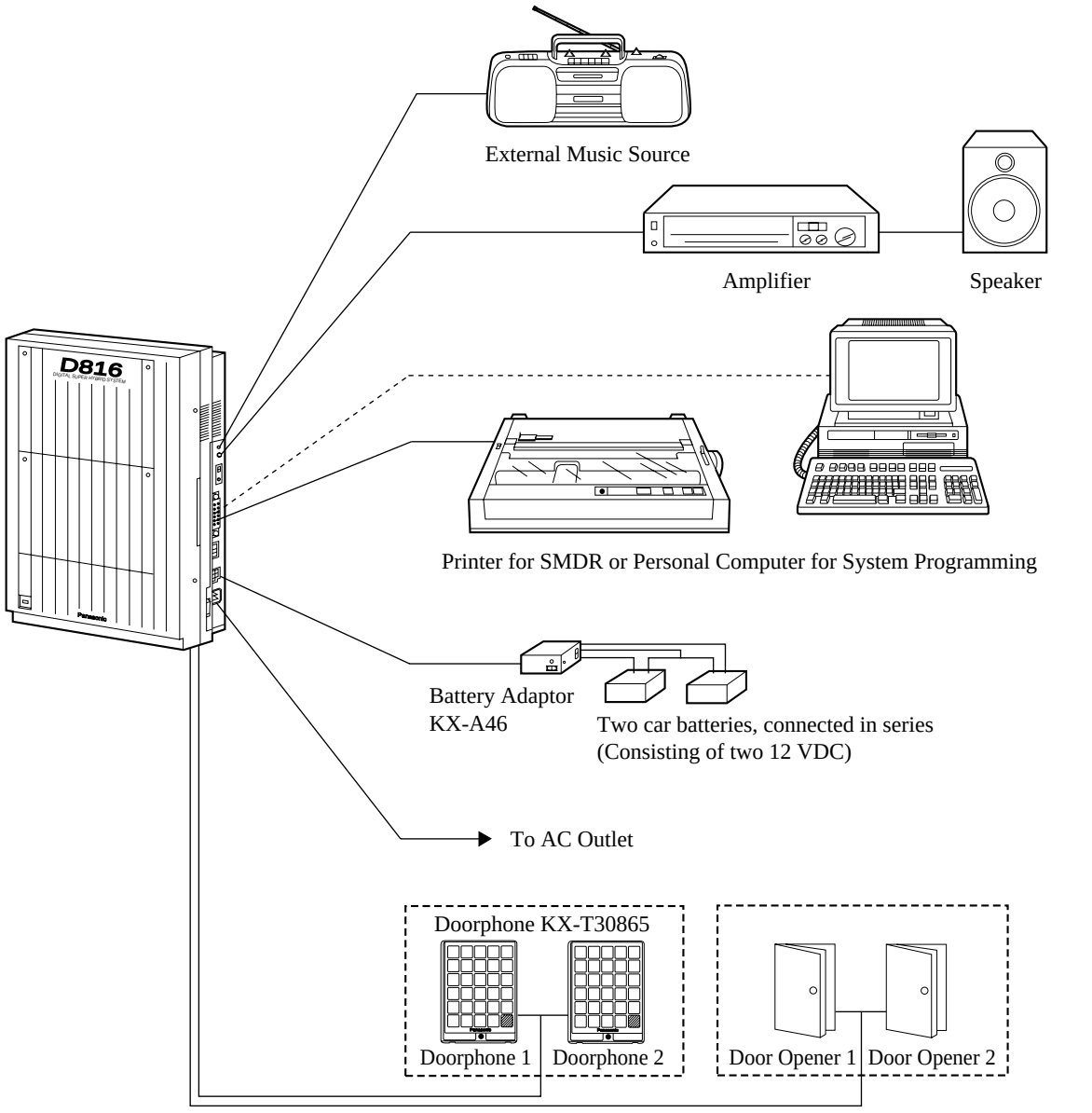
1.2.1 Basic System Construction

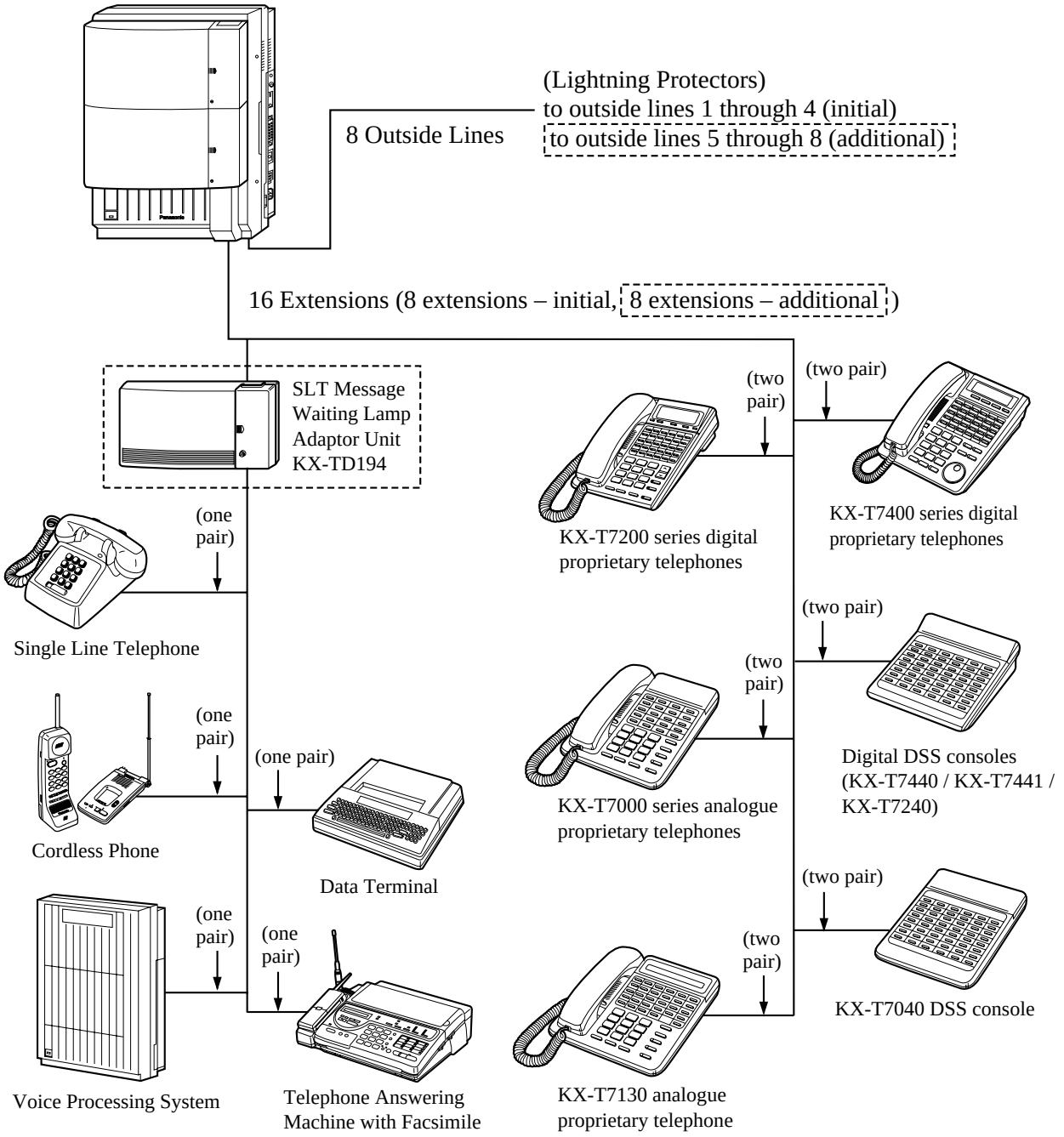
The KX-TD816 Digital Super Hybrid System has a basic capacity of four outside lines and eight extensions, and the KX-TD1232 has eight outside lines and 16 extensions. They are capable of supporting Panasonic digital and analogue proprietary telephones, consoles and single line devices such as single line telephones and fax machines.
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).



1.2.2 System Connection Diagram

KX-TD816



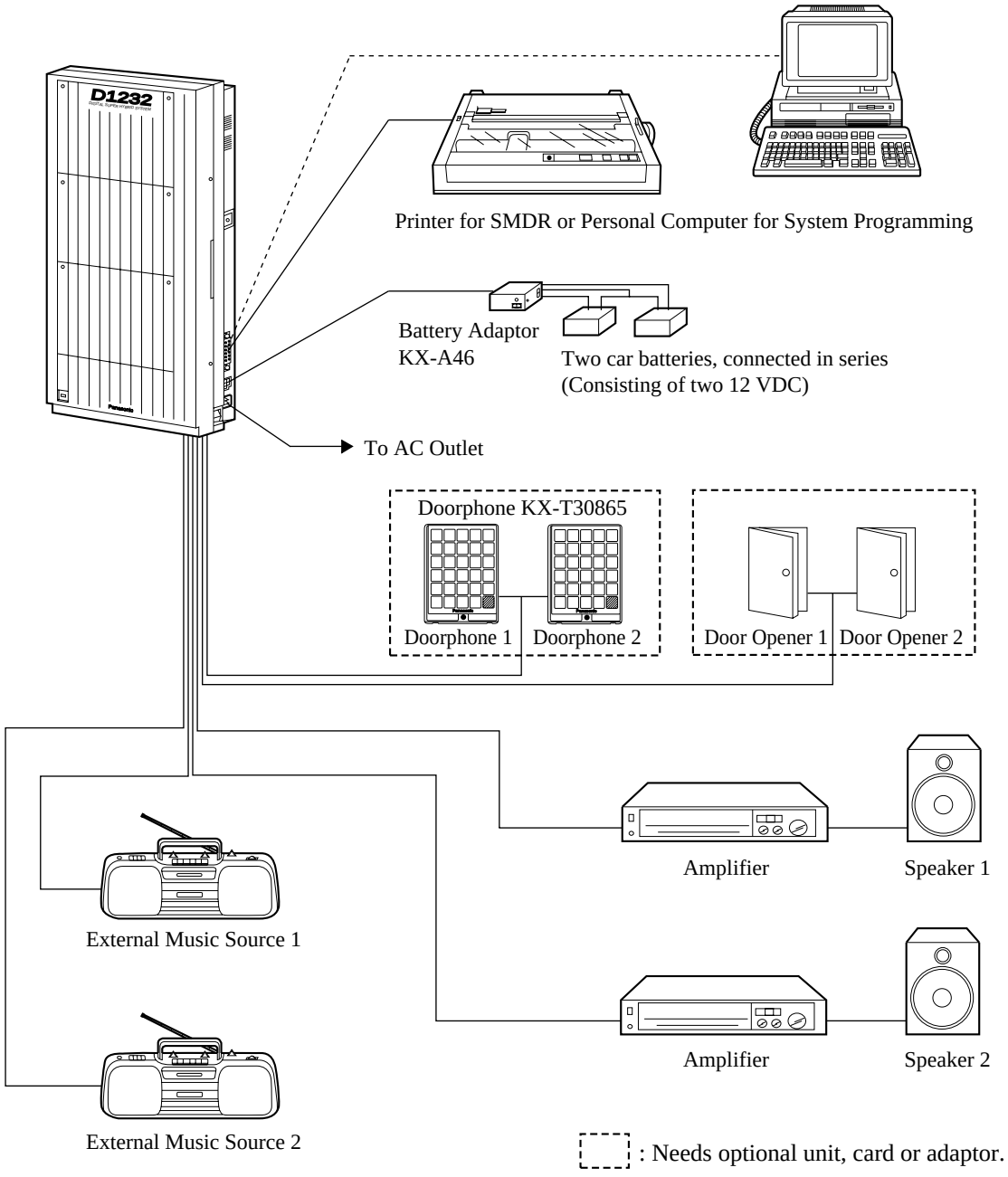


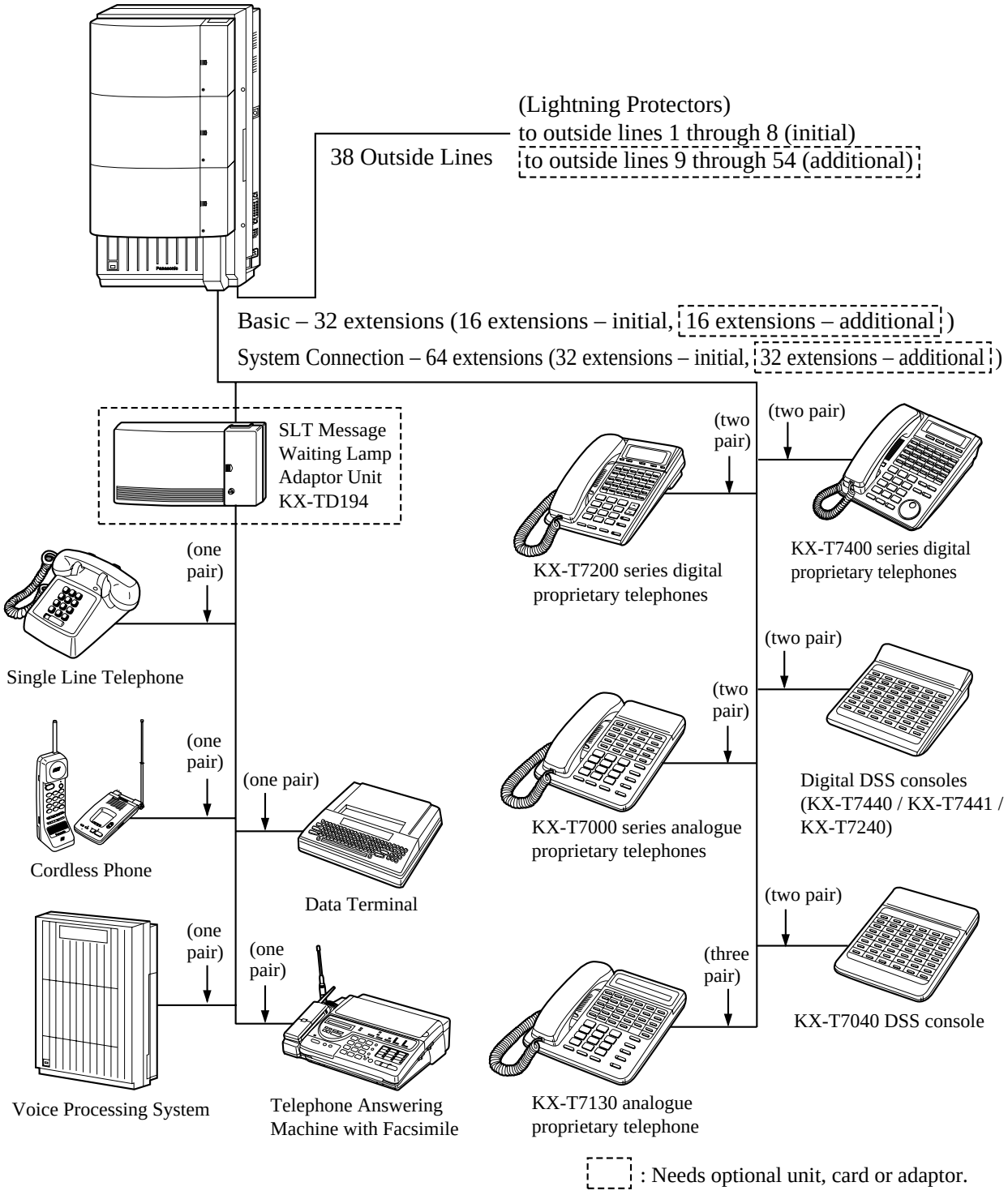
: Needs optional unit, card or adaptor.

Note

- It is recommended that extension of jack 1 is a display proprietary telephone.
- Parallel connection of telephones is possible. Refer to Section 2.3.3 Parallelled Telephone Connection.

KX-TD1232


D1232
Printer for SMDR or Personal Computer for System Programming
Battery Adaptor
KX-A46
Two car batteries, connected in series
(Consisting of two 12 VDC)
To AC Outlet
Doorphone KX-T30865
Doorphone 1
Doorphone 2
Door Opener 1
Door Opener 2
Amplifier
Speaker 1
External Music Source 1
Amplifier
Speaker 2
External Music Source 2
: Needs optional unit, card or adaptor.



Note

- It is recommended that extension of jack 1 is a display proprietary telephone.
- Parallel connection of telephones is possible. Refer to Section 2.3.3 Parallelled Telephone Connection.

1.3 Proprietary Telephones

1.3.1 Proprietary Telephones

The following Panasonic proprietary telephones are available with this system.

Proprietary Telephone	Description
KX-T7425	Digital, speakerphone, Jog Dial, 24 Flexible CO
KX-T7433	Digital, 3-line display, speakerphone, Jog Dial, 24 Flexible CO
KX-T7436	Digital, 6-line display, speakerphone, Jog Dial, 24 Flexible CO
KX-T7450	Digital, monitor, Jog Dial, 12 Flexible CO
KX-T7220	Digital, speakerphone, 24 Flexible CO
KX-T7230	Digital, 2-line display, speakerphone, 24 Flexible CO
KX-T7235	Digital, 6-line display, speakerphone, 12 Flexible CO
KX-T7250	Digital, monitor, 6 Flexible CO
KX-T7130	1-line display, speakerphone, 12 Flexible CO, 12 PF
KX-T7020	Speakerphone, 12 Flexible CO, 4 PF
KX-T7030	1-line display, speakerphone, 12 Flexible CO, 4 PF
KX-T7033	1-line display, speakerphone, 12 Flexible CO, 4 PF
KX-T7050	Monitor, 12 Flexible CO, 4 PF
KX-T7055	Monitor, 3 Flexible CO, 4 PF

Note

- Flexible CO : Flexible CO button (programmable)
- PF : Programmable Feature button

1.4 Options

1.4.1 Options

Model No.	Model Name	Description	Max. Quantity on KX-TD816	Max. Quantity on KX-TD1232	
				Single System	System Connection
KX-TD170	8-Station Line Unit	Adds 8 extension lines.	1	2	4
KX-TD174	16 SLT Line Circuit Unit	Adds 16 extension lines which contain single line telephones.	1	2	4
KX-TD180	4-CO Line Unit	Adds 4 outside lines.	1	1	2
KX-TD184	4-E&M (TIE) Line Unit	Adds 4 ports for E&M Line Service.	1	1	2
KX-TD185	4-DID Line Unit	Adds 4 DID lines.	1	1	2
KX-TD188	E1 Unit	Adds 1 E1 line.	—	1	1
KX-TD280	2-ISDN S0 Line Unit	Adds 2 ISDN S0 lines.	1	1	2
KX-TD286	6-ISDN S0 Line Unit	Adds 6 ISDN S0 lines.	1	1	2
KX-TD290	Primary Rate Interface ISDN Expansion Unit	Adds 1 PRI ISDN line.	—	1	1
KX-TD193	Caller ID Card	Supports the Caller ID service of the central office. This card can be connected to every four CO (outside line) ports.	2	3	6
KX-TD190	DISA Unit	Supports the Direct Inward System Access (DISA) feature and records outgoing messages.	1	—	—
KX-TD191	DISA Card	Supports the Direct Inward System Access (DISA) feature and records outgoing messages.	—	1	2
KX-TD192	System Inter Connection Card	Connects two Digital Super Hybrid Systems.	—	—	2

Model No.	Model Name	Description	Max. Quantity on KX-TD816	Max. Quantity on KX-TD1232	
				Single System	System Connection
KX-TD194	SLT Message Waiting Lamp Adaptor Unit	Supports the Message Waiting feature for a single line telephone with a message waiting lamp. One unit supports 16 extensions.	1	3	6
KX-TD196	Remote Card	Supports the programming and maintenance of the system from a remote location.	—	1	2*1
KX-TD197	High Speed Remote Card	Supports the programming and maintenance of the system from a remote location. This card can also be installed in the KX-TD190, DISA Unit, for the KX-TD816.	(1 per KX-TD190)	1	2*1
KX-TD198	Remote Unit	Supports the programming and maintenance of the system from a remote location.	1	—	—
KX-TD199	DISA Card	Supports the Direct Inward System Access (DISA) feature and records an Outgoing Message. This card can only be installed in the KX-TD198, Remote Unit.	(1 per KX-TD198)	—	—
KX-TD160	Doorphone Card	Supports 2 doorphones (KX-T30865) and 2 door openers.	1	1	2
KX-A216	Backup Battery and Adaptor Card	Operates all the features as a backup power supply in the event of a power failure.	1	—	—

Model No.	Model Name	Description	Max. Quantity on KX-TD816	Max. Quantity on KX-TD1232	
				Single System	System Connection
KX-A46	Battery Adaptor	Supports the connection of two car batteries for power backup in the event of a power failure.	1	1	2
KX-T7440 / KX-T7240	Digital DSS Console	Provides easy and quick access to extensions and features. This must be used with a proprietary telephone.	4	4	8
KX-T7441	DSS Console for Attendant				
KX-T7040	DSS Console				
KX-T30865	Doorphone	Used for a doorphone call.	2	2	4
KX-T30890	Headset (Earphone type)	Connected to a proprietary telephone to establish hands-free operation.	—	—	—
KX-T7090	Headset (Headphone type)	Connected to a proprietary telephone to establish hands-free operation.	—	—	—

*1 For remote maintenance calls, if you know which system (master or slave) where the calls will arrive, then only one remote card is needed. However, if you are using DDI, etc., you may not know where the calls will be received. In this case, you should install a remote card in each system.

1.4.2 Expansion Unit Combination

KX-TD816

	KX-TD17x	KX-TD180 / KX-TD184 / KX-TD185	KX-TD188	KX-TD28x	KX-TD290
Basic (no unit connected)	○	○	×	○	×
KX-TD17x	×	○	×	○	×
KX-TD180 / KX-TD184 / KX-TD185		×	×	×	×
KX-TD188			×	×	×
KX-TD28x				×	×
KX-TD290					×

KX-TD1232 Master System

	KX-TD17x	KX-TD180 / KX-TD184 / KX-TD185	KX-TD188	KX-TD28x	KX-TD290
Basic (no unit connected)	○	○	○	○	○
KX-TD17x	○	○	○	○	○
KX-TD180 / KX-TD184 / KX-TD185		×	×	×	×
KX-TD188			×	×	×
KX-TD28x				×	×
KX-TD290					×
KX-TD17x + KX-TD17x	×	○	○	○	○
KX-TD17x + KX-TD180 / KX-TD184 / KX-TD185		×	×	×	×
KX-TD17x + KX-TD188			×	×	×
KX-TD17x + KX-TD28x				×	×
KX-TD17x + KX-TD290					×

KX-TD1232 Slave System

	KX-TD17x	KX-TD180 / KX-TD184 / KX-TD185	KX-TD188	KX-TD28x	KX-TD290
Slave Basic (no unit connected)	○	○	×	○	×
KX-TD17x	○	○	×	○	×
KX-TD180 / KX-TD184 / KX-TD185		×	×	×	×
KX-TD28x			×	×	×
KX-TD17x + KX-TD17x	×	○	×	○	×
KX-TD17x + KX-TD180 / KX-TD184 / KX-TD185		×	×	×	×
KX-TD17x + KX-TD28x			×	×	×
KX-TD290 on Master	○	×	×	○ (For ISDN extension port only)	×

Note

- ○: Combination possible; ×: Combination not possible;
  Shaded part: These combinations shown elsewhere in the table.
  x: Any number (e.g. KX-TD28x can be KX-TD280 or KX-TD286)
- The KX-TD188 and KX-TD290 can only be connected to the Master system.
- If the KX-TD188 or KX-TD290 is connected, no outside lines on the Slave system can be used.

1.5 Specifications

1.5.1 General Description

Control Method		CPU: 16-bit CPU
Switching		Non Blocking PCM Time Switch
Power Supplies	**Primary**	KX-TD816BX: 110 VAC - 115 VAC / 200 VAC / 220 VAC / 240 VAC, 50 Hz / 60 Hz KX-TD816HK: 220 VAC – 230 VAC, 50 Hz KX-TD1232(D)BX/HK/ML, KX-TDN1232: 220 VAC – 240 VAC, 50 Hz / 60 Hz KX-TD1232X: 110 VAC – 120 VAC, 50 Hz / 60 Hz
	Secondary	Station Supply Volt: 30 V Circuit Volt: ± 5 V, ± 15 V
	Power Failure	• Memory backup duration: seven years with a factory-provided lithium battery • 4 outside lines max. for KX-TD816 and 6 outside lines max. for KX-TD1232 automatically assigned to extensions (Power Failure Transfer) • System operation for about ten minutes with optional Backup Battery and Adaptor Card (KX-A216) for KX-TD816. • System operation for about three hours using recommended batteries (consisting of two 12 VDC car batteries)
Dialling	**Outward**	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling
	Internal	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling
Connectors	**Outside lines**	KX-TD816: 4-pin Connector KX-TD1232DBX/ML, KX-TDN1232: 4-pin Connector KX-TD1232BX/HK/X: Modular Jack
	Extensions	KX-TD816: 4-pin Connector KX-TD1232DBX/ML, KX-TDN1232: 6-pin Connector KX-TD1232BX/HK/X: Amphenol Connector
	Paging Output	Pin Jack (RCA JACK)
	External Music Input	Two-conductor Jack (MINIJACK 3.5 mm diameter)

Extension Connection Cable		Single line telephones	1 pair wire (T, R)
		KX-T7425, KX-T7433, KX-T7436, KX-T7450, KX-T7220, KX-T7230, KX-T7235, KX-T7250	1 pair wire (D1, D2) or 2 pair wire (T, R, D1, D2)
		KX-T7130 (with the KX-TD816), KX-T7020, KX-T7030, KX-T7033, KX-T7050, KX-T7055	2 pair wire (T, R, D1, D2)
		KX-T7130 (with the KX-TD1232)	3 pair wire (T, R, D1, D2, P1, P2)
		KX-T7440, KX-T7441, KX-T7240, KX-T7040	1 pair wire (D1, D2)
Station Message Detail Recording (SMDR)	**Interface**	Serial Interface (RS-232C)	
	Output Equipment	Printer	

1.5.2 Characteristics

Station Loop Limit	Proprietary Telephone: 40 Ω Single Line Telephone: 600 Ω including set Doorphone: 20 Ω
Minimum Leakage Resistance	15 000 Ω
Maximum Number of Station Instruments per Line	**1** for proprietary telephone or single line telephone **2** by Parallel or eXtra Device Port Connection of a proprietary telephone and a single line telephone
Ring Voltage	70 Vrms at 25 Hz depending on the Ringing Load
Central Office Loop Limit	1 600 Ω max.
Environmental Requirements	0 °C – 40 °C, 10 % – 90 % relative humidity
Hookswitch Flash Timing Range	204 ms –1000 ms

1.5.3 System Capacity

Line

Actual capacity will depend on the number or/and type of units connected to the system.

		KX-TD816	KX-TD1232	KX-TD1232 x 2
Extension	PT & SLT*1	16 (XDP*2 : 32)	32 (XDP: 64)	64 (XDP: 128)
	ISDN telephone	6 BRI (12 ch)	6 BRI (12 ch)	12 BRI (24 ch)
Outside Line	Analogue	8	12	24
	Basic Rate Interface (BRI)	4 BRI (8 ch)	6 BRI (12 ch)	12 BRI (24 ch)
	Primary Rate Interface (PRI)	—	1 PRI (30 ch)	1 PRI (30 ch)
	E1	—	1 E1 (30 ch)	1 E1 (30 ch)

*1 Proprietary telephone and single line telephone
*2 EXtra Device Port

User-supplied Equipment

Item	Max. Quantity on KX-TD816	Max. Quantity on KX-TD1232	
		Single System	System Connection
Doorphones	2	2	4
Door Openers	2	2	4
External Pagers	1	2	4
External Music Source	1	2	4

System Data

Item	Max. Quantity
Operators	2
System Speed Dialling	500
One-Touch Dialling	24 per extension (proprietary telephone)
Station Speed Dialling	10 per extension
Call Park areas	10
Absent Messages	9
Outside Line Groups	8
Toll Restriction Levels	8
Extension Groups	8
Class of Service	8
Message Waitings	128
Uniform Call Distribution Groups	8

Section 2

General Installation

2.1 Before Installation

2.1.1 Before Installation

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

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:

a) Never install telephone wiring during a lightning storm.

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

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

d) Use caution when installing or modifying telephone lines.

Installation Precautions

This system is designed for wall mounting only. Avoid installing in the following places. (Doing so may result in malfunction, noise, or discoloration.)

a) In direct sunlight and hot, cold, or humid places. (Temperature range: 0 °C – 40 °C)

b) Sulfuric gases produced in areas where there are thermal springs, etc. may damage the equipment or contacts.

c) Places in which shocks or vibrations are frequent or strong.

d) Dusty places, or places where water or oil may come into contact with the system.

e) Near high-frequency generating devices such as sewing machines or electric welders.

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

g) Install at least 1.8 m away from radios and televisions. (Both the system and Panasonic proprietary telephones)

h) Do not obstruct area around the system (for reasons of maintenance and inspection — be especially careful to allow space for cooling above and at the sides of the system).

Wiring Precautions

Be sure to follow these instructions when wiring the unit:

a) 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.

b) If cables are run on the floor, use protectors to prevent the wires from being stepped on. Avoid wiring under carpets.

c) 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.

d) 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 Panasonic proprietary telephones (e.g. KX-T7436, KX-T7235).

e) The Power Switch of the system must be off during wiring. After all of the wiring is completed, turn the Power Switch on.

f) Mis-wiring may cause the system to operate improperly. Refer to Section 5.1.1 Installation and 5.1.2 Connection.

g) If an extension does not operate properly, disconnect the telephone from the extension line and then connect again, or turn off the Power Switch of the system and then on again.

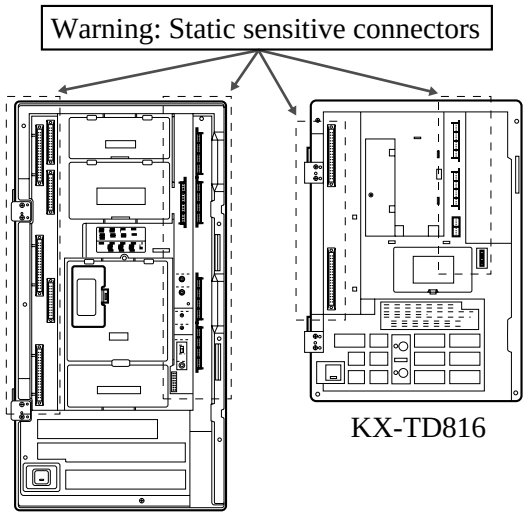
h) The system is equipped with a 3-wire grounding type plug. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

i) Use twisted pair cable for outside line connection.

j) Outside lines should be installed with lightning protectors. For details, refer to Section 2.3.9 Installation of Lightning Protectors.

WARNING

Static sensitive devices are used. To protect printed circuit boards from static electricity, do not touch connectors indicated to the right. To discharge body static, touch ground or wear a grounding strap.



KX-TD816

KX-TD1232

2.2 Installation of the Main Unit

2.2.1 Unpacking

Unpack the box and check the items below:

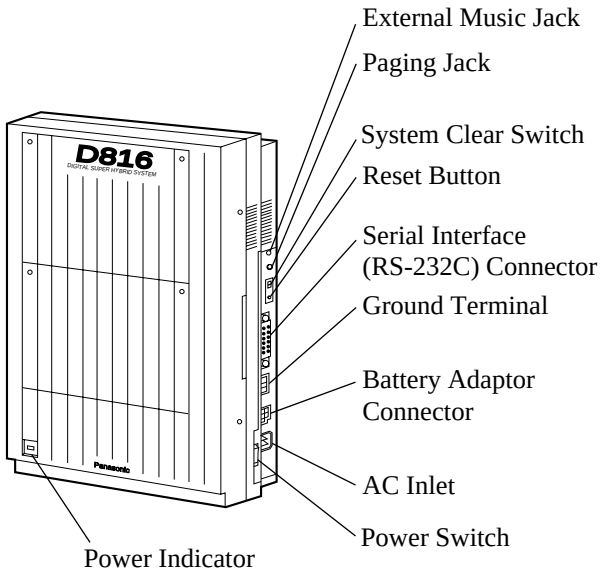
	KX-TD816	KX-TD1232
Main Unit	one	one
AC Cord	one	one
Template	one	one
Screws (Wall Mounting)	three	four
Anchor Plug	three	four
Pager Connectors	—	two
Music Source Connectors	—	two
Expansion Line Cord Holder	one	one
Plug Adaptor *1	one	—

*1 Available for the KX-TD816BX only.

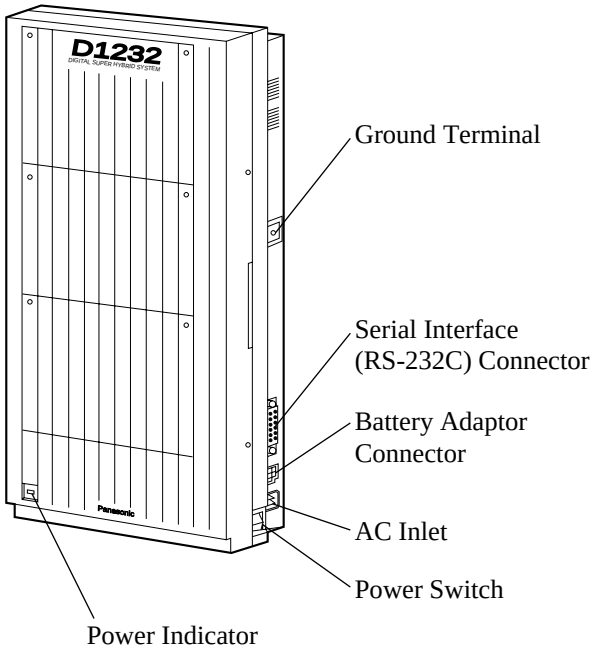
2.2.2 Location of Interfaces

Overview

KX-TD816

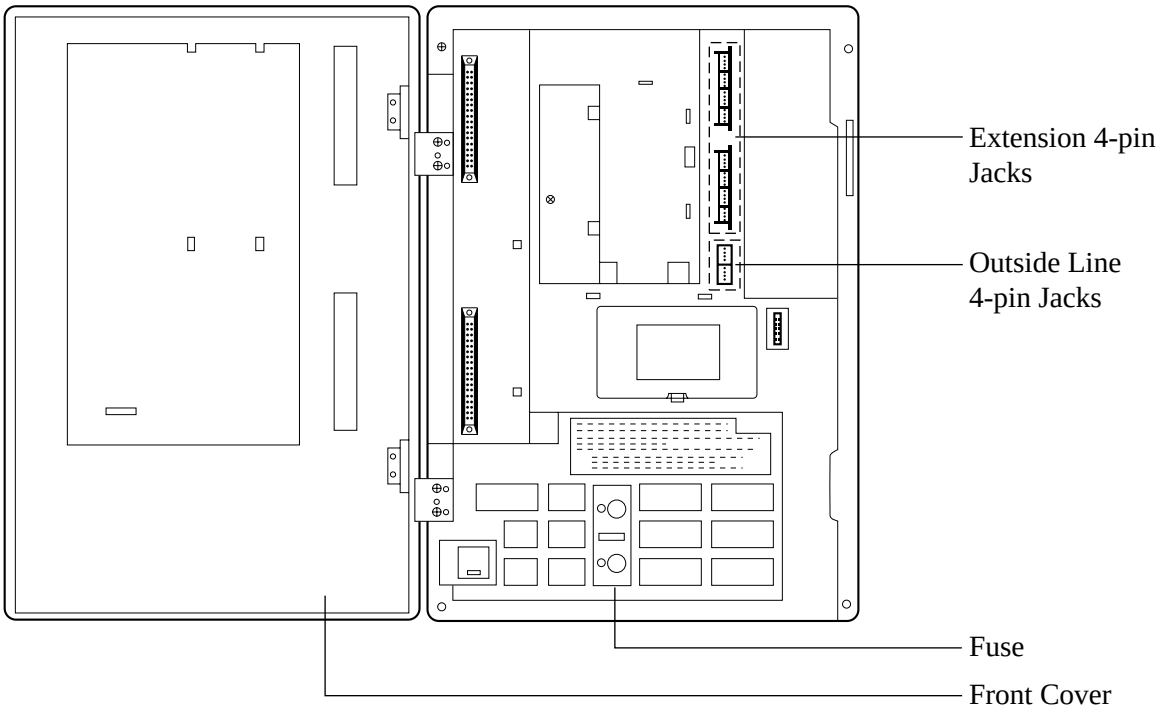


KX-TD1232

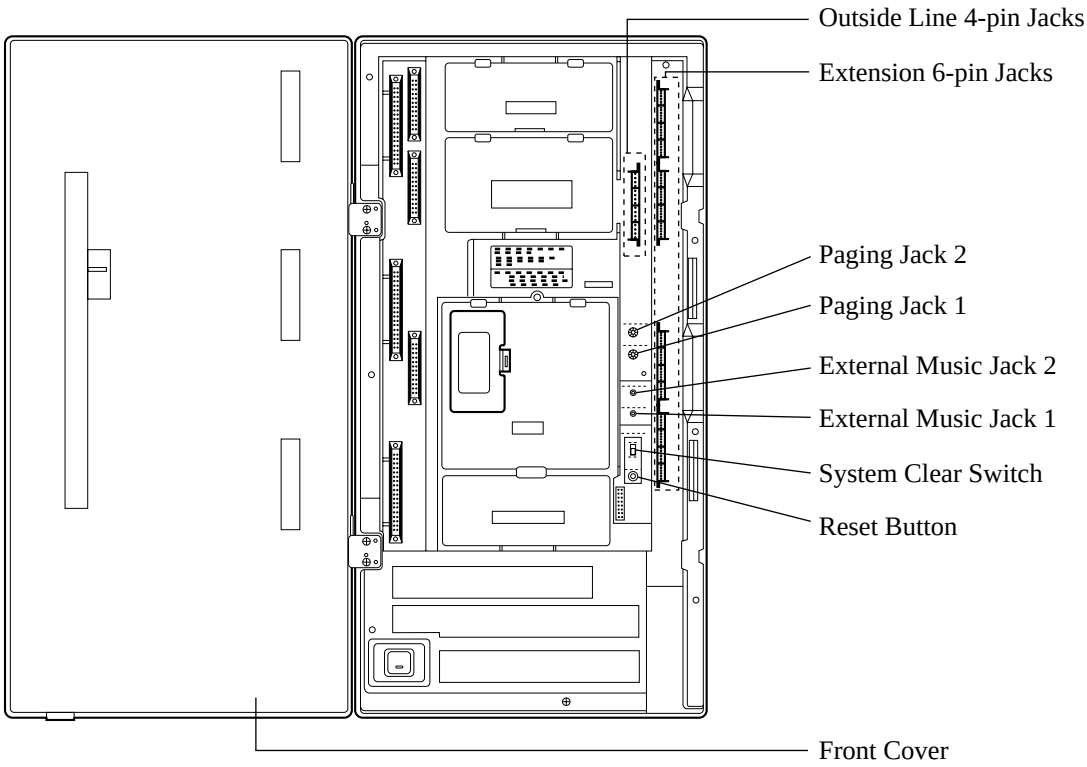


Inside View

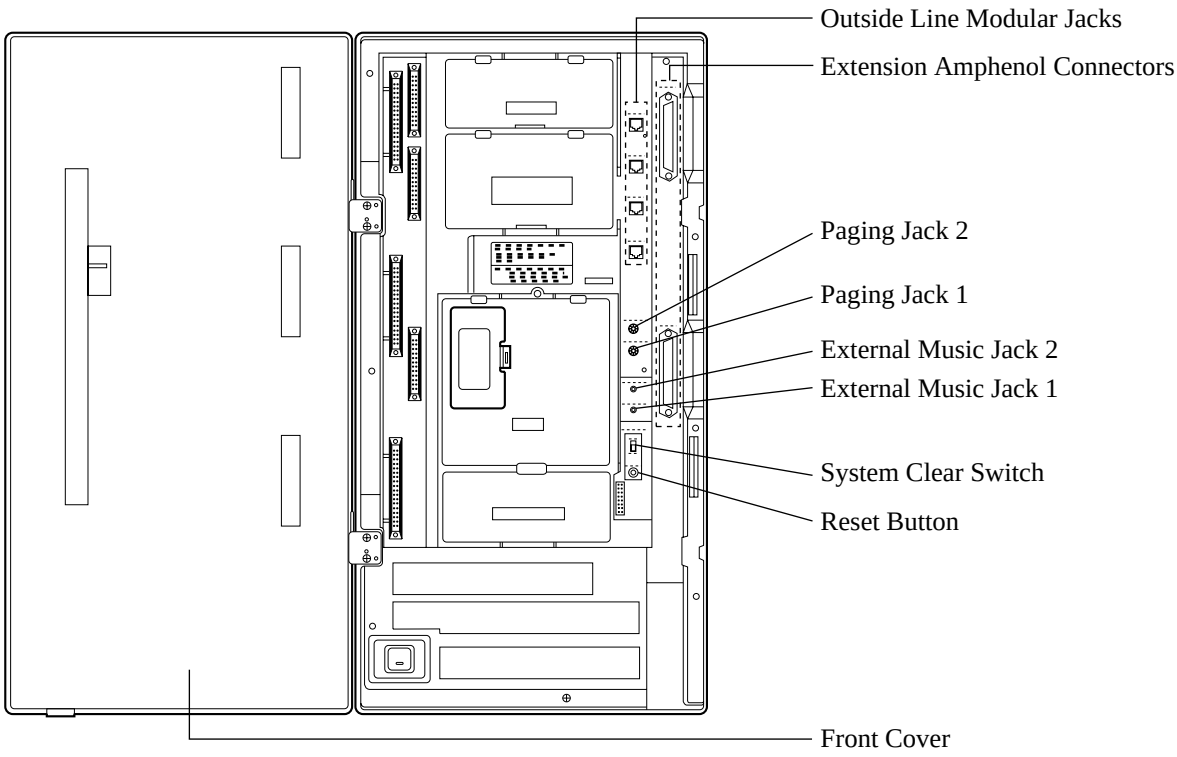
KX-TD816



KX-TD1232 (4-pin / 6-pin Connector Type)



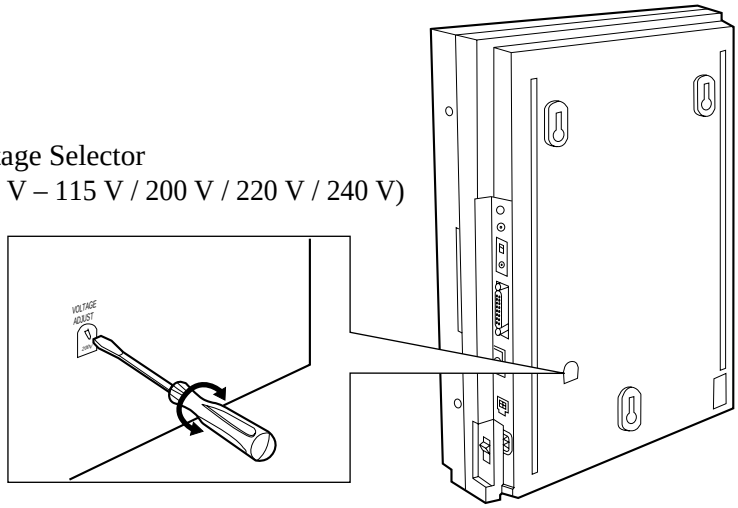
KX-TD1232 (Modular / Amphenol Connector Type)



Power Supply for KX-TD816BX

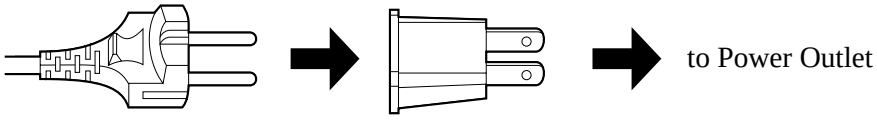
Check the Voltage Selector to confirm if it is set to your house hold AC voltage.
If not, reset the Voltage Selector on the back of the main unit to the correct position with a screwdriver.

Voltage Selector
(110 V – 115 V / 200 V / 220 V / 240 V)



Power Adaptor for KX-TD816BX

The plug adaptor (included) is to be used if the power plug will not fit your socket. Assemble as shown below, using the plug which fits your socket. In this case, be sure to connect the frame of the main unit to ground because the ground line in the power cable cannot be used.



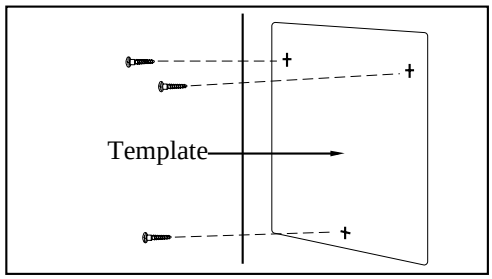
Power Plug Plug Adaptor

2.2.3 Wall Mounting

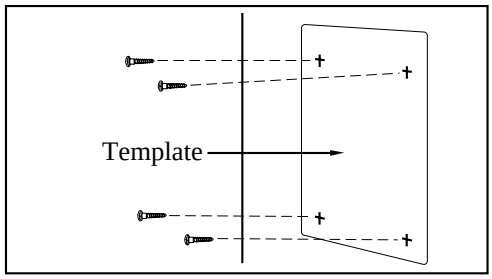
This set is designed for wall mounting only. The wall where the main unit is to be mounted must be able to support the weight of the main unit. If screws other than the ones supplied are used, use screws with the same diameter as the ones enclosed.

Mounting on Wooden Wall

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

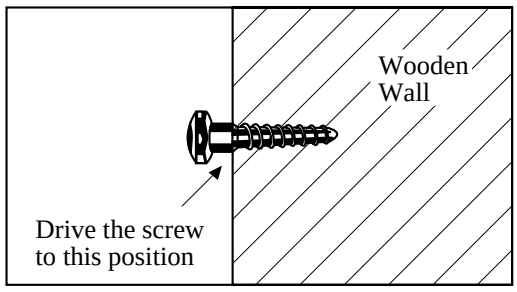


KX-TD816

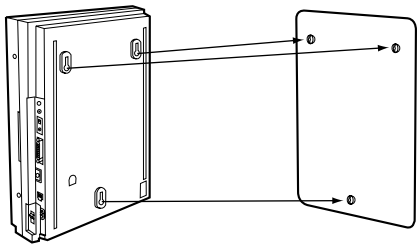


KX-TD1232

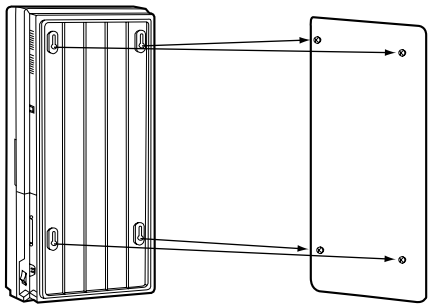
2. Install the screws (included) into the wall.



3. Hook the main unit on the screw heads.



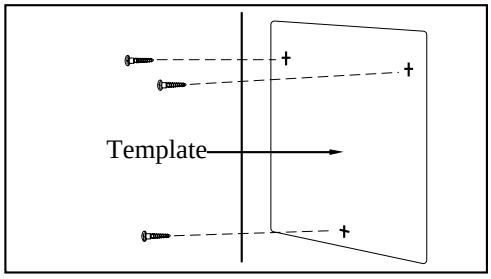
KX-TD816



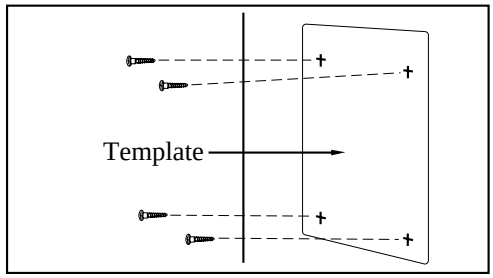
KX-TD1232

Mounting on Concrete or Mortar Wall

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

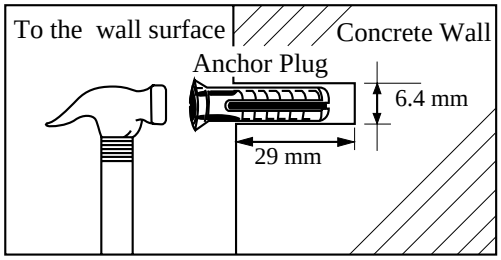


KX-TD816

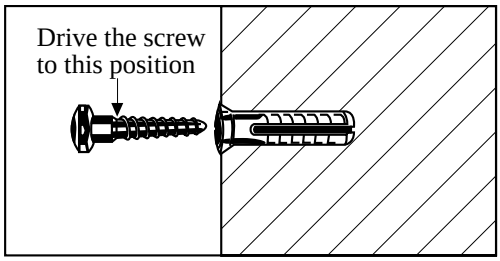


KX-TD1232

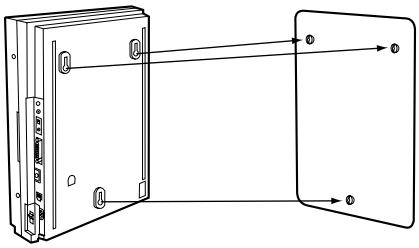
2. Drill holes and drive the anchor plugs (included) with a hammer, flush to the wall.



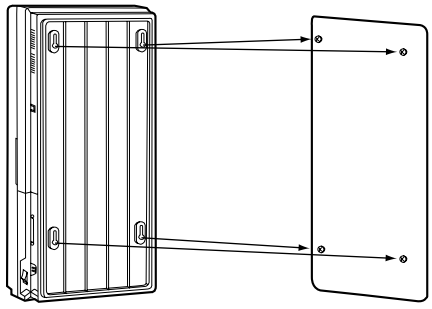
3. Install the screws (included) into the anchor plugs.



4. Hook the main unit on the screw heads.



KX-TD816



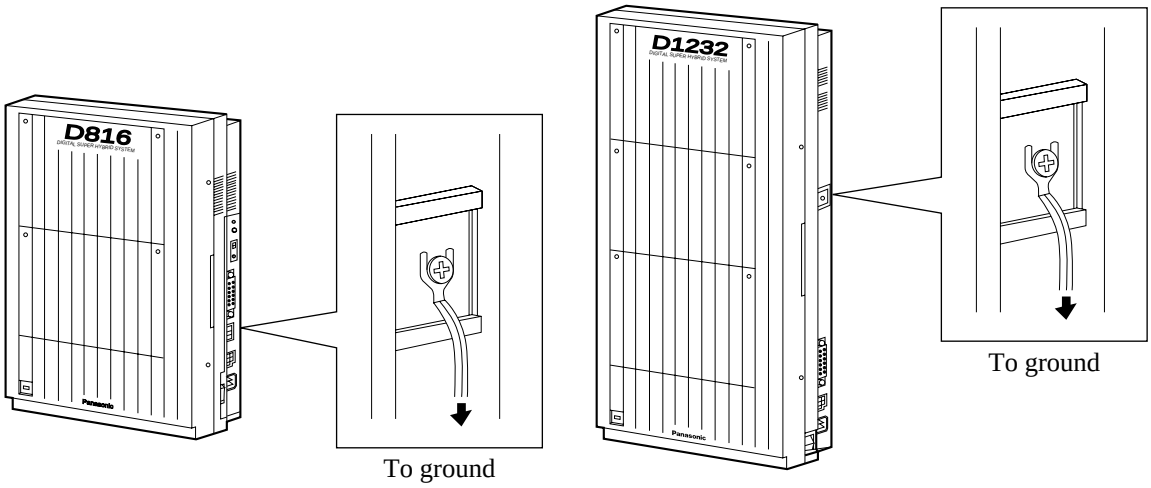
KX-TD1232

2.2.4 Frame Ground Connection

IMPORTANT

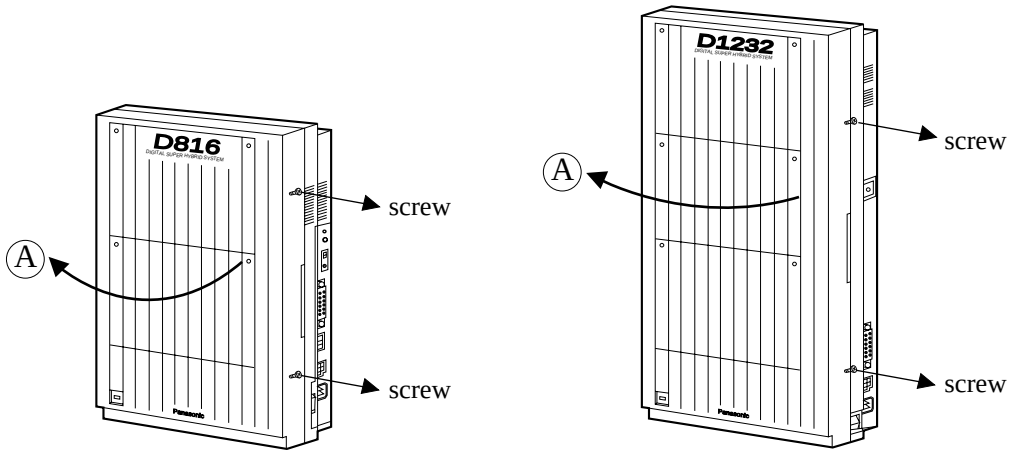
Connect the frame of the main unit to ground.

1. Loosen the screw.
2. Insert the grounding wire.
3. Tighten the screw.
4. Connect the grounding wire to ground.



2.2.5 Opening the Front Cover

1. Loosen the two screws on the right side of the main unit.
2. Open the front cover in the direction of arrow Ⓐ.



Note

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

2.3 Connection

2.3.1 Outside Line Connection

There are two methods to perform Outside Line Connection, using a 4-pin connector and a modular connector. Which method should be used depends on the model number of the system as shown below.

Model number	Connector to be used
KX-TD816 KX-TD1232DBX/ML KX-TDN1232	4-pin Connector
KX-TD1232BX/HK/X	Modular Connector

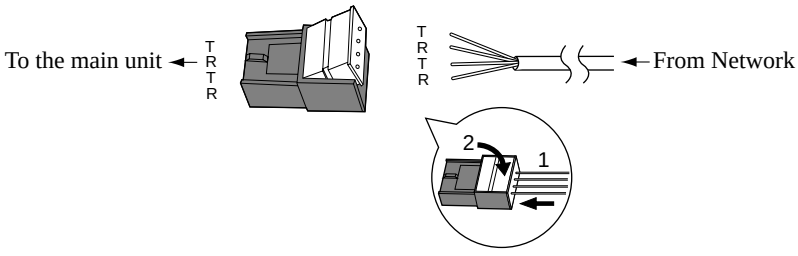
Method 1: Using 4-pin Connector (for KX-TD816, KX-TD1232DBX/ML, KX-TDN1232)

Wire Specifications

Wire	Solid wire
Diameter of conductor	ø 0.4 mm – ø 0.65 mm (22, 24, 26 AWG)
Diameter including coating	ø 0.66 mm – ø 1.05 mm

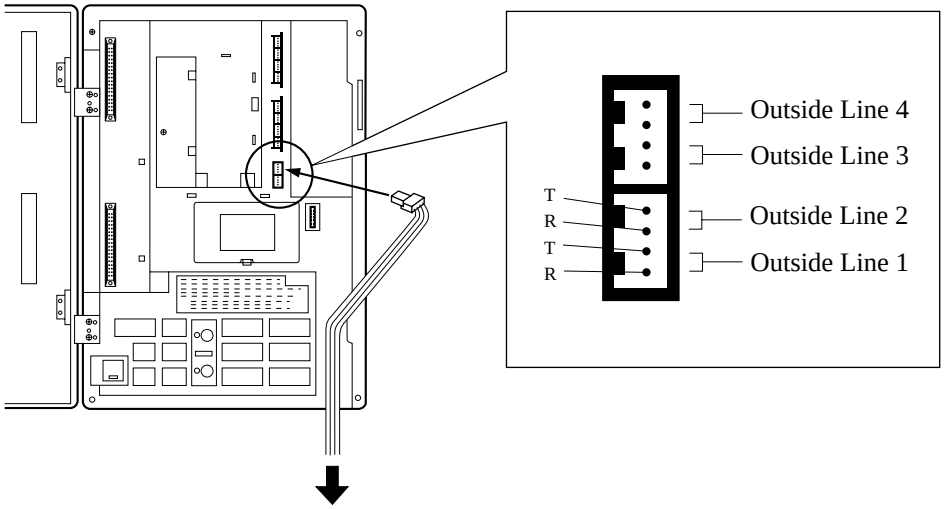
Connection

1. Prepare the required plugs. Two 4-pin plugs for KX-TD816 and four 4-pin plugs for KX-TD1232 are included to connect outside lines. A plug is able to connect two outside lines. Use twisted pair cable.
   Note
   Do not peel off the wire coating. Insert the wires all the way.



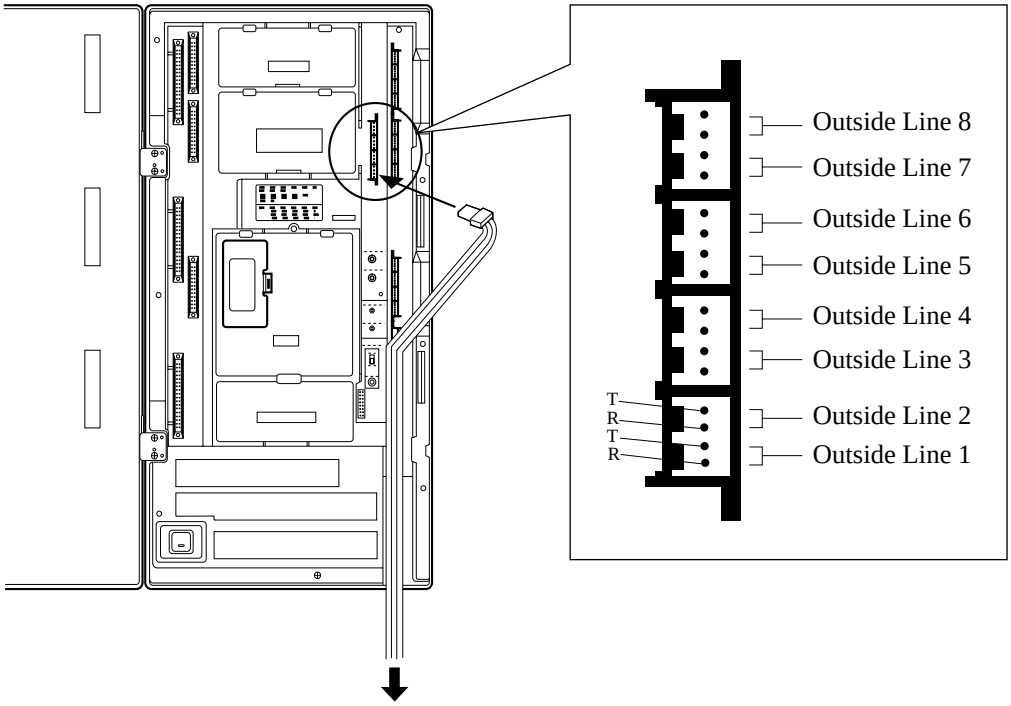
2. Insert the plug into an outside line jack in the main unit.
3. Connect the line cord to the terminal board or the Central Office jack.

KX-TD816



To Terminal Board or Modular Jacks from the Central Office

KX-TD1232

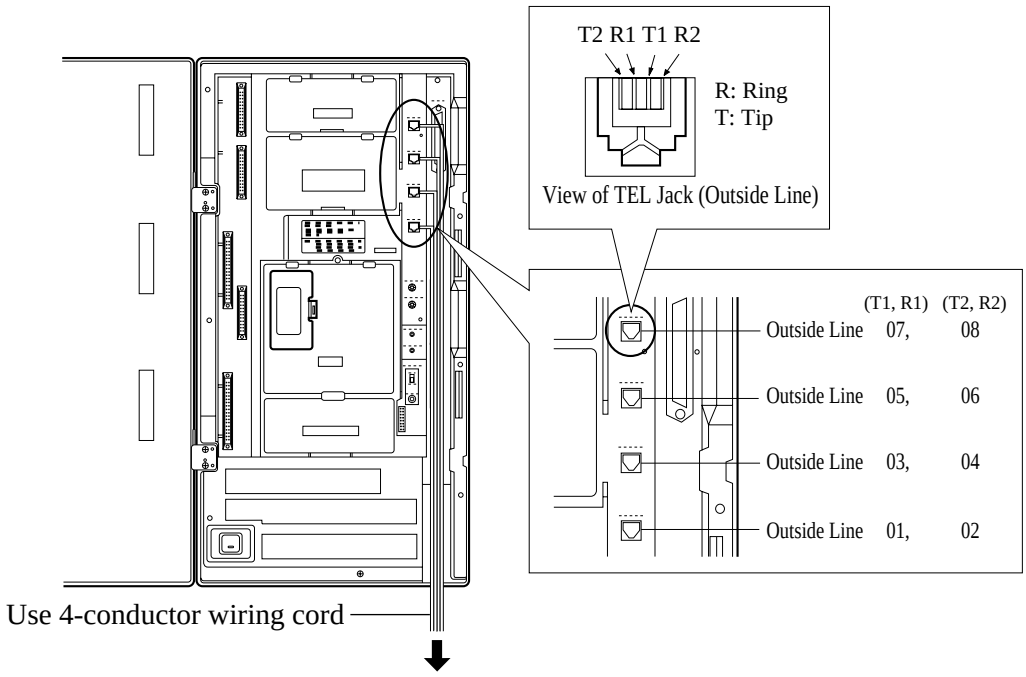


To Terminal Board or Modular Jacks from the Central Office

Method 2: Using Modular Connector (KX-TD1232BX/HK/X)

Connection

1. Insert the modular plugs of the telephone line cords (4-conductor wiring) into the modular jacks on the system.
2. Connect the line cord to the terminal board or the Central Office jack.



Notice

- Use twisted pair cable for installation.
- Mis-connection may cause the system to operate improperly. See Section 5.1.1 Installation and 5.1.2 Connection.

2.3.2 Extension Connection

There are four methods to perform Extension Connection, using a 4-pin connector, a 6-pin connector and an Amphenol Connector. Which method should be used depends on the model number of the system as shown below.

Model number	Connector to be used
KX-TD816	4-pin Connector
KX-TD1232DBX/ML KX-TDN1232	6-pin Connector
KX-TD1232BX/HK/X	Amphenol Connector

Maximum Cabling Distance

The maximum length of the extension line cord (twisted cable) which connects the system and the extension is as follows:

	Diameter of the line	Max. length
Single Line Telephone	22 AWG 24 AWG 26 AWG	1798 m 1128 m 698 m
Proprietary Telephone / Console	22 AWG 24 AWG 26 AWG	360 m 229 m 140 m

Telephone Wiring for KX-TD816

2 or 4-conductor wiring is required for each extension as listed below. There are four pins for possible connection: "T", "R", "D1" and "D2".

T: Tip
R: Ring
D1: Data 1
D2: Data 2

Telephone	Wiring
Single Line telephone	1 pair wire (T, R)
Digital proprietary telephone (e.g. KX-T7436, KX-T7235)	1 pair wire (D1, D2) or 2 pair wire (D1, D2, T, R) for eXtra Device Port
Analogue proprietary telephone (e.g. KX-T7030, KX-T7130)	2 pair wire (D1, D2, T, R)
Console (e.g. KX-T7440, KX-T7240)	1 pair wire (D1, D2)

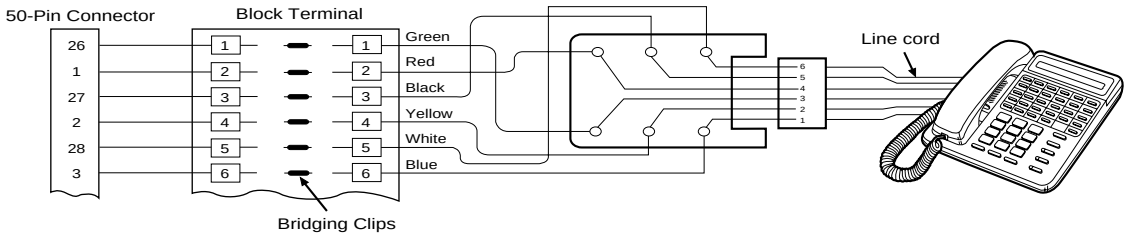
Telephone Wiring for KX-TD1232

2, 4 or 6-conductor wiring is required for each extension as listed below. There are six pins for possible connection: "T", "R", "D1", "D2", "P1" and "P2".

T: Tip
R: Ring
D1: Data 1
D2: Data 2
P1: 3 Pair Voice (OHCA)
P2: 3 Pair Voice (OHCA)

Telephone	Wiring
Single Line telephone	1 pair wire (T, R)
Digital proprietary telephone (e.g. KX-T7436, KX-T7235)	1 pair wire (D1, D2) or 2 pair wire (D1, D2, T, R) for eXtra Device Port
Analogue proprietary telephone except KX-T7130 (e.g. KX-T7020, KX-T7030)	2 pair wire (D1, D2, T, R)
KX-T7130 Analogue proprietary telephone	3 pair wire* (D1, D2, T, R, P1, P2)
Console (e.g. KX-T7440, KX-T7240)	1 pair wire (D1, D2)

***3-pair twisted cabling**



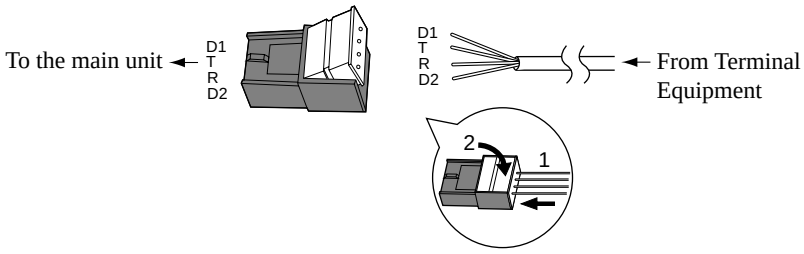
Method 1: Using 4-pin Connector (for KX-TD816)

Connection

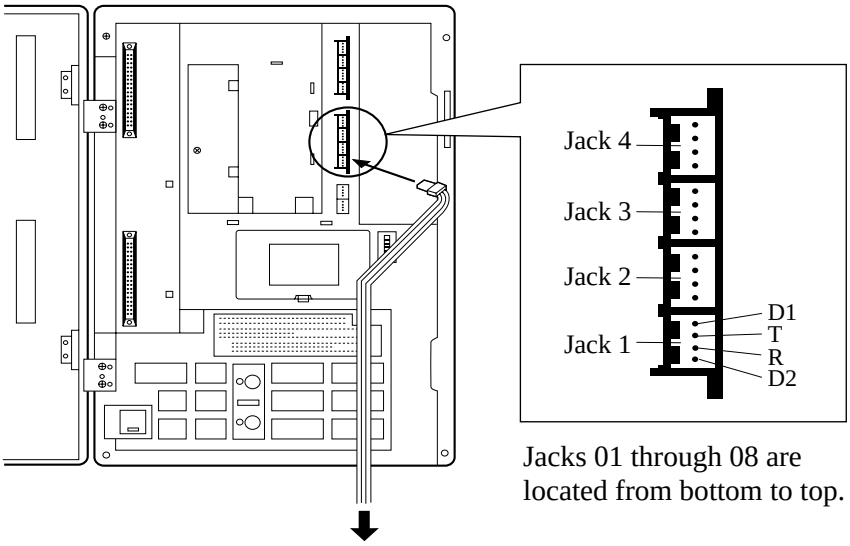
1. Prepare the required plugs. Eight 4-pin plugs are included to connect extension lines.

Note

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



2. Insert the plug into an extension jack in the main unit.



Jacks 01 through 08 are located from bottom to top.

Method 2: Using 6-pin Connector (for KX-TD1232DBX/ML, KX-TDN1232)

Wire Specifications

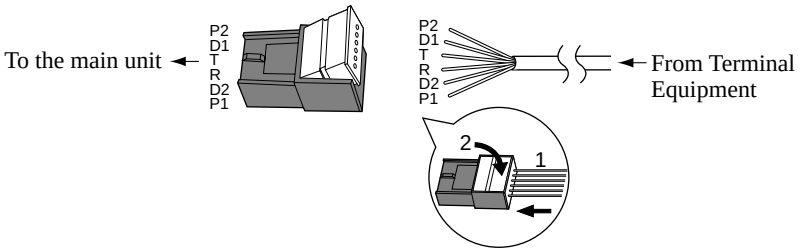
Wire	Solid wire
Diameter of conductor	ø 0.4 mm – ø 0.65 mm (22, 24, 26 AWG)
Diameter including coating	ø 0.66 mm – ø 1.05 mm

Connection

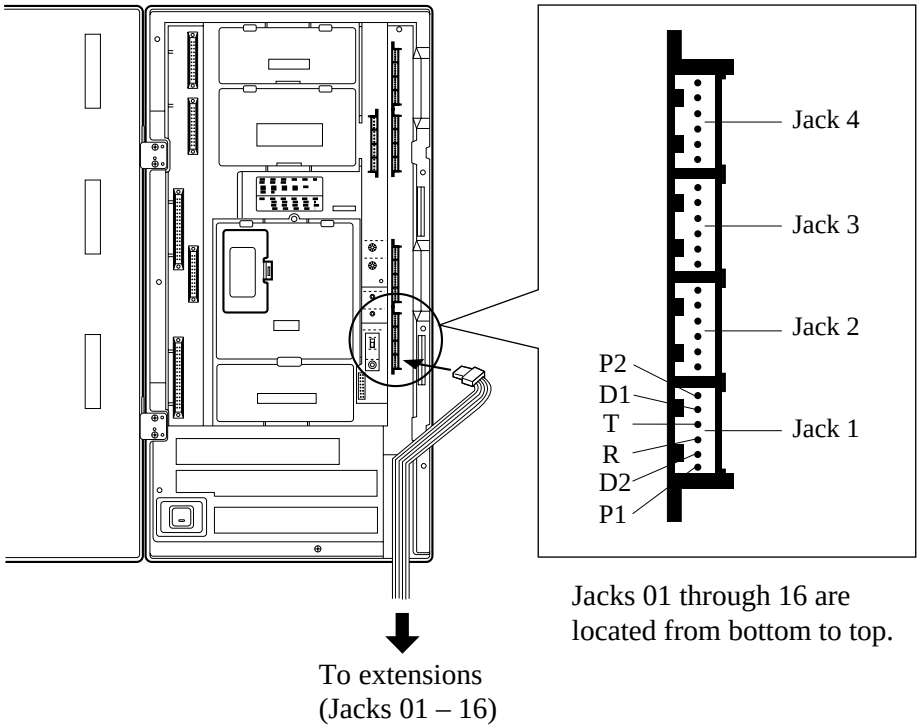
1. Prepare the required plugs. Sixteen 6-pin plugs are included to connect extension lines.

Note

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



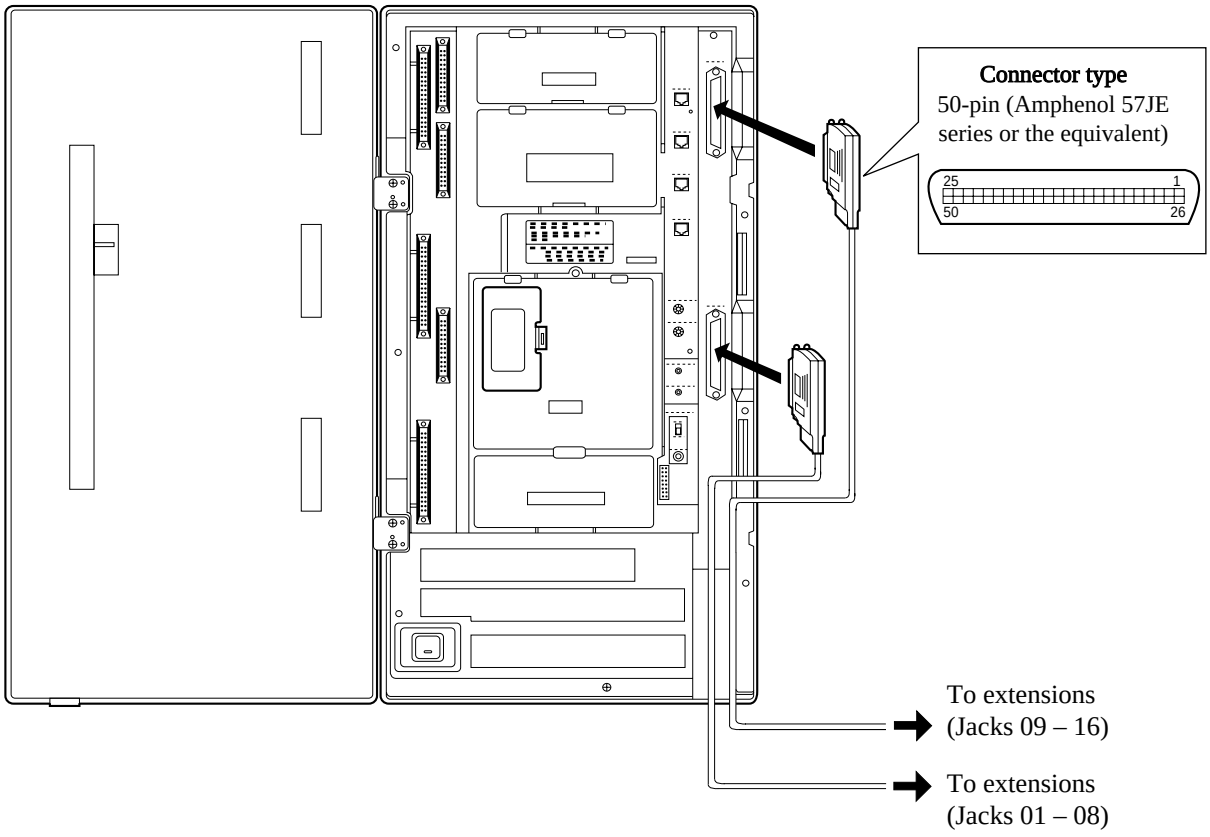
2. Insert the plug into an extension jack in the main unit.



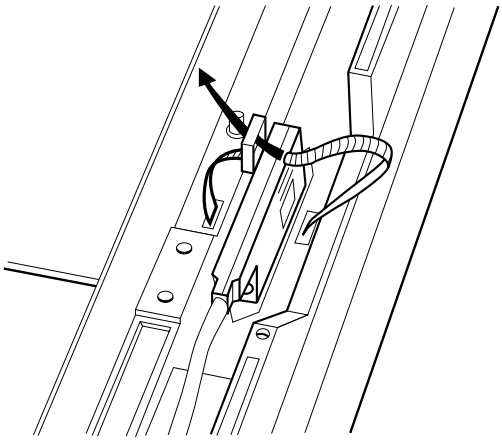
Method 3: Using Amphenol Connector (for KX-TD1232BX/HK/X)

Connection

1. Insert the 50-pin connector to the Extension Jack as shown.
2. Connect the wire cords to the appropriate connector pins and the terminal equipment. Refer to the Telephone Wiring (Page 50) and Pin Number Chart (Page 53).



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

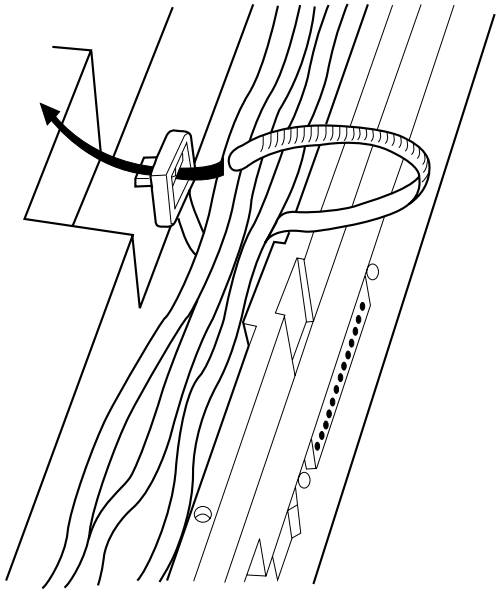


Pin Number Chart

Pin No.	EXTN. 01-08		EXTN. 09-16		8EXTN.		8EXTN.	
26		T		T		T		T
1		R		R		R		R
27	Jack	D1	Jack	D1	Jack	D1	Jack	D1
2	No.01	D2	No.09	D2	No.17	D2	No.25	D2
28		P1		P1		P1		P1
3		P2		P2		P2		P2
29		T		T		T		T
4		R		R		R		R
30	Jack	D1	Jack	D1	Jack	D1	Jack	D1
5	No.02	D2	No.10	D2	No.18	D2	No.26	D2
31		P1		P1		P1		P1
6		P2		P2		P2		P2
32		T		T		T		T
7		R		R		R		R
33	Jack	D1	Jack	D1	Jack	D1	Jack	D1
8	No.03	D2	No.11	D2	No.19	D2	No.27	D2
34		P1		P1		P1		P1
9		P2		P2		P2		P2
35		T		T		T		T
10		R		R		R		R
36	Jack	D1	Jack	D1	Jack	D1	Jack	D1
11	No.04	D2	No.12	D2	No.20	D2	No.28	D2
37		P1		P1		P1		P1
12		P2		P2		P2		P2
38		T		T		T		T
13		R		R		R		R
39	Jack	D1	Jack	D1	Jack	D1	Jack	D1
14	No.05	D2	No.13	D2	No.21	D2	No.29	D2
40		P1		P1		P1		P1
15		P2		P2		P2		P2
41		T		T		T		T
16		R		R		R		R
42	Jack	D1	Jack	D1	Jack	D1	Jack	D1
17	No.06	D2	No.14	D2	No.22	D2	No.30	D2
43		P1		P1		P1		P1
18		P2		P2		P2		P2
44		T		T		T		T
19		R		R		R		R
45	Jack	D1	Jack	D1	Jack	D1	Jack	D1
20	No.07	D2	No.15	D2	No.23	D2	No.31	D2
46		P1		P1		P1		P1
21		P2		P2		P2		P2
47		T		T		T		T
22		R		R		R		R
48	Jack	D1	Jack	D1	Jack	D1	Jack	D1
23	No.08	D2	No.16	D2	No.24	D2	No.32	D2
49		P1		P1		P1		P1
24		P2		P2		P2		P2
50								
25								

Note

- "8EXTN" in the table indicates an extension expansion area for 8-Station Line Unit (KX-TD170). System Programming is required for card location identification. *<SYS PRG [109]>*
- 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. See 5.1.1 Installation and 5.1.2 Connection.
- Up to four consoles (e.g. KX-T7440) can be installed 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 proprietary telephones by System Programming. *<SYS PRG [007]>*
- After completing all the required inside cabling, including outside lines, extensions, external pagers and external music sources, fasten the cables with the nylon tie (included) as shown.



Programming Guide References

[007] Console Port and Paired Telephone Assignment

[109] Expansion Unit Type

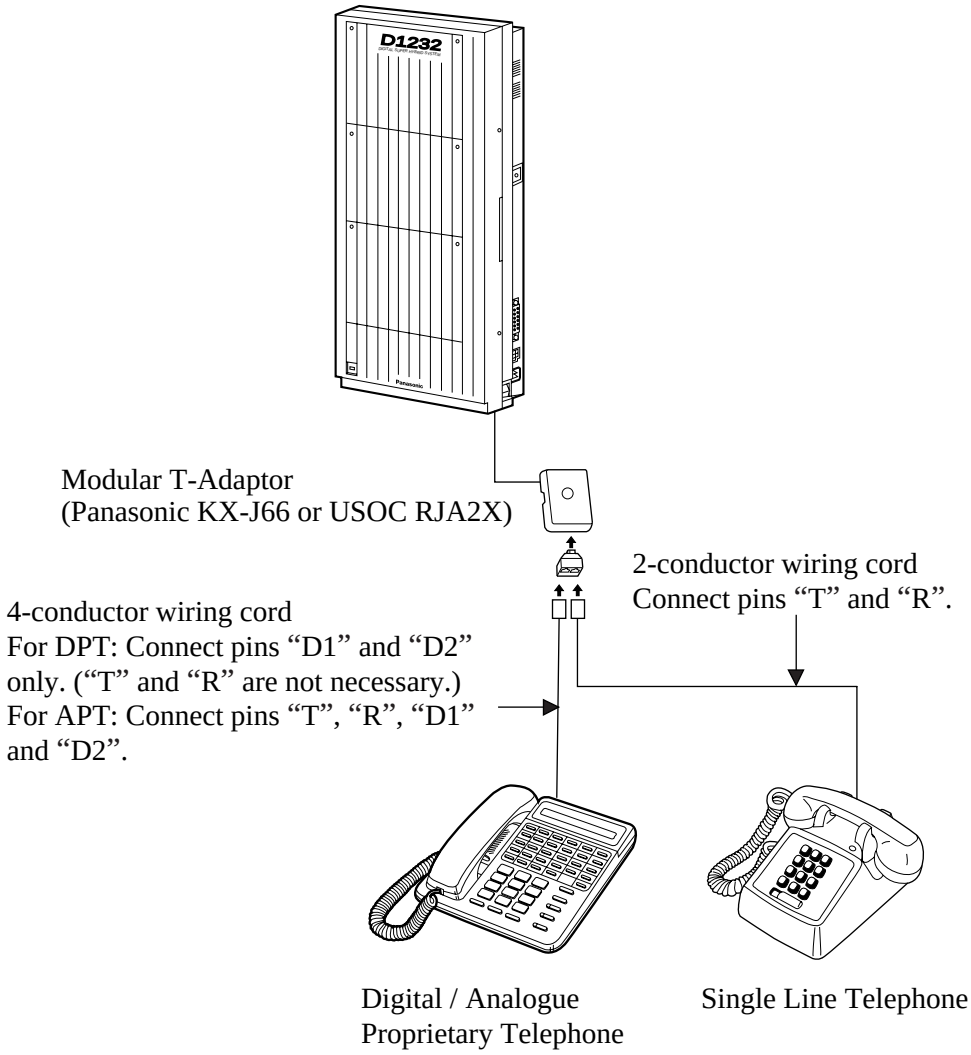
Features Guide References

Console

2.3.3 Parallelled Telephone Connection

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

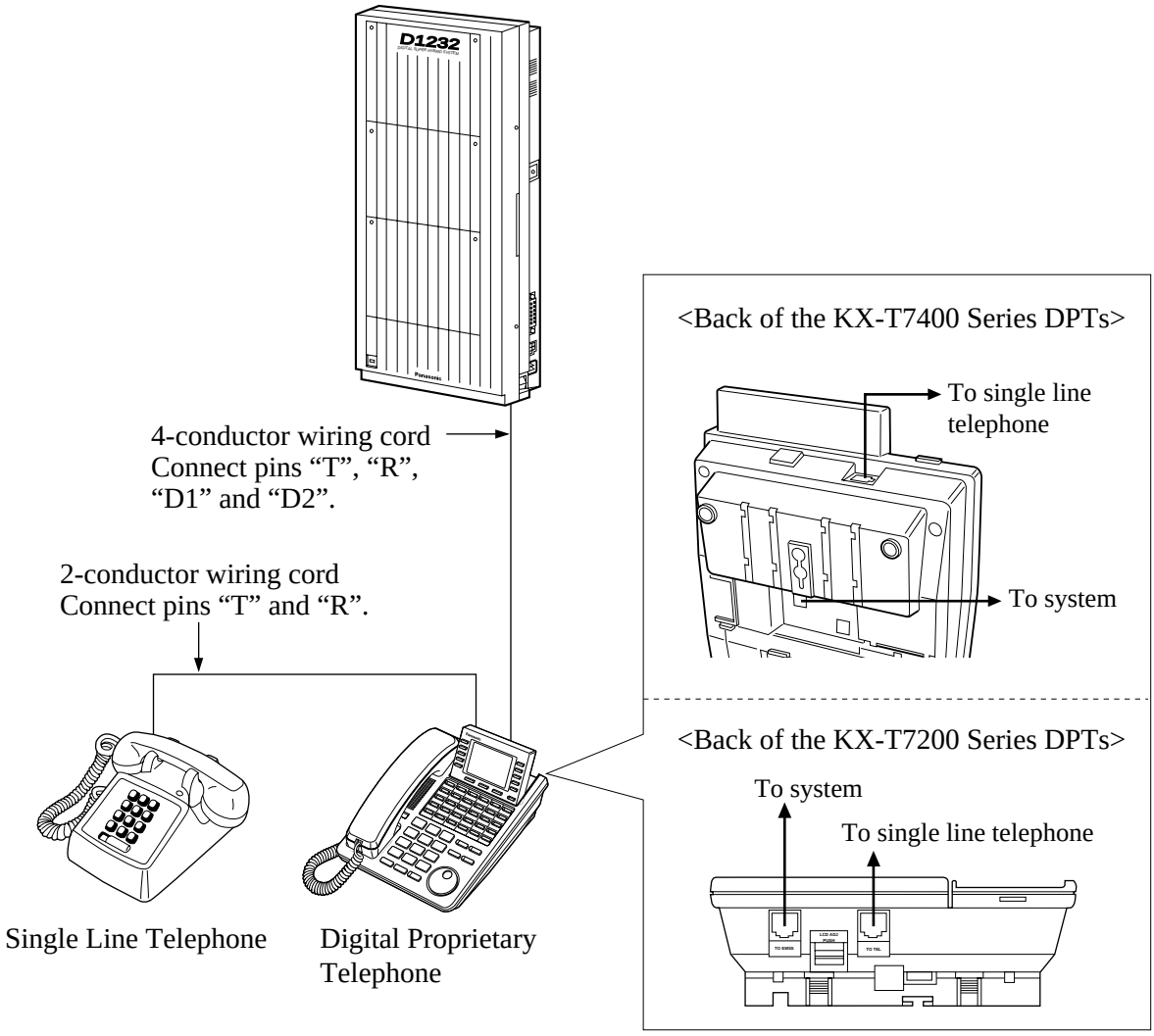
Method 1: Using a Modular T-Adaptor



Note

- The KX-TD1232 is illustrated as the main unit.
- The 6-conductor wiring cord (and the Modular T-Adaptor KX-J36) is required if the proprietary telephone KX-T7130 is to be used for parallel connection for KX-TD1232.

Method 2: For Digital Proprietary Telephones only



Note

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

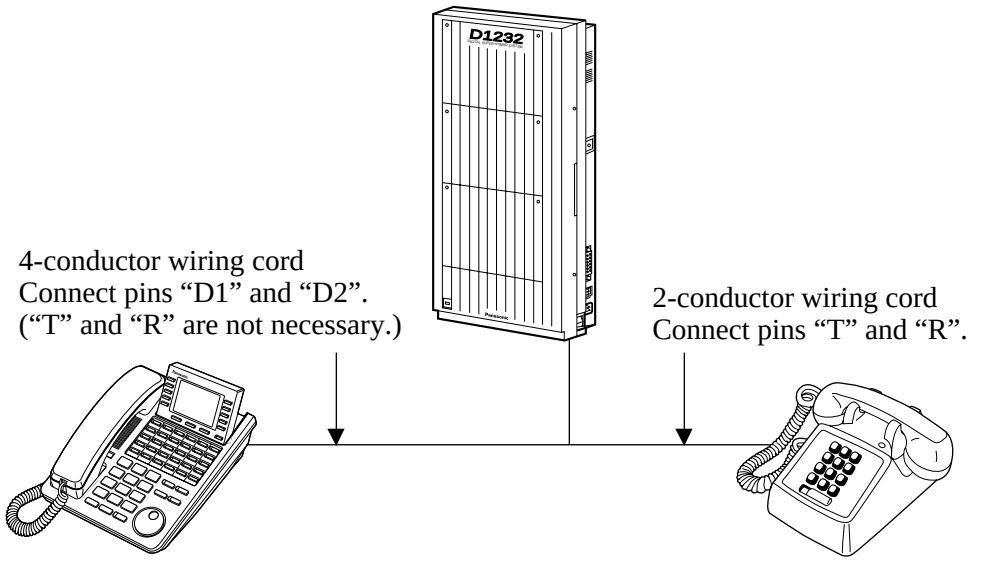
Features Guide References

Parallelled Telephone

2.3.4 EXtra Device Port (XDP) Connection

A digital proprietary telephone 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 for this jack.

Method 1



Note

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

Method 2

Section 2.3.3 Parallelled Telephone Connection, Method 2: for Digital Proprietary Telephone only is also available for XDP connection.

Programming Guide References

[600] EXtra Device Port

Features Guide References

EXtra Device Port (XDP)

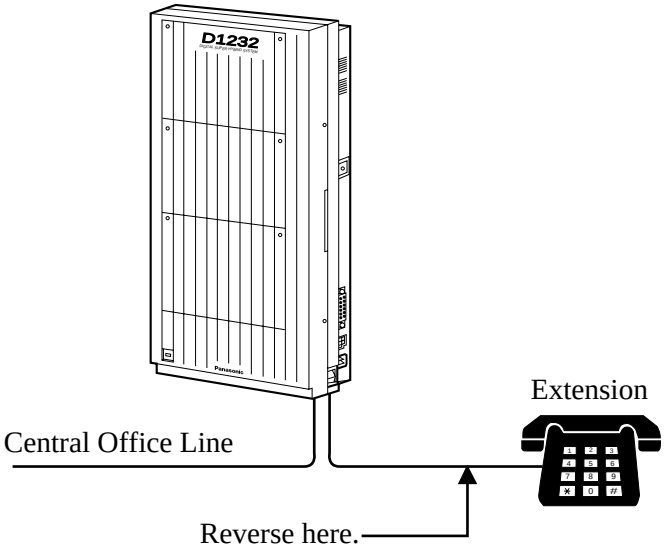
2.3.5 Polarity Sensitive Telephone Connection

If your telephone is polarity sensitive, follow the procedure below:

1. Complete all the required extension wiring.

2. Confirm that dialling can be done from all the extensions using a touch-tone telephone. If dialling fails, the polarity between the extension and the system must be reversed.

3. Reverse as shown.

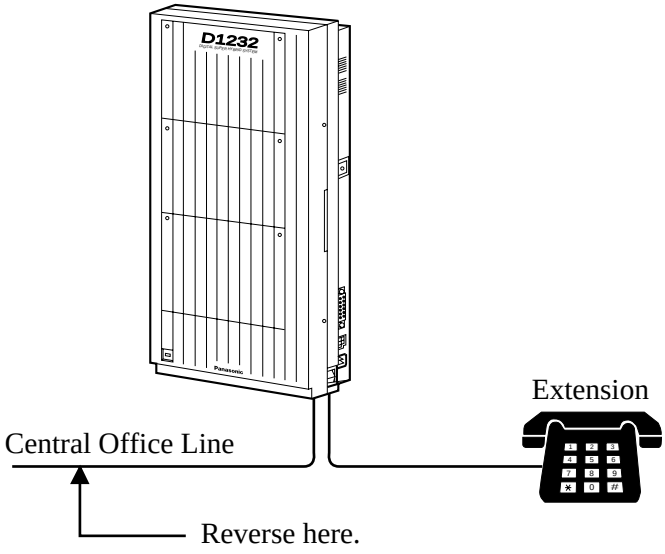


4. Set the Power Switch to "OFF" position.

5. Connect all outside lines.

6. Confirm that dialling can be done on the following extensions using a tone telephone.
KX-TD816
Extension (T, R) of jack 01: Outside line 01
Extension (T, R) of jack 02: Outside line 02
Extension (T, R) of jack 09 and 10 (Extension Expansion Card): Outside line 5 and 6
KX-TD1232
Extension (T, R) of jack 01: Outside line 01
Extension (T, R) of jack 02: Outside line 02
Extension (T, R) of jack 09: Outside line 03
Extension (T, R) of jack 10: Outside line 04
Extensions (T, R) of jacks 17 and 18 (Extension Expansion Card 1): Outside line 09 and 10
(**Note:** Extensions of jacks 09 and 10 for KX-TD816, and 17 and 18 for KX-TD1232 depend on the Power Failure Transfer connection. For details, refer to Section 2.5.1 Auxiliary Connection for Power Failure Transfer.)
If dialling fails, the polarity between the system and the outside line must be reversed.

7. Reverse as shown.



8. Every time an extension telephone is replaced, repeat the above procedure.

Note

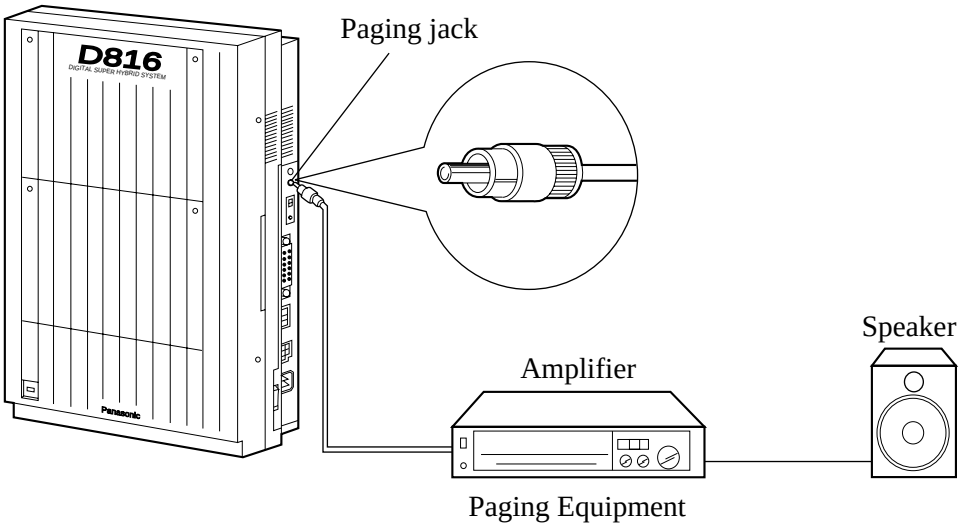
The KX-TD1232 is illustrated as the main unit.

2.3.6 External Pager (Paging Equipment) Connection

KX-TD816

One external pager (user-supplied) can be connected to the KX-TD816 as illustrated below. Use an RCA connector and shielded cable.

- Output impedance: 600 Ω
  Maximum length of the cable
  AWG 18 – 22: Under 10 m

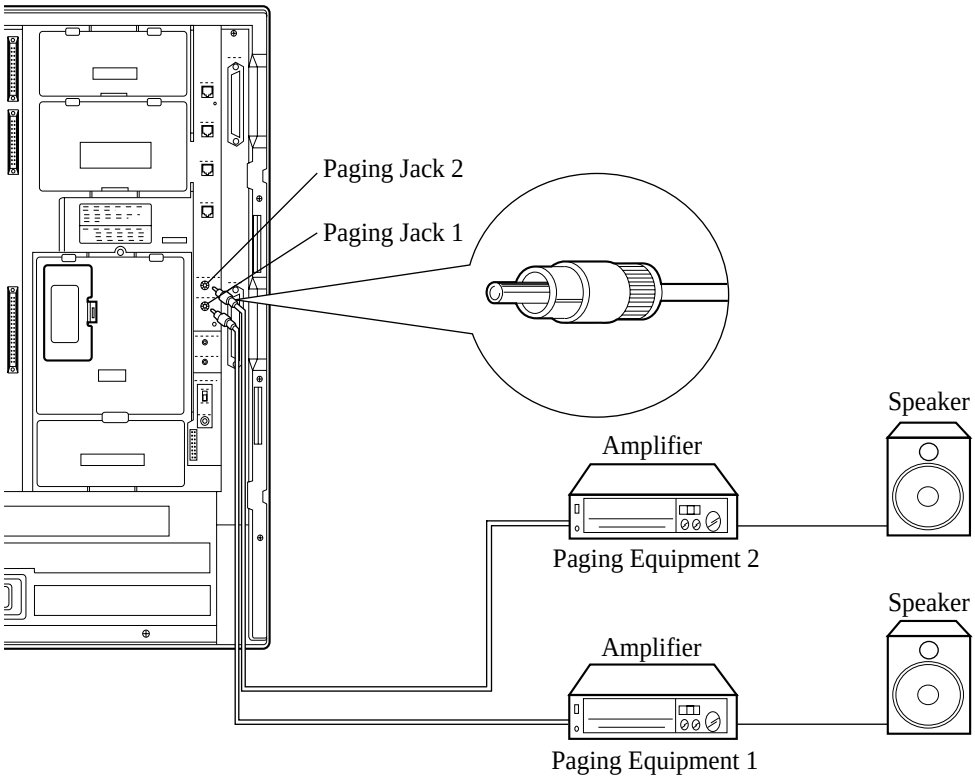


KX-TD1232

Up to two external pagers (user-supplied) can be connected to the KX-TD1232 per system as illustrated below.

Use an RCA connector and shielded cable.

- Output impedance: 600 Ω
  Maximum length of the cable
  AWG 18 – 22: Under 10 m



Note

- System Connection[*1] permits a maximum of four external pagers.
  It is programmable which external pager will send background music <*SYS PRG [804]*> and whether all the pagers will generate a confirmation tone <*SYS PRG [805]*>.
- To adjust the sound level of the pagers, use the volume control on the amplifiers.

Features Guide References

Background Music (BGM)

Paging

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

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

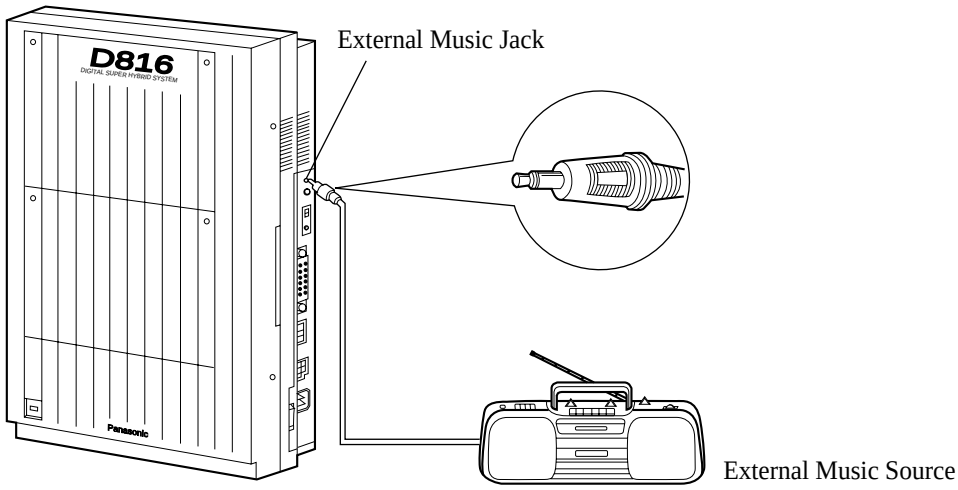
2.3.7 External Music Source Connection

KX-TD816

One music source such as a radio (user-supplied) can be connected to the KX-TD816 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 the cable
  AWG 18 – 22: Under 10 m

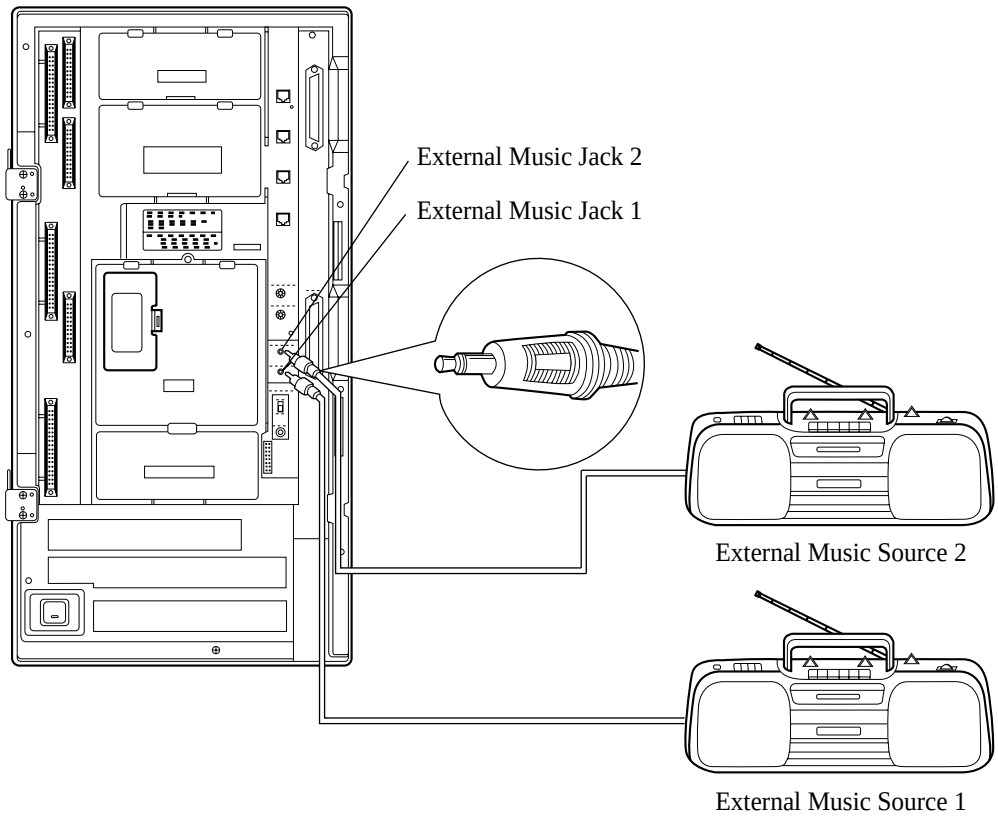


KX-TD1232

Up to two music sources such as a radio (user-supplied) can be connected to the KX-TD1232 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 the cable
  AWG 18 – 22: Under 10 m



Note

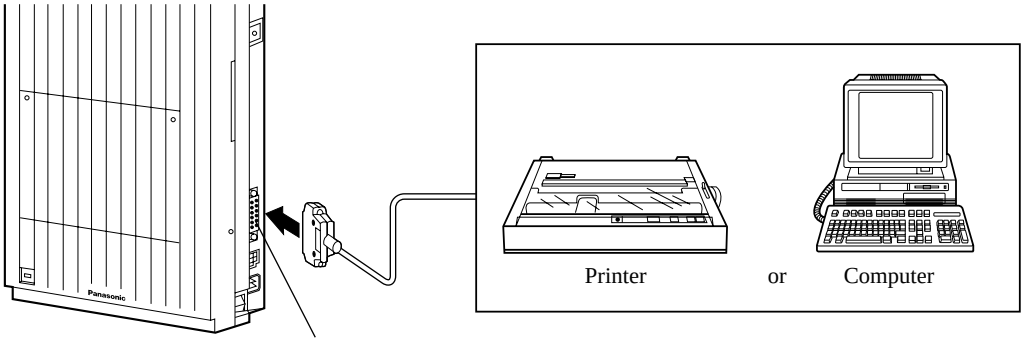
- By default setting, Music Source 1 is used for Music on Hold and Background Music (BGM). *<SYS PRG [803]>*
- The system is provided with an internal music source. By default setting, an internal music source is used as Music Source 1. System Programming is required to use an external music source as Music Source 1. *<SYS PRG [990], Area 02-Bit 10>*
- To adjust the sound level of the Music on Hold, use the volume control on the external music source.

Features Guide References

Background Music (BGM)

2.3.8 Printer and PC Connection

A user-supplied printer or personal computer (PC) can be connected to the system. These are used to print out or refer to the Station Message Detail Recording (SMDR) call records and system programming data.
Connect the printer cable or the PC cable to the Serial Interface (RS-232C) connector. The cable must be shielded and the maximum length is 2 m.



Note

The KX-TD1232 is illustrated as the main unit.

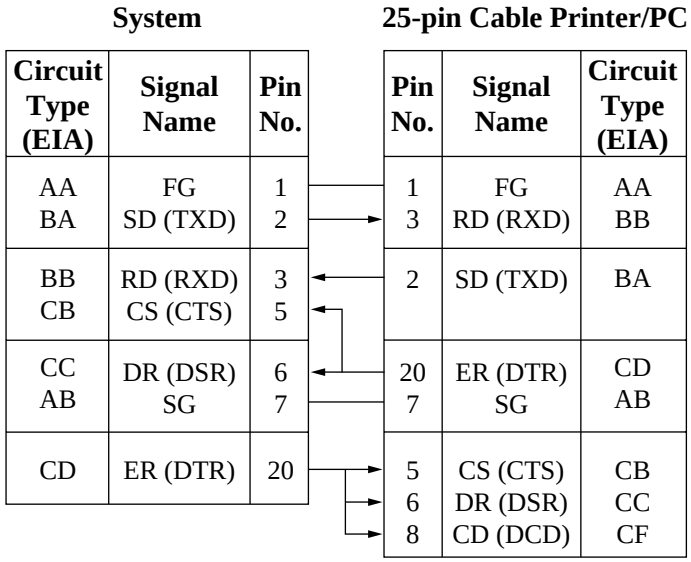
Arrange cables so that the printer will be connected to the system as shown in the chart on the following page.

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

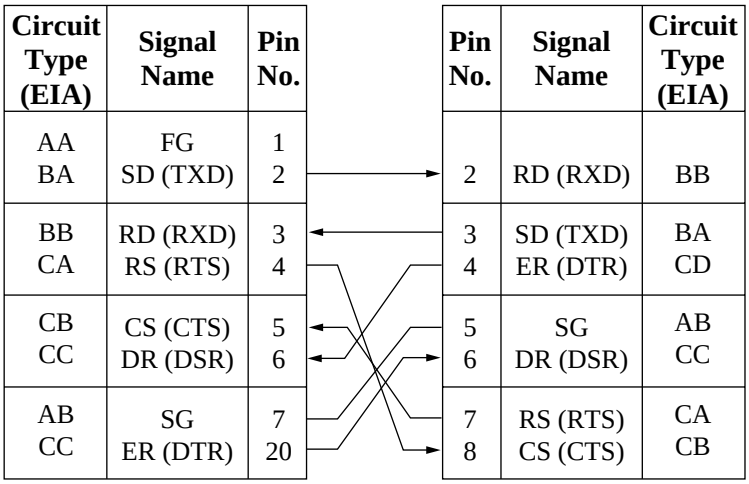
Connection Chart for Printer / IBM[*1] Personal Computer

If you connect a printer or a PC with a 25-pin cable, follow the chart below.



System			25-pin Cable 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

If you connect a printer or an IBM-PC with a 9-pin cable, follow the chart below.



System			9-pin Cable Printer/IBM-PC		
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
CC	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.

[*1] IBM is either a registered trademark or a trademark of International Business Machines Corporation in the United States and/or other countries.

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 Guide References

[800] SMDR Incoming / Outgoing Call Log Printout

[801] SMDR Format

[802] System Data Printout

[806-807] Serial Interface (RS-232C) Parameters

[990] System Additional Information

Features Guide References

Station Message Detail Recording (SMDR)

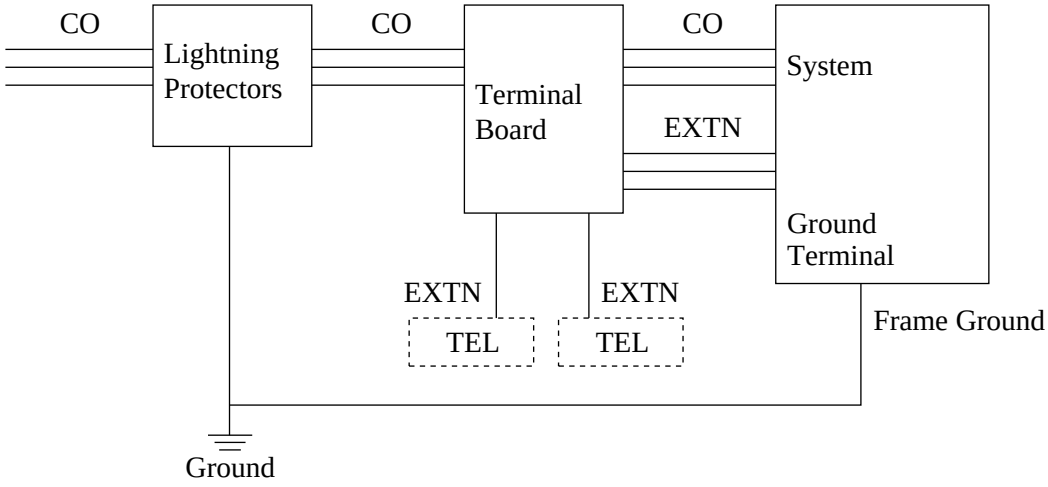
System Programming and Diagnosis with Personal Computer

2.3.9 Installation of Lightning Protectors

Overview

A lightning protector is a device to be installed on an outside 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. Trouble due to lightning surges has 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 V. 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



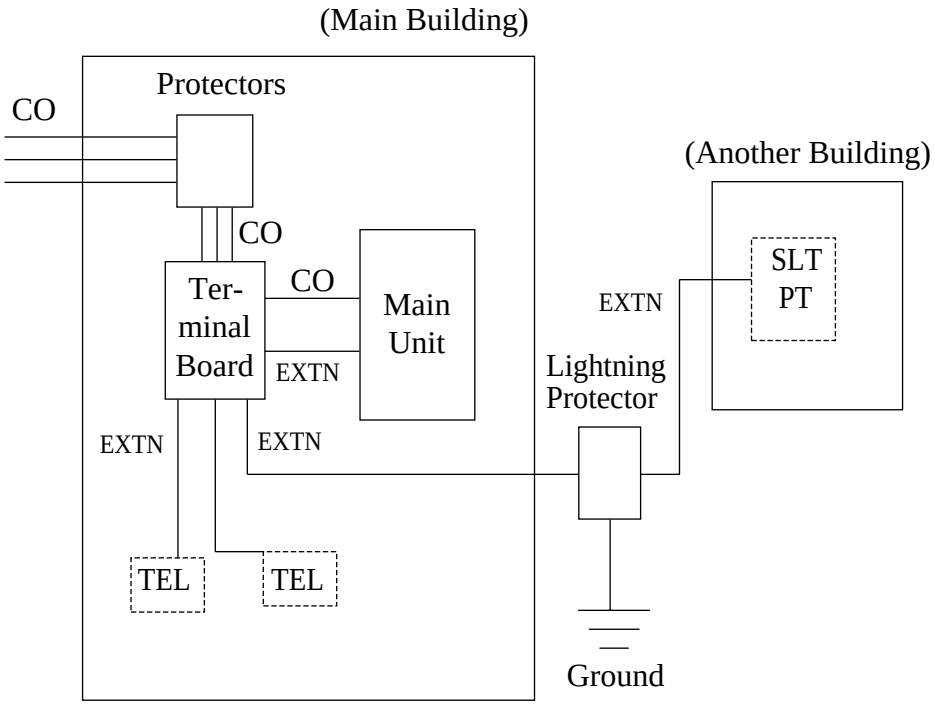
CO: Central Office (Outside line)
EXTN: Extension line
TEL: Telephone

Outside Installation Diagram

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

a) Install the extension wire underground.

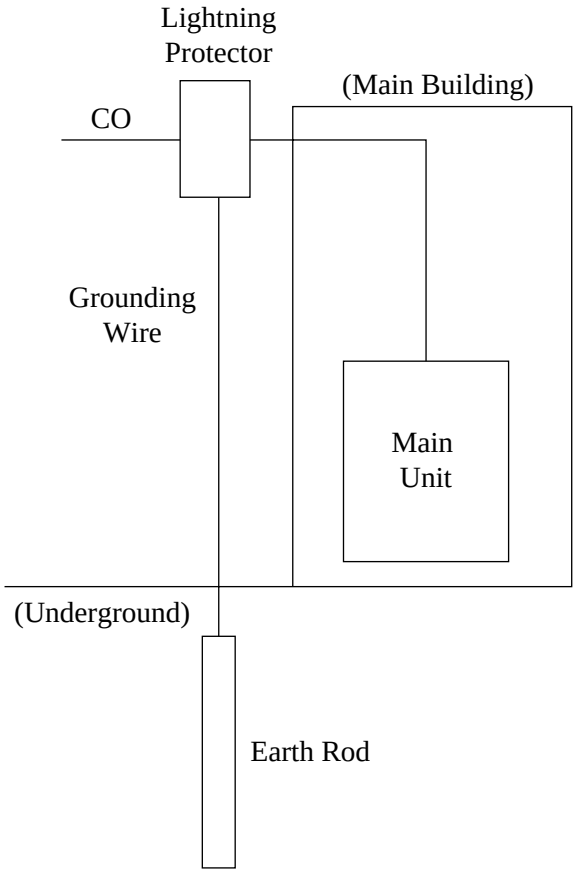
b) Use a conduit to protect the wire.



Note

The lighting protector for an extension is different from that for outside line.

Earth Rod Installation Diagram



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 16 AWG
6. Length of the grounding wire: As short as possible

Note

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

2.4 Installation of Optional Cards and Unit

2.4.1 Location of Optional Cards and Units

Precaution

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 cards.

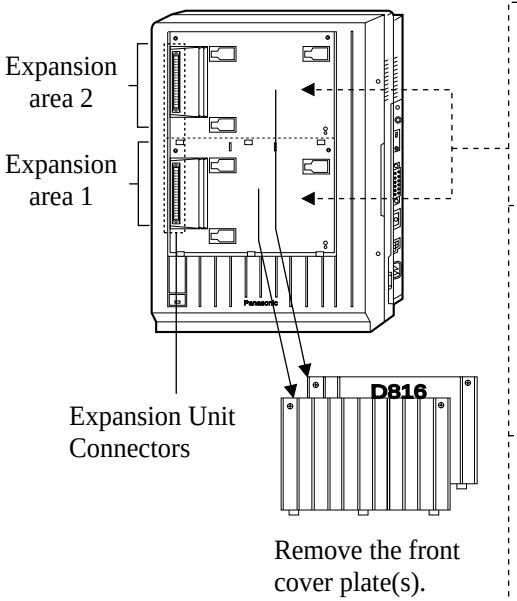
Expansion Units

KX-TD816

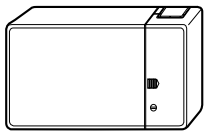
The following expansion units can be installed to any of the two expansion areas.

If you use the KX-TD170 or KX-TD174 with the KX-TD197 / KX-TD198, you must use the KX-TD170-② or KX-TD174-② . The former unit does not work properly with the KX-TD197 / KX-TD198. Please see the back of the unit and check "②" is marked.

Example

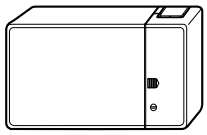


One extension line unit



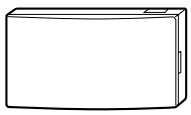
8-Station Line Unit, KX-TD170
or
16 SLT Line Circuit Unit, KX-TD174

One outside line unit



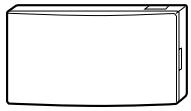
4-CO Line Unit, KX-TD180
or
4-E&M (TIE) Line Unit, KX-TD184
or
4-DID Line Unit, KX-TD185

One DISA Unit, KX-TD190:



A **High Speed Remote Card (KX-TD197)** can be installed into this unit.

One Remote Unit, KX-TD198:



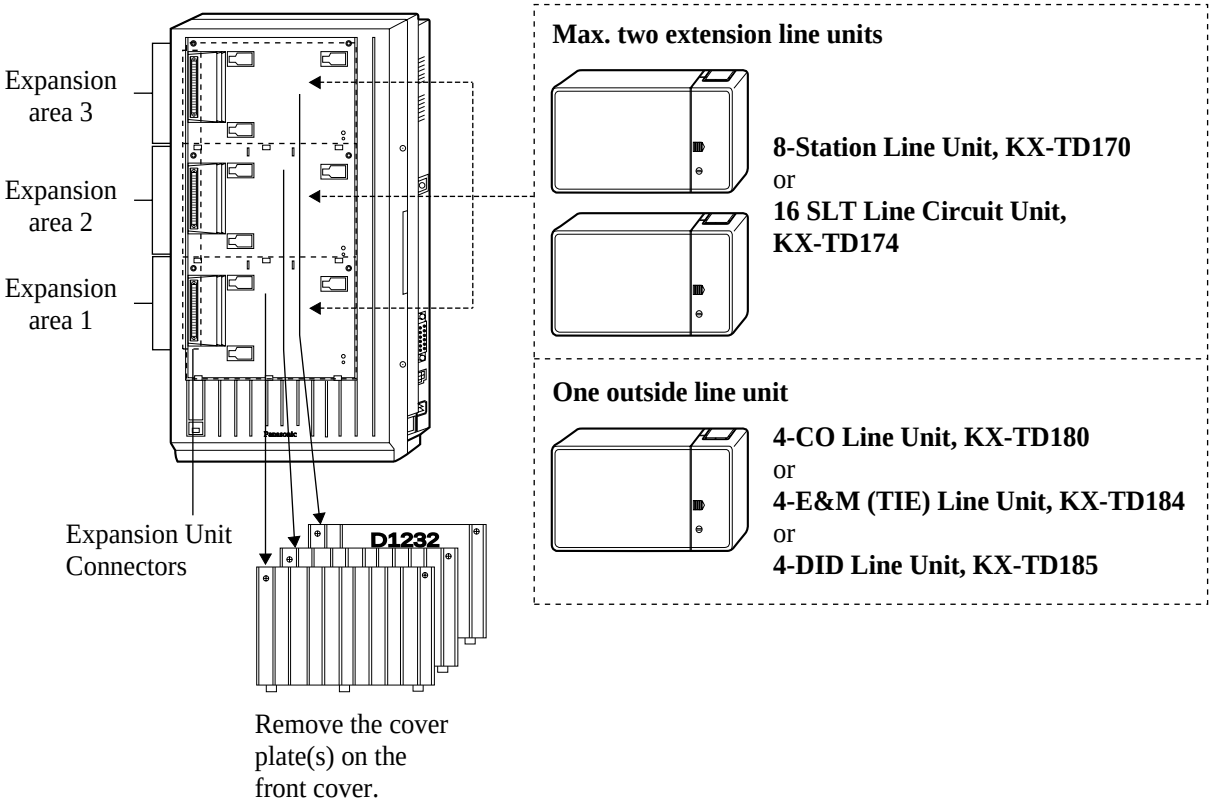
A **DISA Card (KX-TD199)** can be installed into this unit.

Note

- System Programming is required for expansion unit location. <*SYS PRG [109]*>
  Default:
  Area 1 = 4-CO Line Unit,
  Area 2 = 8-Station Line Unit.
- It is also possible to attach the line expansion unit to the DISA or Remote Unit and install them to the main unit.
- For unit combinations, refer to Section 1.4.2 Expansion Unit Combination.

KX-TD1232

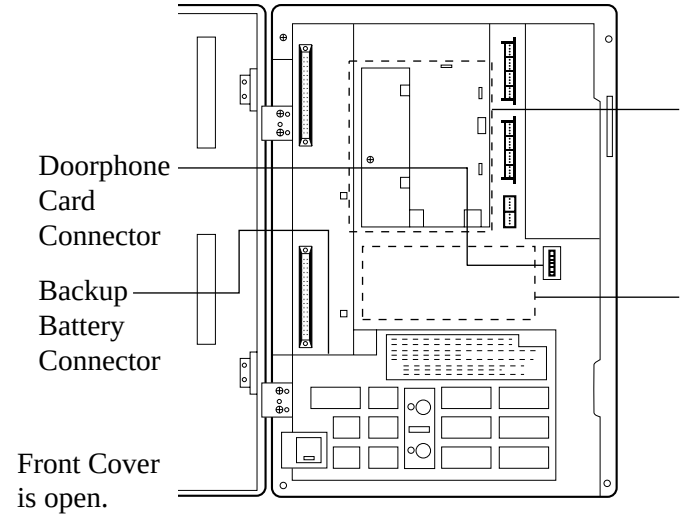
The following expansion units can be installed to any of the three expansion areas.



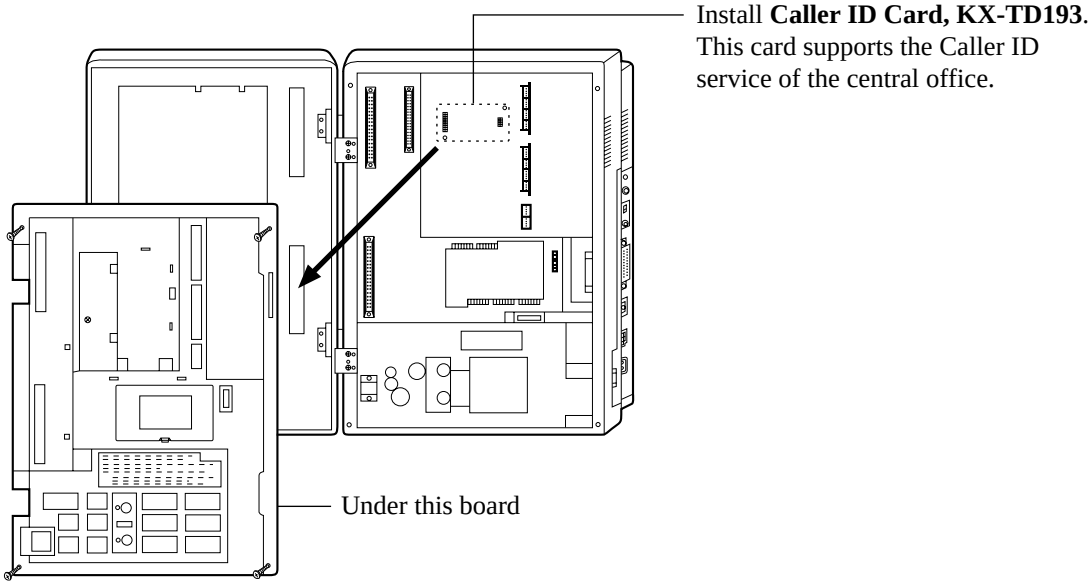
Note

- System Programming is required for expansion unit location. <*SYS PRG [109]*>
  Default:
  Area 1 = 4-CO Line Unit,
  Area 2 and 3 = 8-Station Line Unit.
- It is also possible to attach the line expansion unit to the DISA or Remote Unit and install them to the main unit.
- For unit combinations, refer to Section 1.4.2 Expansion Unit Combination.

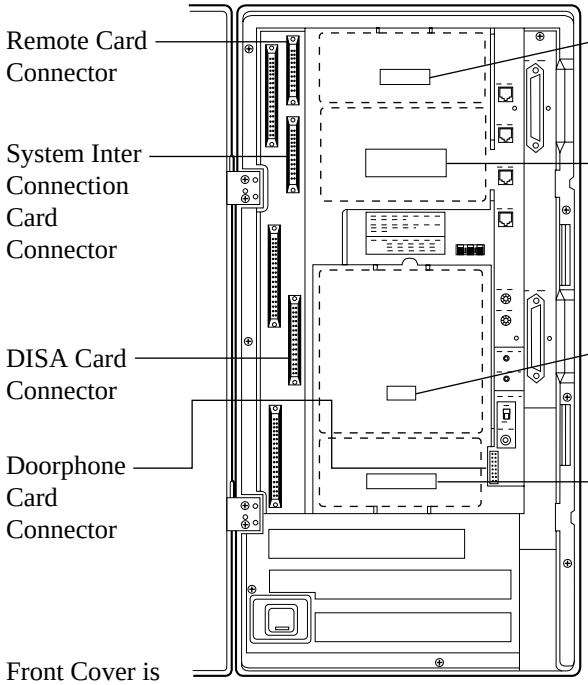
Backup Battery and Adaptor Card, Doorphone Card for KX-TD816



Caller ID Card for KX-TD816



Remote Card, System Inter Connection Card, DISA Card, Doorphone Card for KX-TD1232



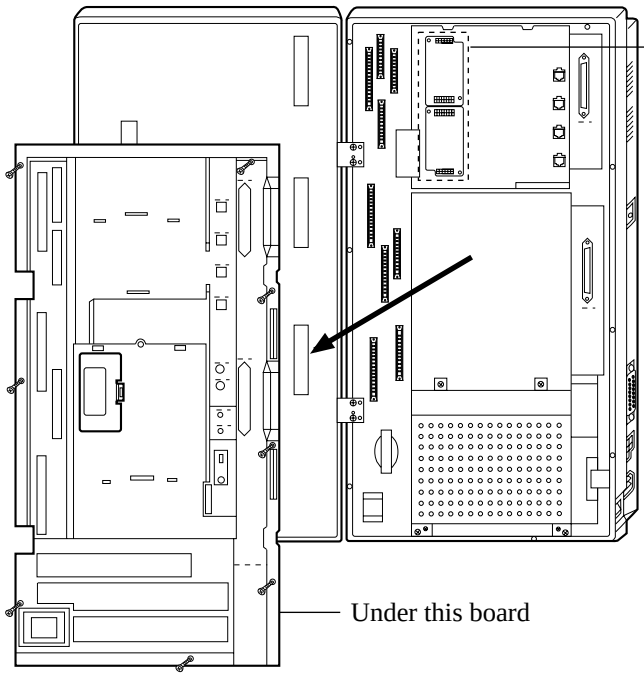
Install **Remote Card, KX-TD196,** or **High Speed Remote Card, KX-TD197.**
This card provides data communications between the system and a remote location.

Install **System Inter Connection Card, KX-TD192.**
This card connects two systems.

Install **DISA Card, KX-TD191.**
This card permits access to the system from outside tone telephones.

Install **Doorphone Card, KX-TD160.**
This card connects two doorphones and two door openers.

Caller ID Card for KX-TD1232

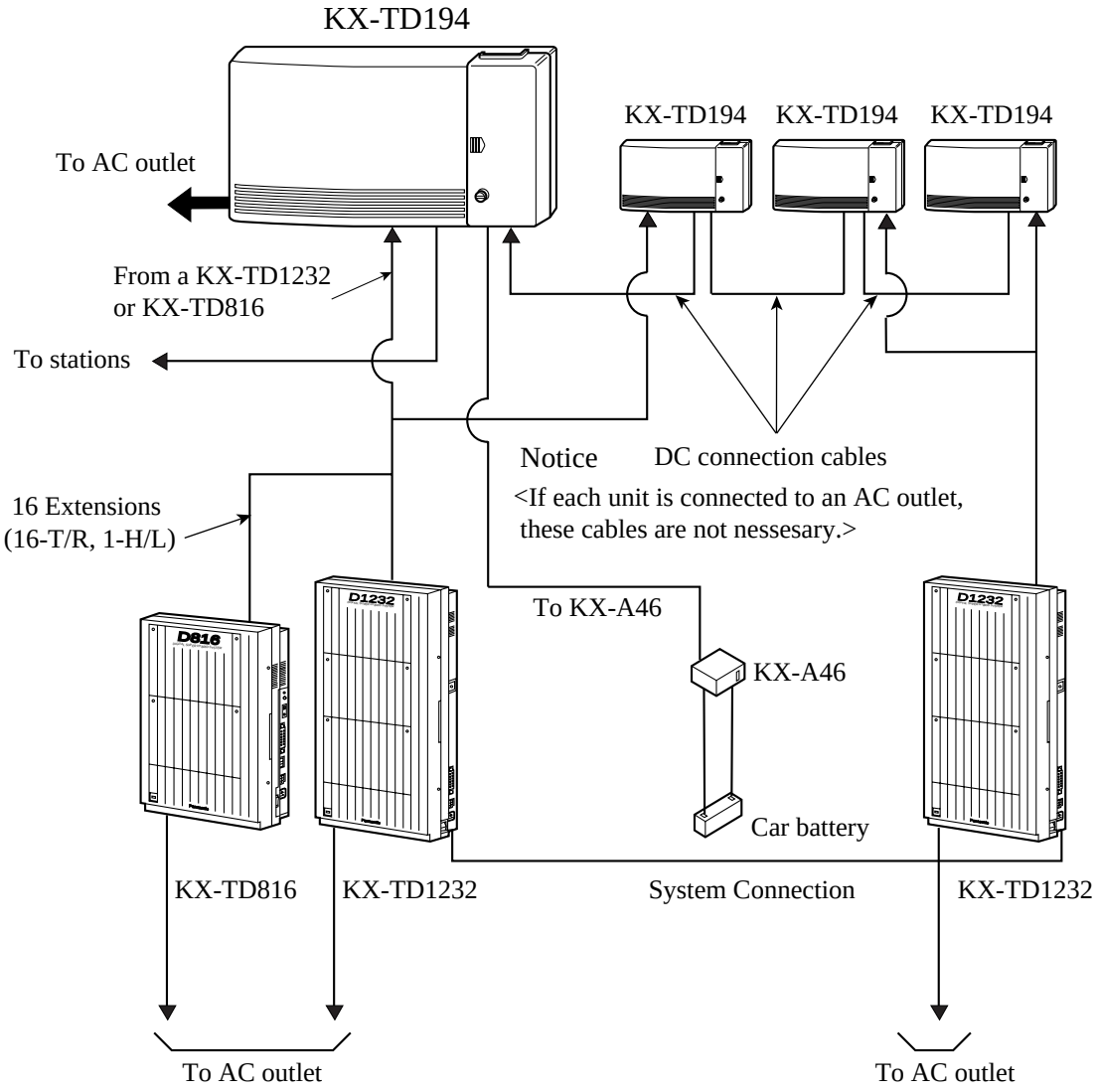


Install **Caller ID Card, KX-TD193**.
This card supports the Caller ID service of the central office.

SLT Message Waiting Lamp Adaptor Unit

One SLT Message Waiting Lamp Adaptor Unit (KX-TD194) for KX-TD816, and up to three SLT Message Waiting Lamp Adaptor Units for KX-TD1232 can be connected. This unit supports the Message Waiting feature for a single line telephone with a message waiting lamp. One adaptor supports 16 extensions.

Connection Example



Note

Do not connect more than four units with DC connection cables.

2.4.2 4-CO Line Unit Connection

To add four outside lines (outside lines 05 through 08 for KX-TD816, and outside lines 09 through 12 for KX-TD1232), use the optional 4-CO Line Unit (KX-TD180).
This unit can be installed to any of the expansion unit areas provided on the front of the main unit. For outside line expansion unit installation, see Section 2.4.7 Installing Expansion Unit.
System Programming is required for card location identification.

Programming Guide References

[109] Expansion Unit Type

2.4.3 4-E&M (TIE) Line Unit Connection

To add four E&M (TIE) lines (outside lines 05 through 08 for KX-TD816, and outside lines 09 through 12 for KX-TD1232), use the optional 4-E&M (TIE) Line Unit (KX-TD184).
This unit can be installed to any of the expansion unit areas provided on the front of the main unit. For outside line expansion unit installation, see Section 2.4.7 Installing Expansion Unit.
System Programming is required for card location identification.

Programming Guide References

[109] Expansion Unit Type

2.4.4 4-DID Line Unit Connection

To add four DID lines, use the optional 4-DID Line Unit (KX-TD185).

This unit adds DID lines with the capability to accept dial pulse, DTMF and MFC-R2 signalling. The following unit types can be selected according to your central office service.

- DID Line Unit with Pulse / DTMF
- DID Line Unit with MFC

This unit can be installed to any of the expansion unit areas provided on the front of the main unit. For outside line expansion unit installation, see Section 2.4.7 Installing Expansion Unit. System Programming is required for card location identification.

Programming Guide References

[109] Expansion Unit Type

2.4.5 8-Station Line Unit Connection

To add eight extensions (jack numbers 09 through 16 for KX-TD816, and jack numbers 17 through 24 or 25 through 32 for KX-TD1232), use the optional 8-Station Line Unit (KX-TD170). To add 16 extensions for KX-TD1232 (jack numbers 17 through 32), use two 8-Station Line Units.
This unit can be installed to any of the expansion unit areas provided on the front of the main unit. For extension expansion unit installation, see Section 2.4.7 Installing Expansion Unit.
System Programming is required for card location identification.

Programming Guide References

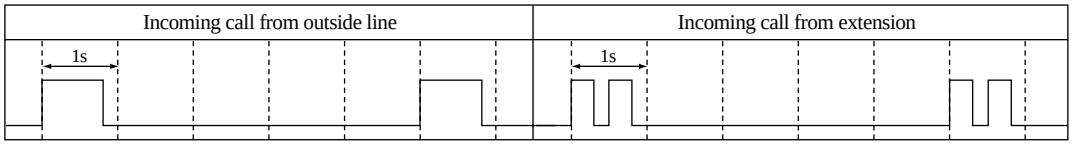
[109] Expansion Unit Type

2.4.6 16 SLT Line Circuit Unit Connection

To add eight extensions which contain two single line telephones, use the optional 16 SLT Line Circuit Unit (KX-TD174). The unit can support 16 single line telephones per unit. Each single line telephone in the same jack has different extension number so that it can act as completely different extension like an eXtra Device Port feature.
This unit can be installed to any of the expansion unit areas provided on the front of the main unit. For extension expansion unit installation, see Section 2.4.7 Installing Expansion Unit. System Programming is required for card location identification.

Note

- Installing this unit allows the eXtra Device Port setting to "Enable" automatically in system programming [600]. However, assigning "Disable" makes a single line telephone which is connected to the second jack (Jack xx-2) disable to use.
- This unit cannot support the proprietary telephone and Voice Mail Integration features.
- This unit has four DTMF receivers; two receivers in the first eight ports and two receivers in the last eight ports.
- The Ringing Patterns for all single line telephones which are connected to the system are changed as below;



Auxiliary Connection for Power Failure Transfer

When there is a power failure, the first two jacks on this unit can be connected to specific outside lines mentioned below. An auxiliary connection is required to implement this feature. For more information about the connection between an extension jack to an outside line, refer to Section 2.5 Auxiliary Connection for Power Failure Transfer.

Programming Guide References

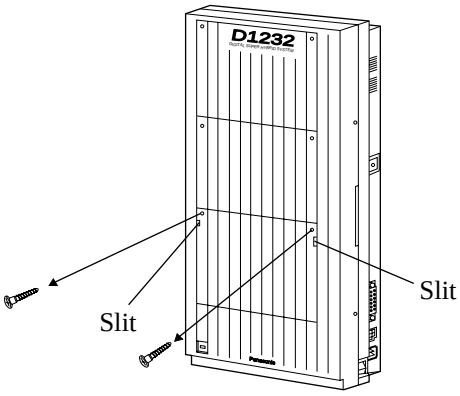
[109] Expansion Unit Type

[600] EXtra Device Port

2.4.7 Installing Expansion Unit

The following procedures can be used to install the optional expansion units.
The following steps 1 through 5 and 7 through 10 are the same for all expansion units. Step 6 is different for each unit.
The KX-TD1232 is illustrated as the main unit.

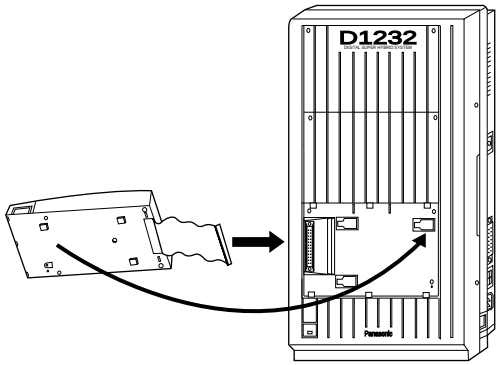
1. Loosen the two screws on the cover plate. Insert fingers into the slits to remove the cover plate.



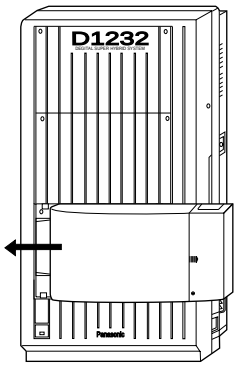
Note

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

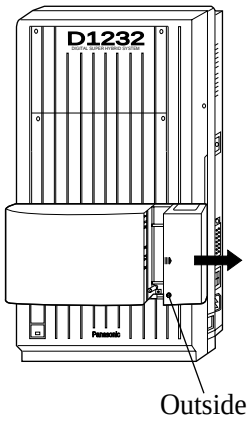
2. Connect the cabinet cord to the connector in the main unit firmly.



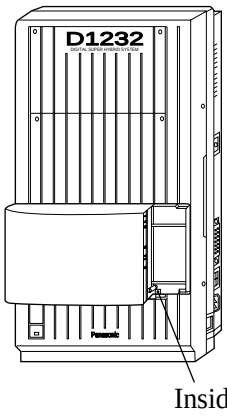
3. Hook the cabinet on the main unit and slide the cabinet to the left until it is secured.



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



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



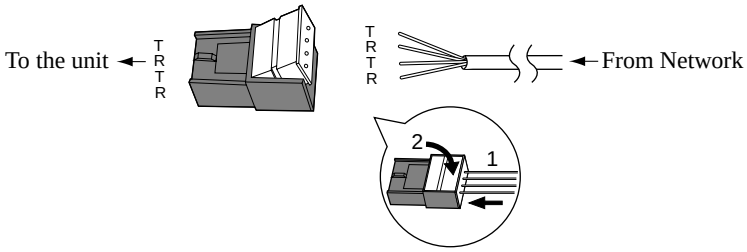
Note

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

6. (If a option is to be installed)

If a KX-TD180D (for KX-TD816, KX-TD1232DBX/ML, KX-TDN1232) is to be installed;

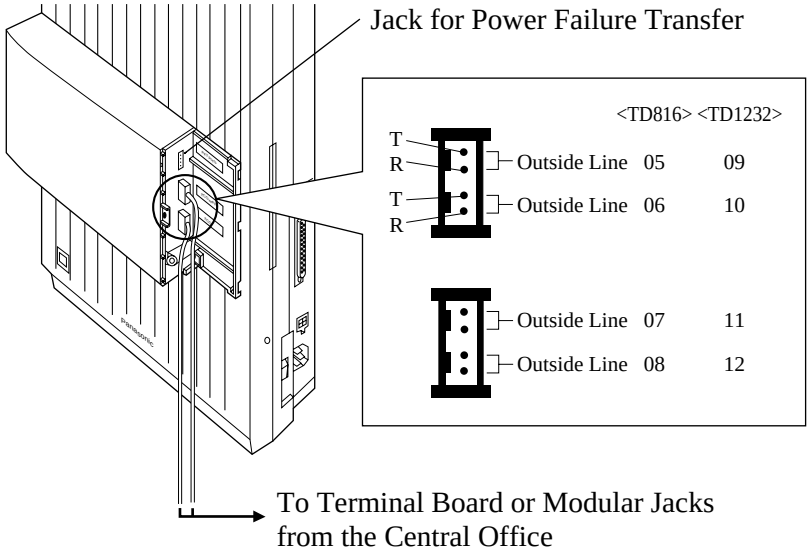
a) Prepare the required 4-pin plugs.



Note

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

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

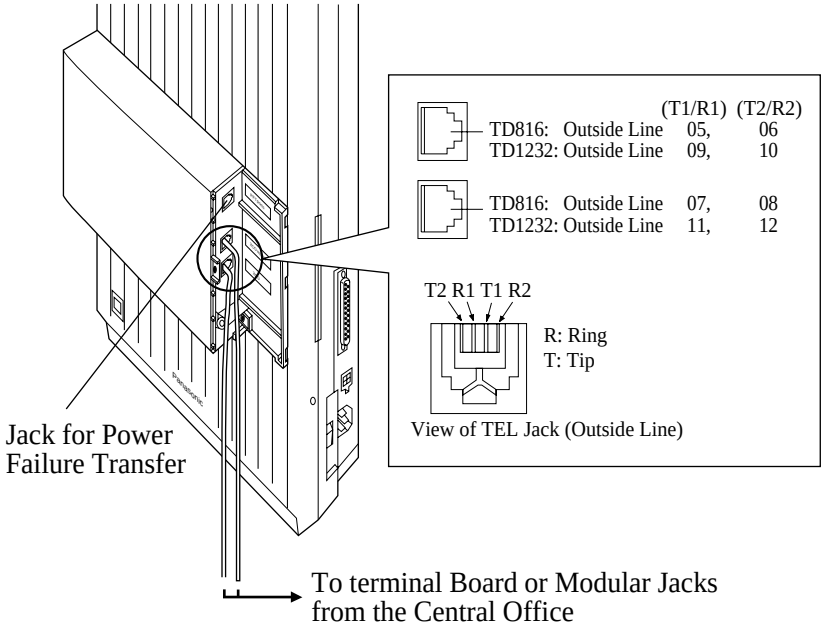


Note

- For details about the jack for Power Failure Transfer, refer to Section 2.5.1 Auxiliary Connection for Power Failure Transfer.

If a KX-TD180 (for KX-TD1232BX/HK/X) or a KX-TD185 is to be installed;

Insert the modular plugs of the telephone line cords (4-conductor wiring) into the modular jacks on the unit.

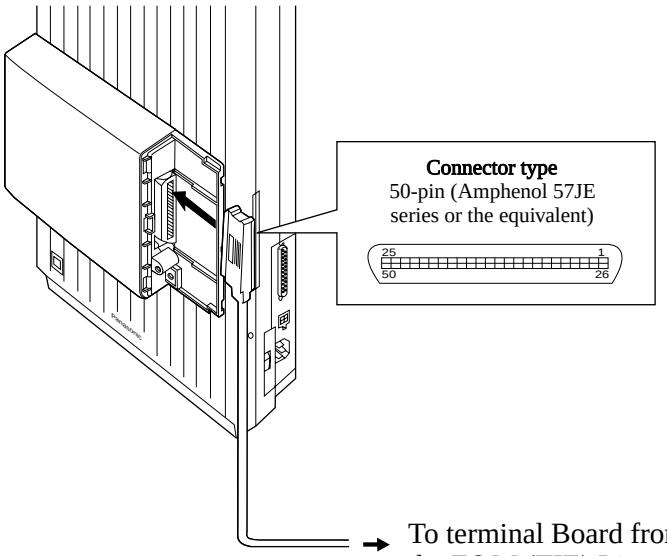


Note

- DID lines of the KX-TD185 are polarity sensitive.
- For details about the jack for Power Failure Transfer, refer to Section 2.5.1 Auxiliary Connection for Power Failure Transfer.

If a KX-TD184 is to be installed;

Insert the Amphenol Connector into the jack.

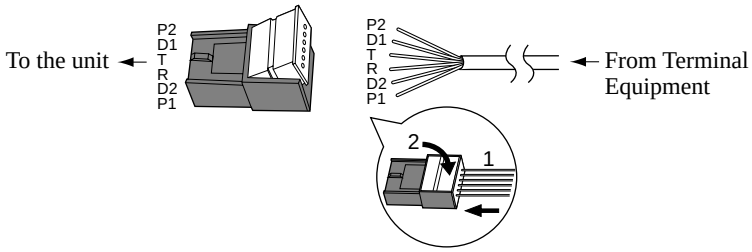


Note

- For fixing the connector, see "Amphenol 57JE Type (screw-attach-type 50-pin connector) Connection" on page 88.
- For jack connection, please see "E&M (TIE) Line Connection" on page 91.

If a KX-TD170D (for KX-TD816, KX-TD1232DBX/ML, KX-TDN1232) is to be installed;

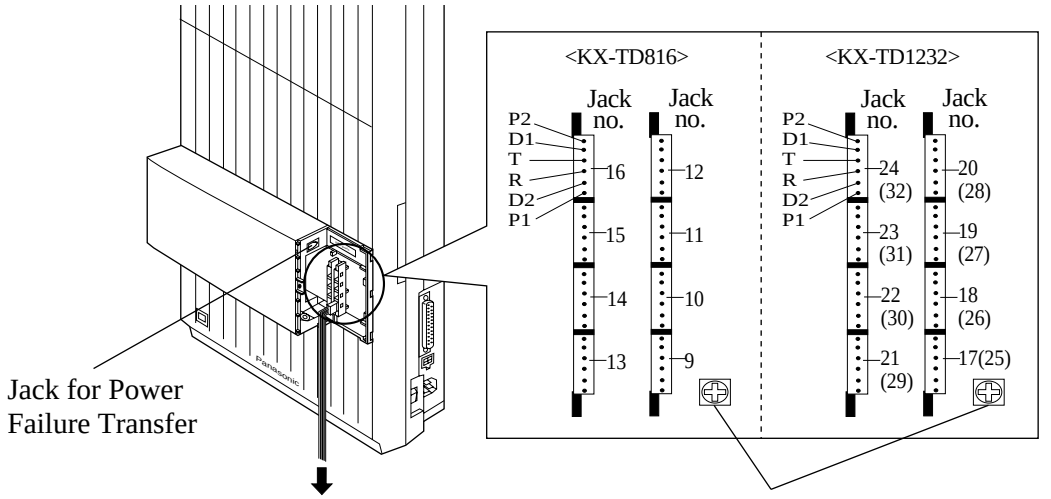
a) Prepare the required 6-pin plugs.



Note

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

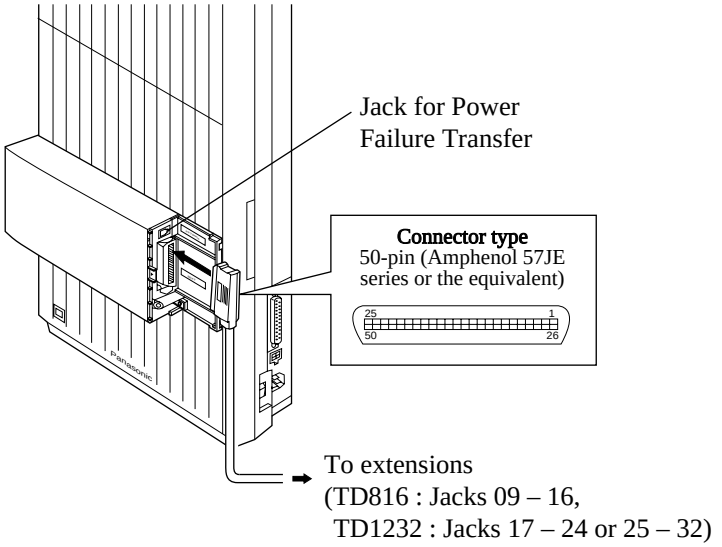
b) Insert the plug into a jack on the unit.



Note

- For details about the jack for Power Failure Transfer, refer to Section 2.5.1 Auxiliary Connection for Power Failure Transfer.

If a KX-TD170 (for KX-TD1232BX/HK/X) or a KX-TD174 is to be installed;
Insert the Amphenol Connector into the jack.



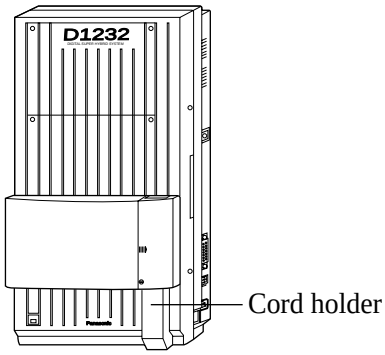
Note

- For details about the jack for Power Failure Transfer, refer to Section 2.5.1 Auxiliary Connection for Power Failure Transfer.
- For cable pin numbers to be connected, see "Pin Number Chart" for the KX-TD170 in Section 2.3.2 Extension Connection and "Pin Number Chart for the KX-TD174" on Page 90.
- For fixing the connector, see "Amphenol 57JE Type (screw-attach-type 50-pin connector) Connection" on Page 88.

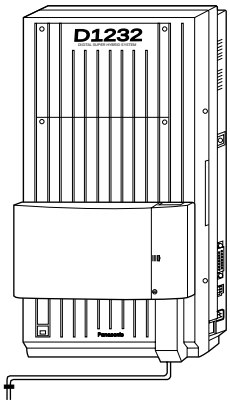
7. Tie all of the cords into a bundle. If other cords are exposed in the upper cabinets, tie them also.

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

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

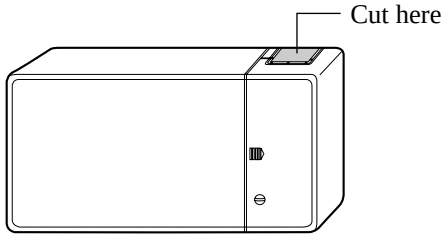


10. Fix the cords to the wall as shown so that the front cover can be opened.



Note

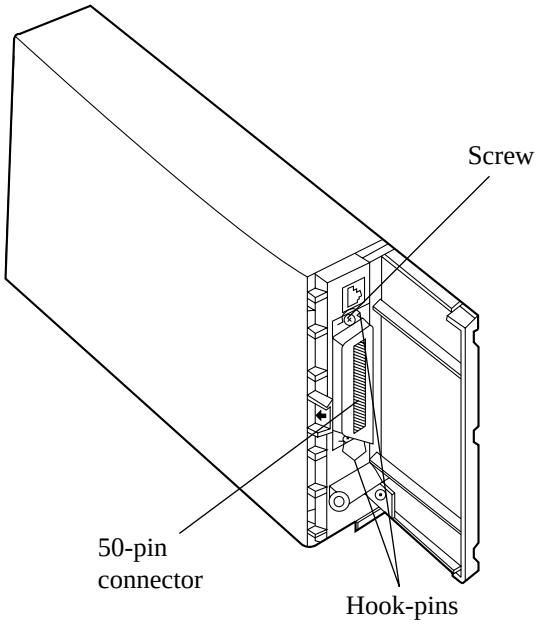
If two expansion units are installed, cut the cabinet cover(s) on the lower cabinet(s) to allow the cords from upper cabinet to go down through the cabinet cover(s). To protect the cords, smooth the cut edges.



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

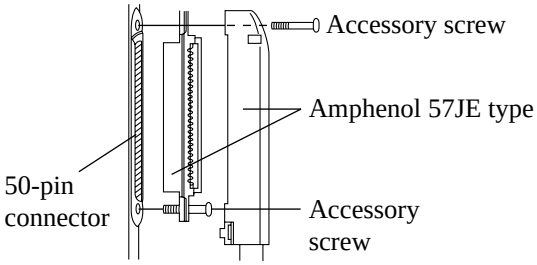
To fix the Amphenol 57JE type (screw-attach type 50-pin connector) to the unit, follow the procedure below.

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

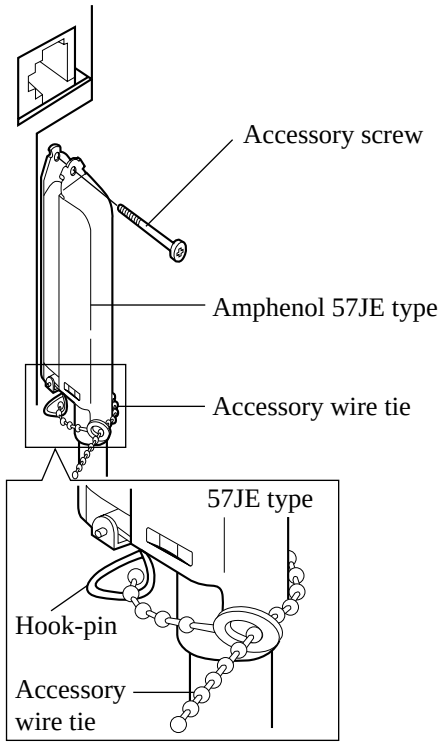


Note

When installing a connector like the type shown below, unscrew the lower hook-pin also. Then drive both accessory screws.



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



Pin Number Chart for the KX-TD174

Pin No.	Clip Terminal (KX-A205) No.	For KX-TD816		For KX-TD1232 (Expansion 1)		For KX-TD1232 (Expansion 2)	
		Jack No.09-16		Jack No.17-24		Jack No.25-32	
26 1	1 2	Jack. 09-1	T R	Jack. 17-1	T R	Jack. 25-1	T R
27 2	3 4	Jack. 10-1	T R	Jack. 18-1	T R	Jack. 26-1	T R
28 3	5 6	Jack. 11-1	T R	Jack. 19-1	T R	Jack. 27-1	T R
29 4	7 8	Jack. 12-1	T R	Jack. 20-1	T R	Jack. 28-1	T R
30 5	9 10	Jack. 13-1	T R	Jack. 21-1	T R	Jack. 29-1	T R
31 6	11 12	Jack. 14-1	T R	Jack. 22-1	T R	Jack. 30-1	T R
32 7	13 14	Jack. 15-1	T R	Jack. 23-1	T R	Jack. 31-1	T R
33 8	15 16	Jack. 16-1	T R	Jack. 24-1	T R	Jack. 32-1	T R
34 9	17 18	Jack. 09-2	T R	Jack. 17-2	T R	Jack. 25-2	T R
35 10	19 20	Jack. 10-2	T R	Jack. 18-2	T R	Jack. 26-2	T R
36 11	21 22	Jack. 11-2	T R	Jack. 19-2	T R	Jack. 27-2	T R
37 12	23 24	Jack. 12-2	T R	Jack. 20-2	T R	Jack. 28-2	T R
38 13	25 26	Jack. 13-2	T R	Jack. 21-2	T R	Jack. 29-2	T R
39 14	27 28	Jack. 14-2	T R	Jack. 22-2	T R	Jack. 30-2	T R
40 15	29 30	Jack. 15-2	T R	Jack. 23-2	T R	Jack. 31-2	T R
41 16	31 32	Jack. 16-2	T R	Jack. 24-2	T R	Jack. 32-2	T R

E&M (TIE) Line Connection

a) Unit Specifications

Item	Description
E&M (TIE) Line Types	Type 5 only
Transmission	2-wire or 4-wire voice path (Programmable) (Note) Maximum cabling distance of the E&M line cord (twisted cable): 22 AWG: Under 9.6 km
Transmission levels	2-wire voice path: -3 db (transmit/receive) 4-wire voice path: -3 db normal (transmit/receive) Programmable (-6 db, -3 db, 0 db, +3 db)
Signalling	DTMF or Pulse
E lead	Battery: -48 VDC, 20 mA to ground (max.) Sensitivity: 5 mA or 2000 Ω to ground (max.) (min)
M lead	Available current: 30 mA (max.) Available voltage: ±100 V (max.)

b) Pin Number Chart (E&M Line)

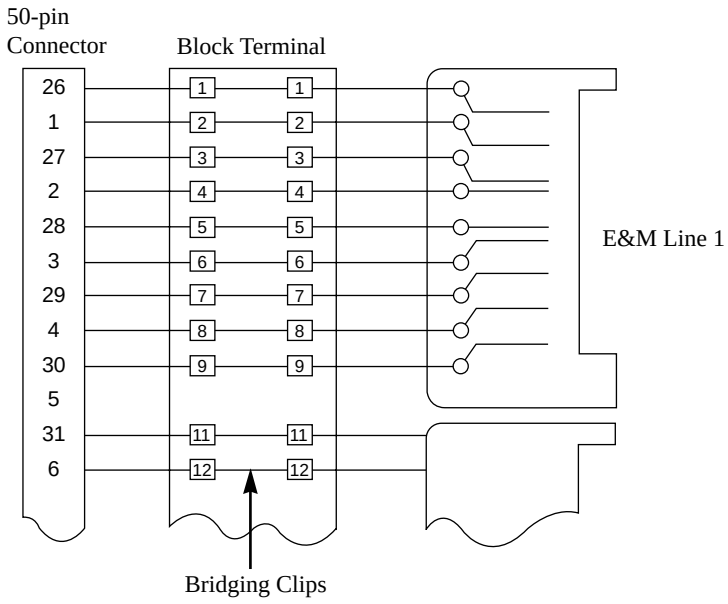
Pin No.	Cable Color	Clip No.	Number of Dots	E&M Line	
1	ORN-RED	1	1		T } 2-wire or 4-wire - send
26	ORN-BLK	2	1		R }
2	YEL-RED	3	1		T1 } 4-wire - receive
27	YEL-BLK	4	1		R1 }
3	GRY-RED	5	1	NO.1	E Lead
28	GRY-BLK	6	1		SG Lead
4	WHY-RED	7	1		SB Lead
29	WHY-BLK	8	1		M1 Lead
5	ORN-RED	9	1		SG0
30	ORN-BLK	10	1		M Lead only for Type 5
6	YEL-RED	11	2		T } 2-wire or 4-wire - send
31	YEL-BLK	12	2		R }
7	GRY-RED	13	2		T1 } 4-wire - receive
32	GRY-BLK	14	2		R1 }
8	WHY-RED	15	2	NO.2	E Lead
33	WHY-BLK	16	2		SG Lead
9	ORN-RED	17	2		SB Lead
34	ORN-BLK	18	2		M1 Lead
10	YEL-RED	19	2		SG0
35	YEL-BLK	20	2		M Lead only for Type 5
11	GRY-RED	21	3		T } 2-wire or 4-wire - send
36	GRY-BLK	22	3		R }
12	WHY-RED	23	3		T1 } 4-wire - receive
37	WHY-BLK	24	3		R1 }
13	ORN-RED	25	3	NO.3	E Lead
38	ORN-BLK	26	3		SG Lead
14	YEL-RED	27	3		SB Lead
39	YEL-BLK	28	3		M1 Lead
15	GRY-RED	29	3		SG0
40	GRY-BLK	30	3		M Lead only for Type 5
16	WHY-RED	31	4		T } 2-wire or 4-wire - send
41	WHY-BLK	32	4		R }
17	ORN-RED	33	4		T1 } 4-wire - receive
42	ORN-BLK	34	4		R1 }
18	YEL-RED	35	4	NO.4	E Lead
43	YEL-BLK	36	4		SG Lead
19	GRY-RED	37	4		SB Lead
44	GRY-BLK	38	4		M1 Lead
20	WHY-RED	39	4		SG0
45	WHY-BLK	40	4		M Lead only for Type 5

Note

21-25, 46-50: Cannot be connected

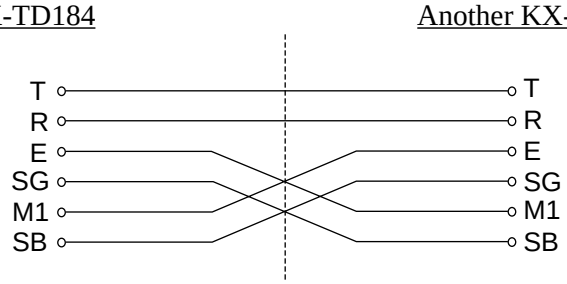
c) Cable Pins to be Connected (E&M Line)

- E&M Line Wiring

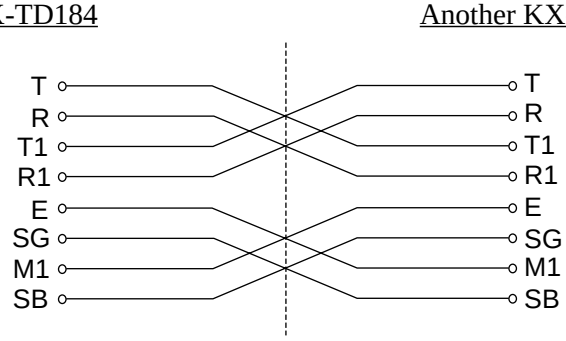


d) Connecting to another KX-TD816/KX-TD1232 system (KX-TD184)

1. 2-wire voice path

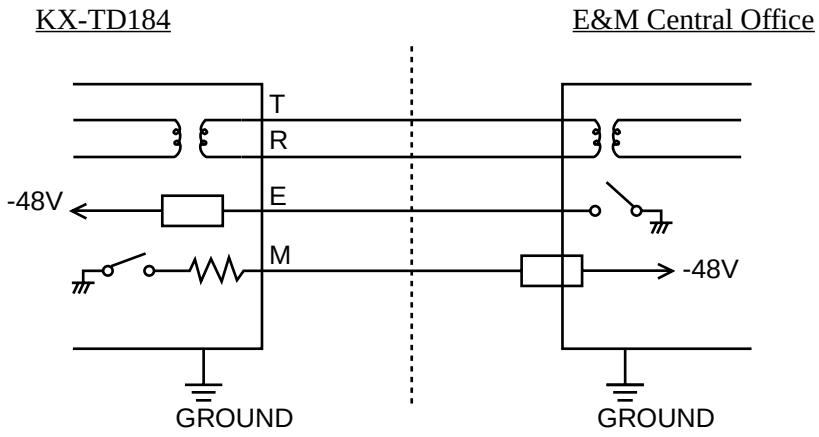


2. 4-wire voice path

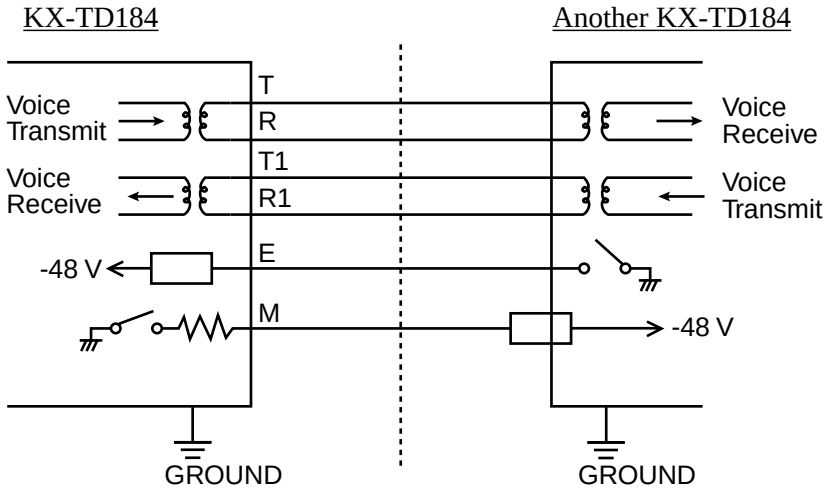


e) Connecting to the E&M Central Office

1. 2-wire voice path



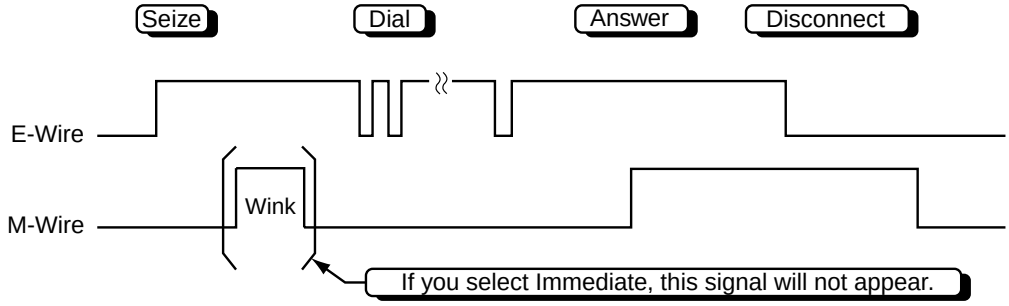
2. 4-wire voice path



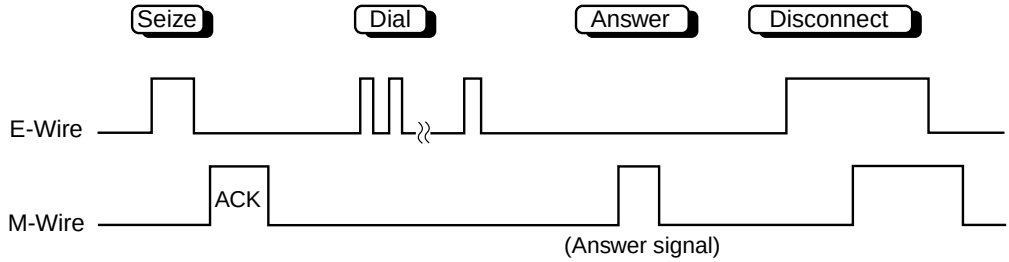
f) E&M Sequences

You can choose one of the following E&M sequences. *<SYS PRG [129]>*

1. Continuous E&M

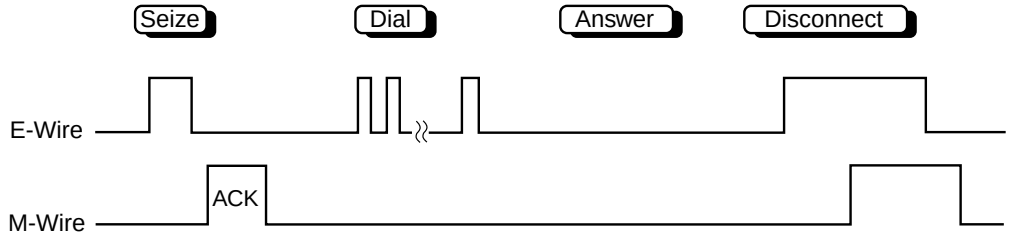


2. Pulsed E&M with Answer signal



❊ If you select this sequence, then you must select “Wink” as the start type.

3. Pulsed E&M without Answer signal



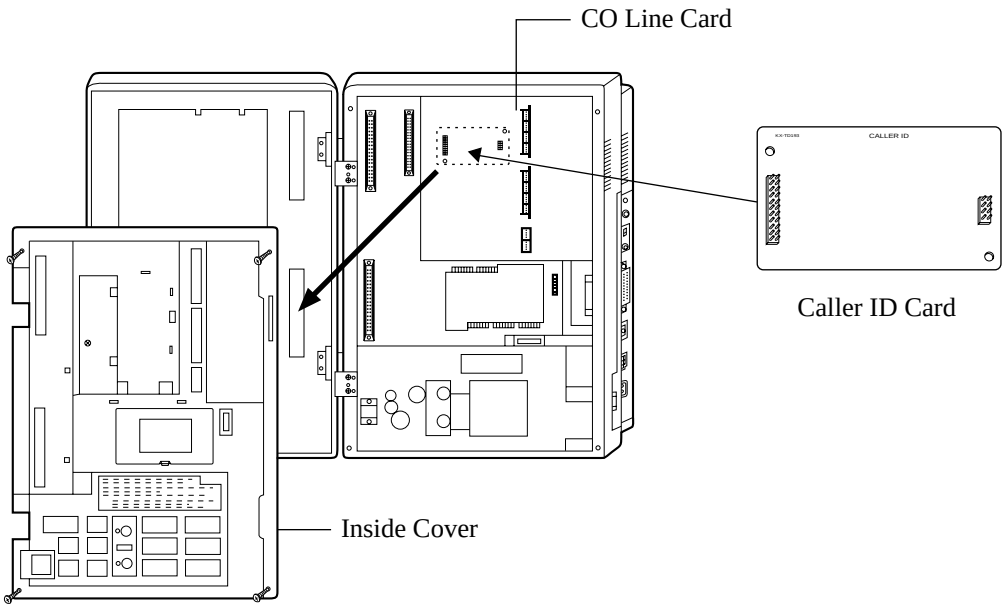
❊ If you select this sequence, then you must select “Wink” as the start type.

2.4.8 Caller ID Card Installation

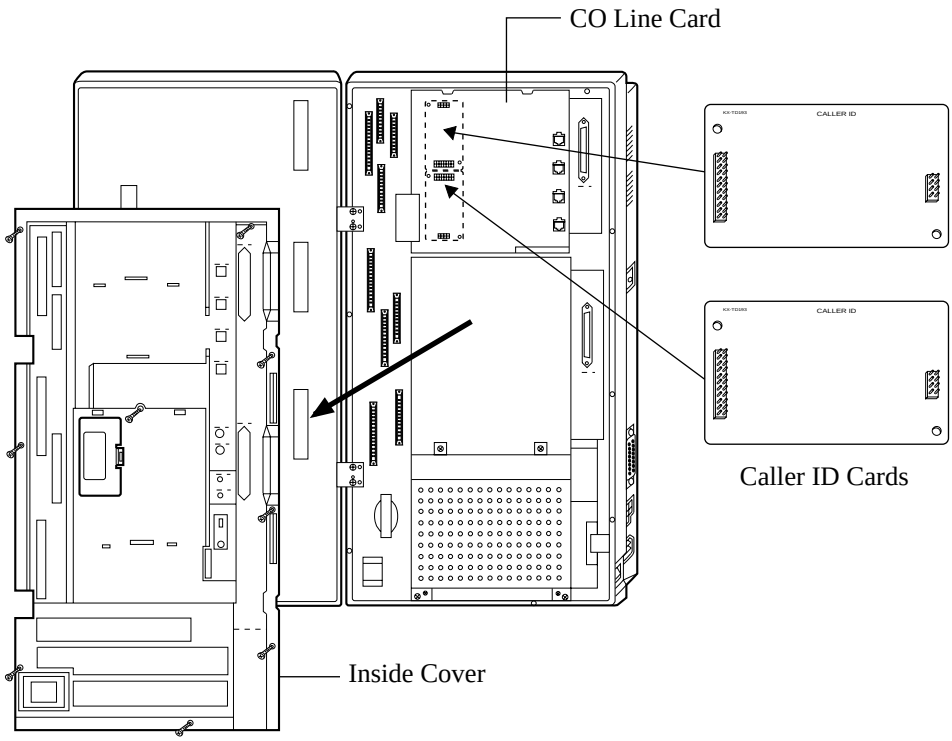
Installing to the Initial CO Line Card

1. Loosen four screws for KX-TD816 or eight screws for KX-TD1232 to open the inside cover of the main unit.
   Note
   If any cards, units, or cords are installed in the main unit, remove them beforehand.
2. Attach the Caller ID Card(s) (KX-TD193) to the CO Line Card, with the spacers (Accessory included).
   One Caller ID Card for KX-TD816, and up to two Caller ID Cards for KX-TD1232 can be installed to the initial CO Line Card.

KX-TD816



KX-TD1232

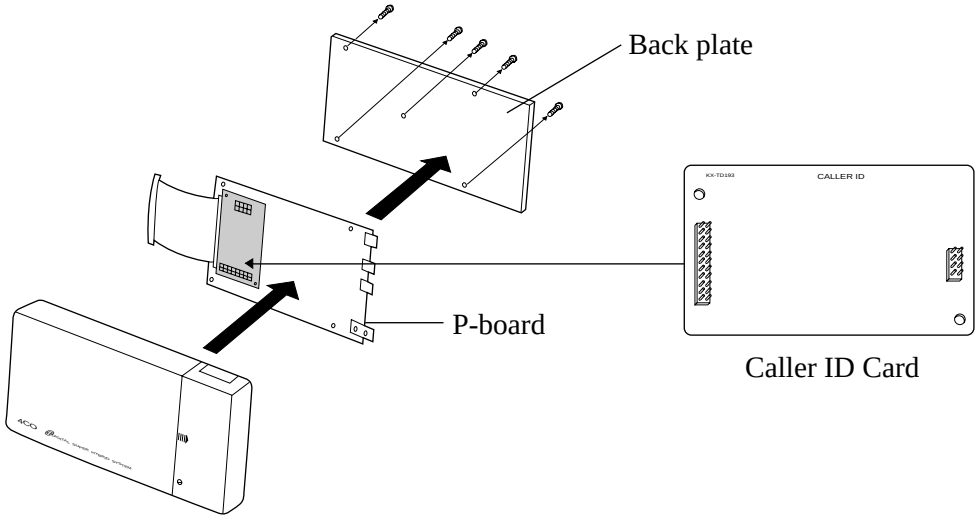


3. Put the inside cover back on the main unit and secure the screws.

Installing to the Optional 4-CO Line Unit

The following procedures must be done before installing the 4-CO Line Unit (KX-TD180) to the main unit.

1. Loosen five screws located on the rear of the 4-CO Line Unit.
2. Remove the back plate and take out the P-board.
3. Attach the Caller ID Card (KX-TD193) to the P-board, fitting the connectors.
4. Put the P-board back into the cabinet and fix the rear plate with the five screws.



Note

To install the 4-CO Line Unit to the main unit, refer to Section 2.4.7 Installing Expansion Unit.

Features Guide References

Caller ID

2.4.9 DISA Card / Unit and Remote Card / Unit Installation

The DISA Card (KX-TD191 and KX-TD199), DISA Unit (KX-TD190), Remote Card (KX-TD196), High Speed Remote Card (KX-TD197) and Remote Unit (KX-TD198) can be installed as follows.

Main Unit	For DISA feature	For remote access
KX-TD816	KX-TD190, KX-TD198 with KX-TD199	KX-TD198, KX-TD190 with KX-TD197
KX-TD1232	KX-TD191	KX-TD196, KX-TD197

The DISA Unit and the Remote Unit can also be attached with other line expansion unit.

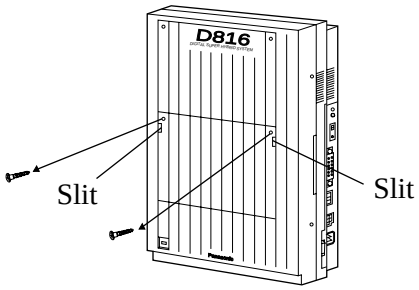
If you use the KX-TD170 or KX-TD174 with the KX-TD197 / KX-TD198, you must use the KX-TD170-② or KX-TD174-②. The former unit does not work properly with the KX-TD197 / KX-TD198. Please see the back of the unit and check "②" is marked.

Example

KX-TD816

Installing the DISA Unit (KX-TD190) or Remote Unit (KX-TD198)

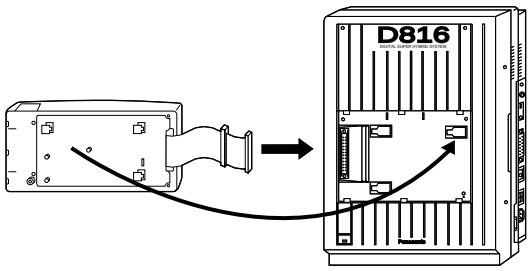
1. Loosen the two screws on the cover plate. Insert your fingers into the slits to remove the cover plate.



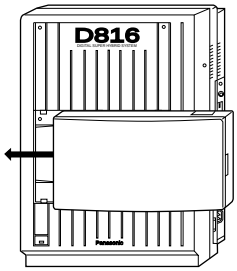
Note

There are two cover plates. Any of them can be removed, as needed.

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



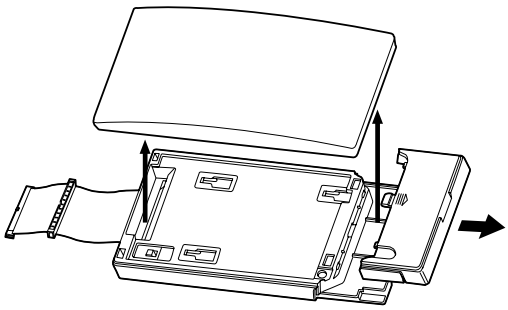
3. Hook the cabinet onto the main unit and slide the cabinet to the left until it is secured.



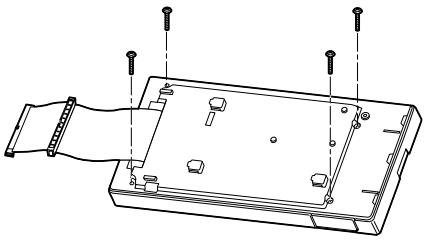
Installing the DISA Card (KX-TD199) to the Remote Unit (KX-TD198) /
Installing the High Speed Remote Card (KX-TD197) to the DISA Unit (KX-TD190)

It is possible to install the required card in the unit before installing the unit to the main unit. The illustrations below are the examples for installing the DISA Card to the Remote Unit.

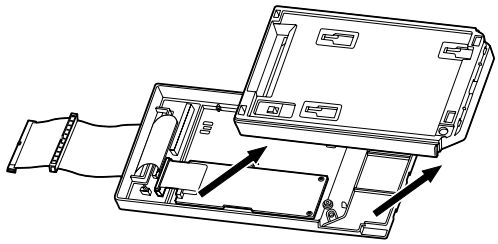
1. Open the front cover of the unit, slide the side cover to the right and remove it.



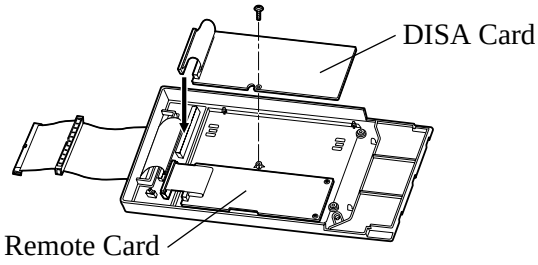
2. Turn over the unit and remove the four screws.



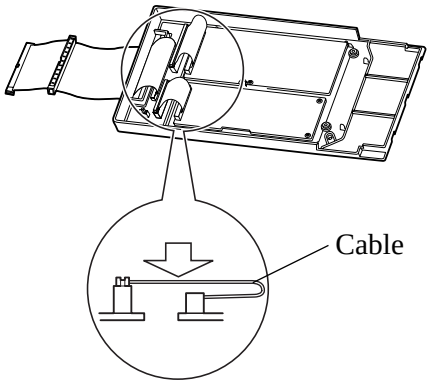
3. Turn over the unit again and remove the inside cover.



4. Install the card, secure the screw (included with the unit) and connect the cable to the connector.



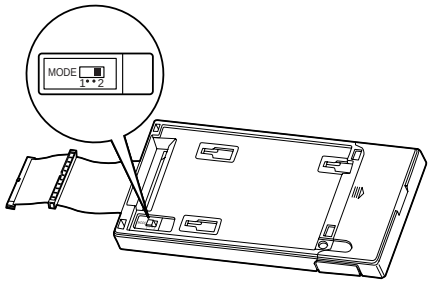
5. Flatten the cable to replace the inside cover properly.



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 2.

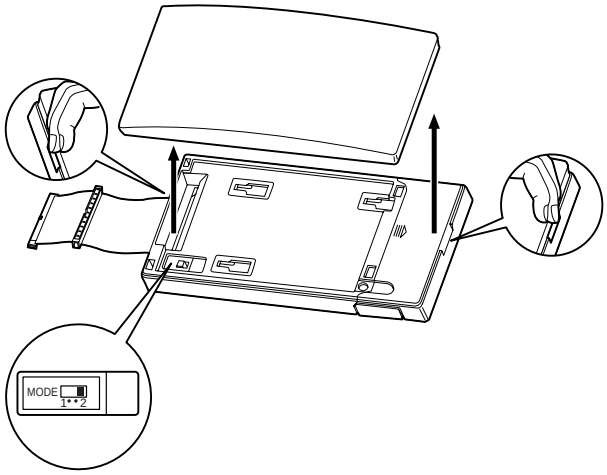


8. Replace the front cover.

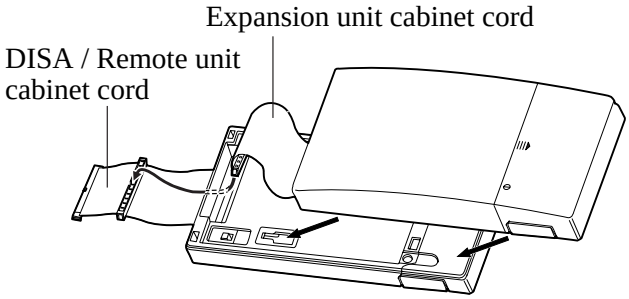
9. Install the unit to the main unit.

Attaching another line expansion unit to the DISA Unit (KX-TD190) or Remote Unit (KX-TD198) and install them to the system

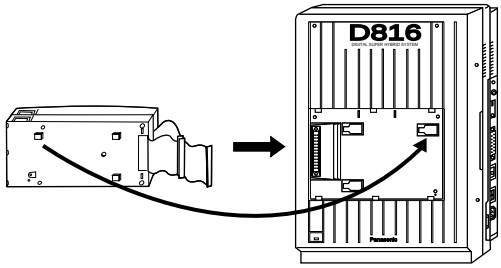
1. Remove the front cover of the DISA or Remote Unit.
The KX-TD198 users must set the MODE switch to 2.



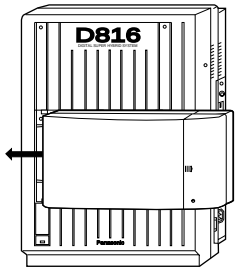
2. Attach the expansion unit to the DISA or Remote Unit as shown below. Be sure to connect the cabinet cords by inserting the expansion unit cabinet cord through the slot in the DISA or Remote Unit.



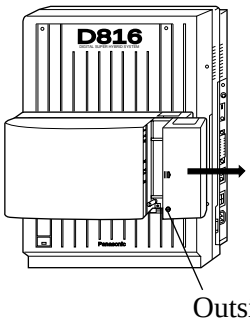
3. Remove the cover plate and connect the cabinet cord to the connector in the main unit firmly.



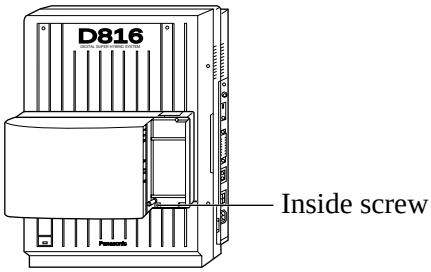
4. Hook the cabinets onto the main unit and slide the cabinets to the left until they are secured.



5. Loosen the outside screw of the expansion unit and slide the cover to the right.



6. Secure the inside screw (included with the DISA or Remote Unit) to fix the cabinet to the main unit.

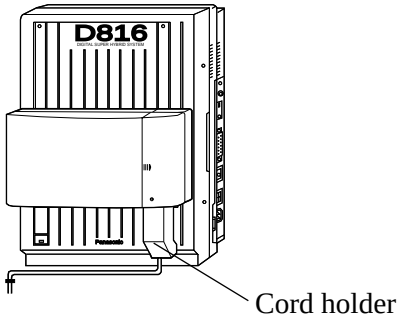


7. Tie all of the cords into a bundle. If other cords are exposed from the upper cabinets, tie them also.

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

9. Cover the cords with the cord holder. If two cabinets are connected together and attached to the main unit, use the cord holder included with the DISA or Remote Unit.

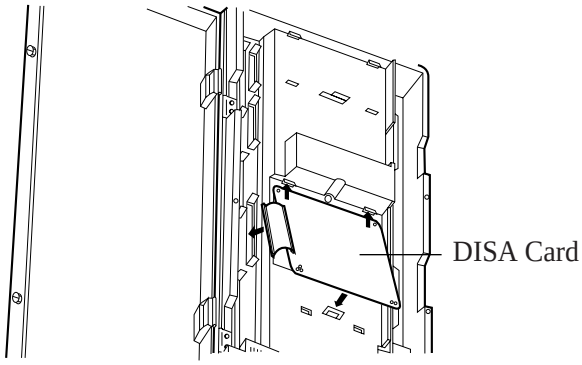
10. Fix the cords to the wall as shown here, so that the front cover can be opened.



KX-TD1232

Installing the DISA Card (KX-TD191)

1. Insert the upper side of the DISA Card into the two hooks on the main unit.



2. Press down the two corners of the lower side of the DISA Card.

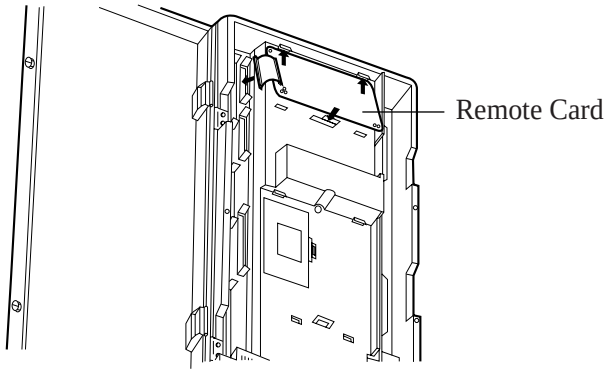
3. Connect the cord to the DISA Card Connector.

Features Guide References

Direct Inward System Access (DISA)

Installing the Remote Card (KX-TD196) or High Speed Remote Card (KX-TD197)

1. Insert the upper side of the Remote Card into the two hooks on the main unit.



2. Press down the two corners of the lower side of the Remote Card.

3. Connect the cord to the Remote Card Connector.

Features Guide References

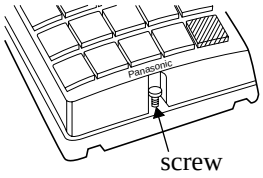
System Programming and Diagnosis with Personal Computer

2.4.10 Doorphone and Door Opener Connection

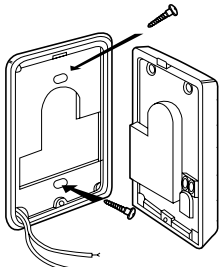
To connect up to two doorphones (KX-T30865) and up to two door openers (user-supplied), a Doorphone Card (KX-TD160) is required.

Installing the Doorphone

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



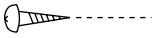
2. Install the base cover to the wall with two screws.



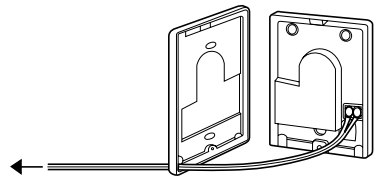
Note

Two kinds of screws are included. Please choose the appropriate one depending on your wall type:


Type 1: When the doorphone plate has been fixed to the wall.


Type 2: When you wish to install the doorphone directly to the wall.

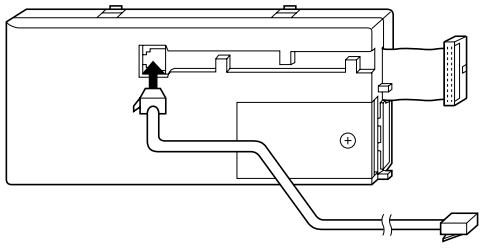
3. Connect the wires to the screws located in the front cover.



4. Secure both halves together and re-install the screw.

Doorphone Card Installation

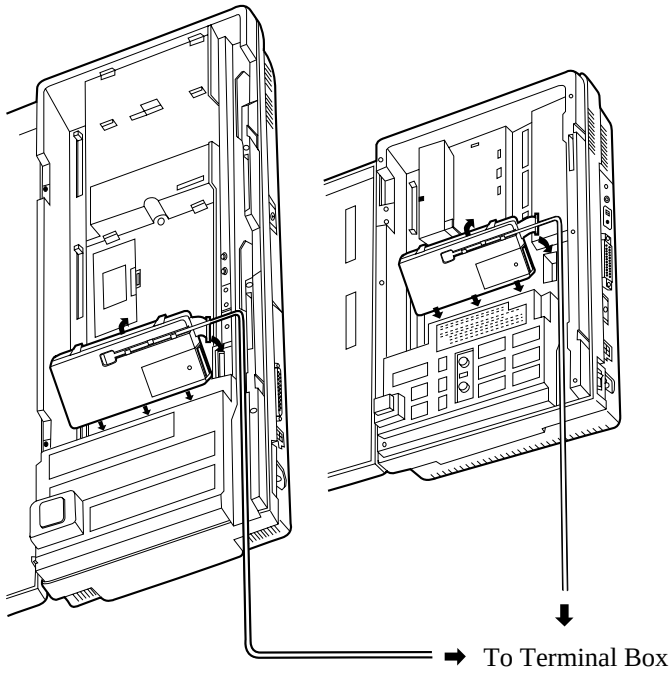
1. Connect a 4-conductor modular connector to the Doorphone Card Cabinet, and pass the cord through the groove in the cabinet.



2. Attach the Doorphone Card Cabinet to the main unit and press down.

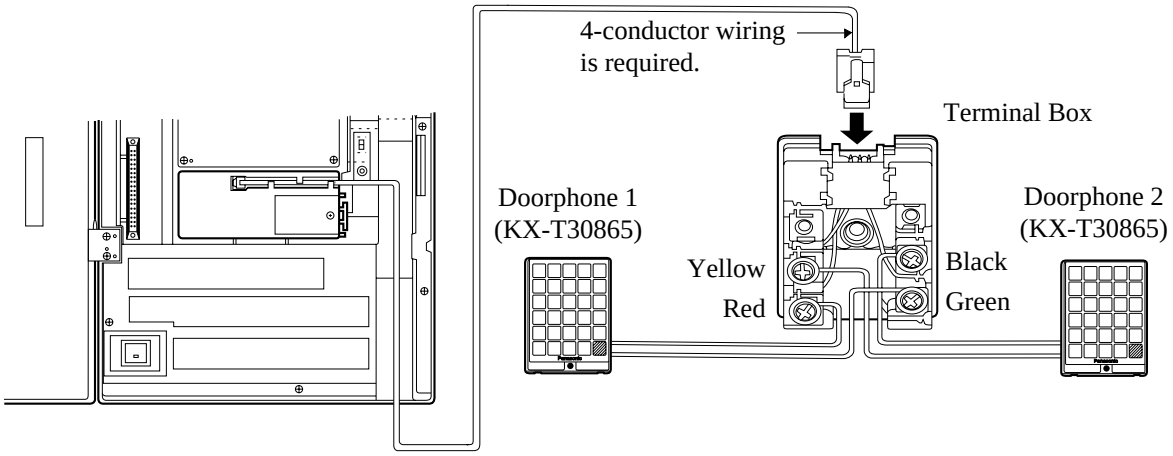
3. Connect the cord to the Doorphone Card Connector.

KX-TD1232 **KX-TD816**



Wiring of the Doorphone

1. Connect the Doorphone Card to the terminal box using a 4-conductor modular connector.
2. Connect the wires of doorphone 1 to the red and green screws of the terminal box.
3. Connect the wires of doorphone 2 to the yellow and black screws of the terminal box.

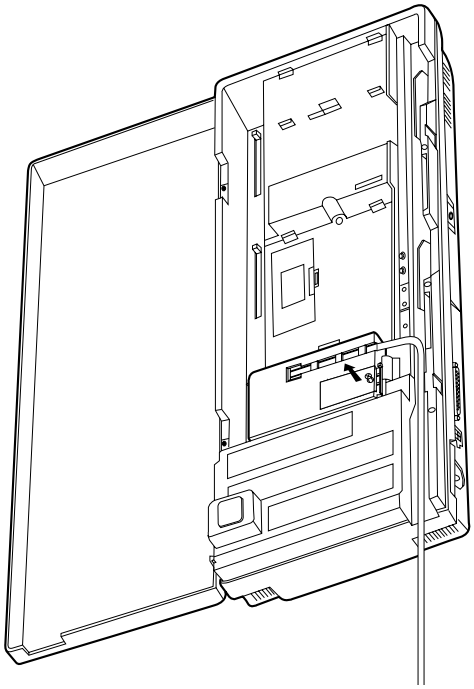


Note

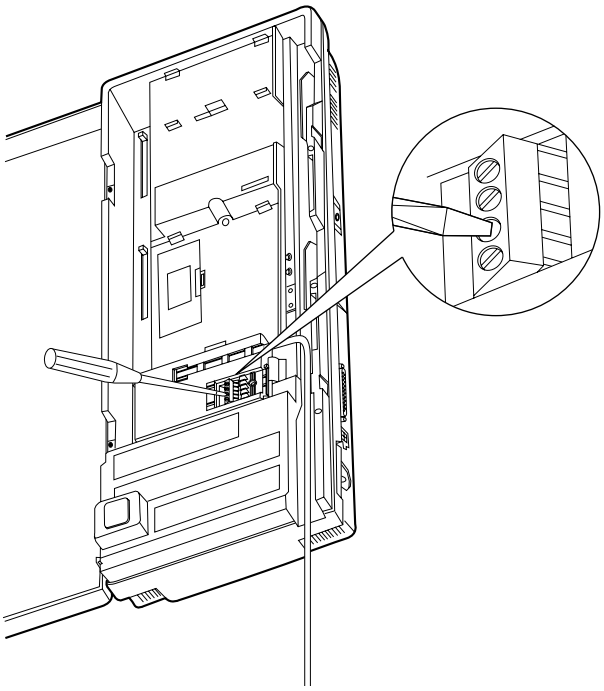
The KX-TD1232 is illustrated as the main unit.

Connecting Door Openers

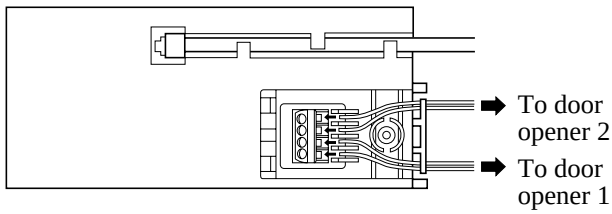
1. Loosen the screw to remove the cover.



2. Loosen the screws on the terminal strip.

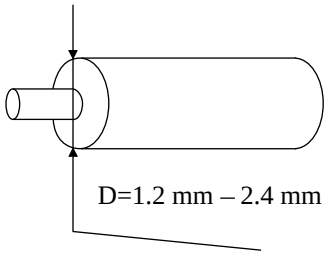


3. Insert the wires coming from the door openers into holes and tighten the screws.



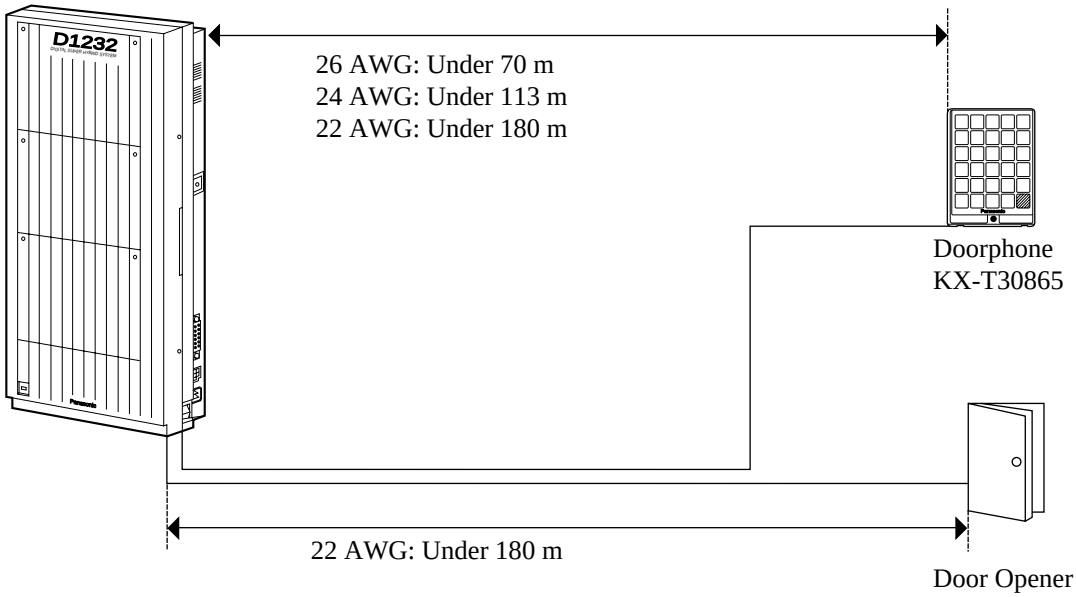
Note

- The KX-TD1232 is illustrated as the main unit.
- For wiring, UL 1015, AWG 22 twisted wire or the equivalent is recommended.
- The wire should be between 1.2 mm and 2.4 mm in diameter including the coating.



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 the main unit.

Programming Guide References

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

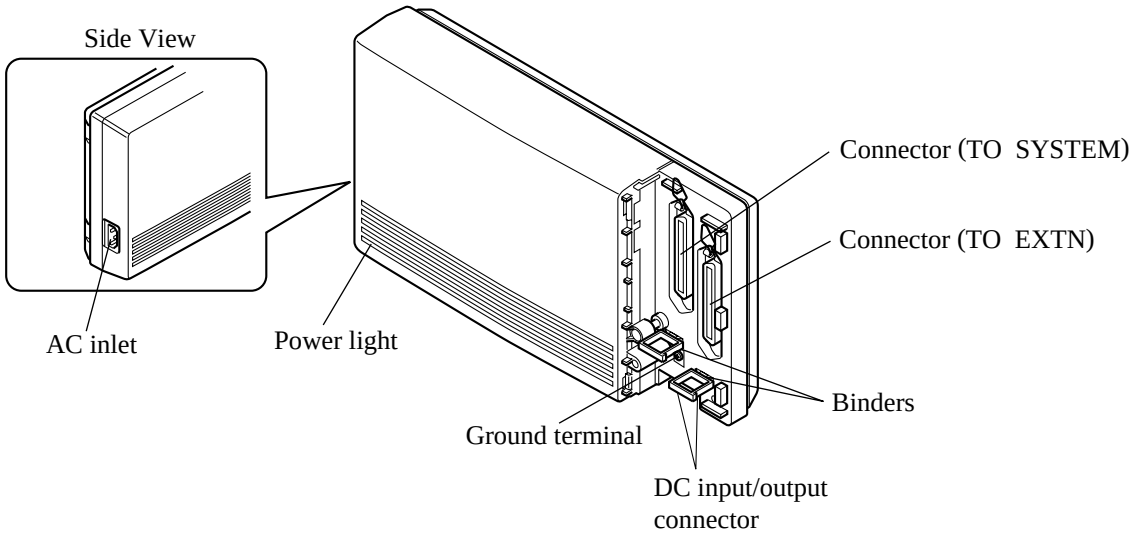
Features Guide References

Door Opener

Doorphone Call

2.4.11 SLT Message Waiting Lamp Adaptor Unit Connection

Name and Locations



Specifications

1. General Description

Capacity	Corresponding extensions	16
Control Method	CPU: One-chip microcomputer Interface: 1-APT Interface	
Power Supplies	Primary Power Secondary	120 VAC, 60 Hz Station Supply Voltage: + 85 V Circuit Voltage: + 5V, + 15 V
Connectors	Stations DC Input/Output Interface	50-pin Amphenol Connector 4-pin Connector

2. Characteristics

DC Power Supply to Stations	85 V, 1.2 mA (max)
Primary Power	120 VAC, 60 Hz, 0.8 A (max)*1
Environmental Requirements	0 °C – 40 °C, 10 % – 90 % rel. hum.

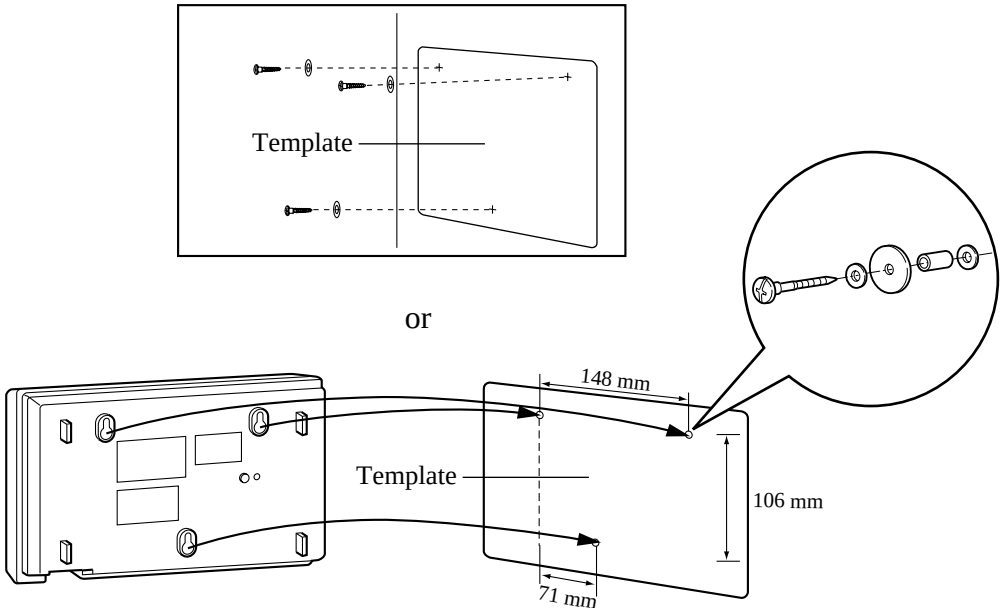
*1 This is the maximum current when three TD194s are connected by DC input/output interfaces (only the main TD194 is connected to an AC outlet).

WARNING

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

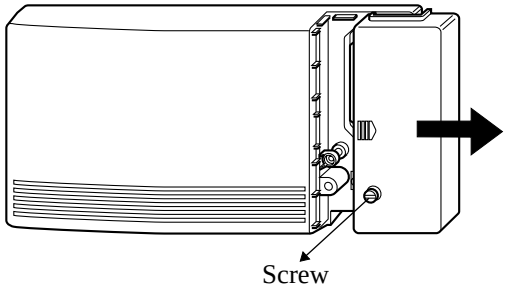
Wall Mounting

This unit can be mounted to a wall. Refer to Section 2.2.3 Wall Mounting for details.



Opening the Front Cover

1. Loosen the screw.
2. Slide the cover while pressing the ⫸ mark.



Note

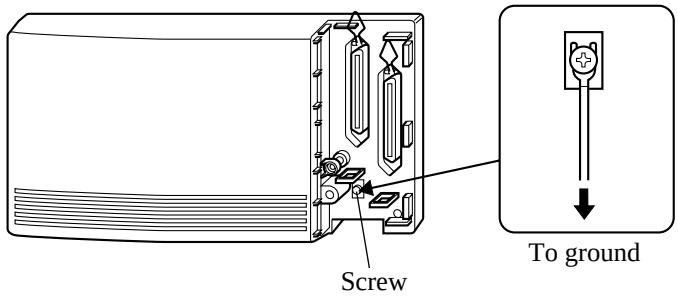
The screw cannot be removed from the unit.

Frame Ground Connection

IMPORTANT

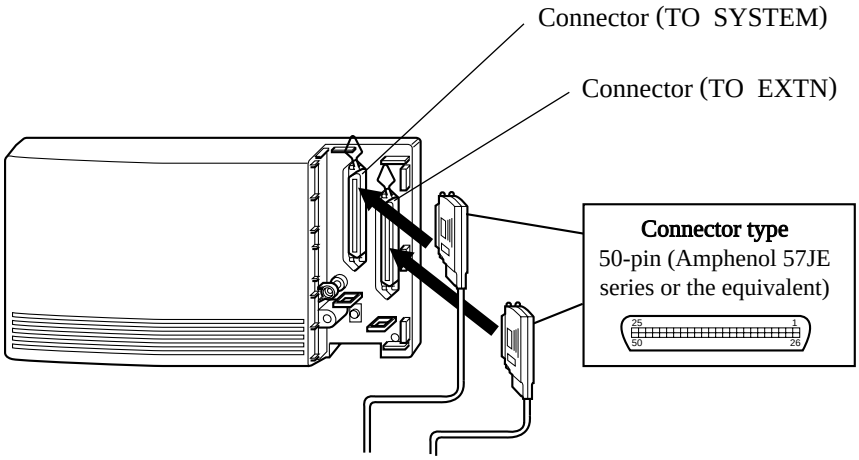
Connect the system frame to the ground.

1. Loosen the screw.
2. Insert the grounding wire.
3. Tighten the screw.
4. Connect the grounding wire to the ground.

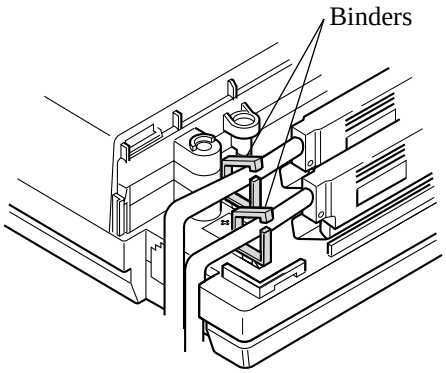


Inserting the Connector

1. Insert the two 50-pin connectors to the jacks as shown below.
The connector "TO SYSTEM" should be connected to the cable which is connected to the KX-TD816/KX-TD1232.
Also, the connector "TO EXTN" should be connected to the cable which is connected to the extensions.



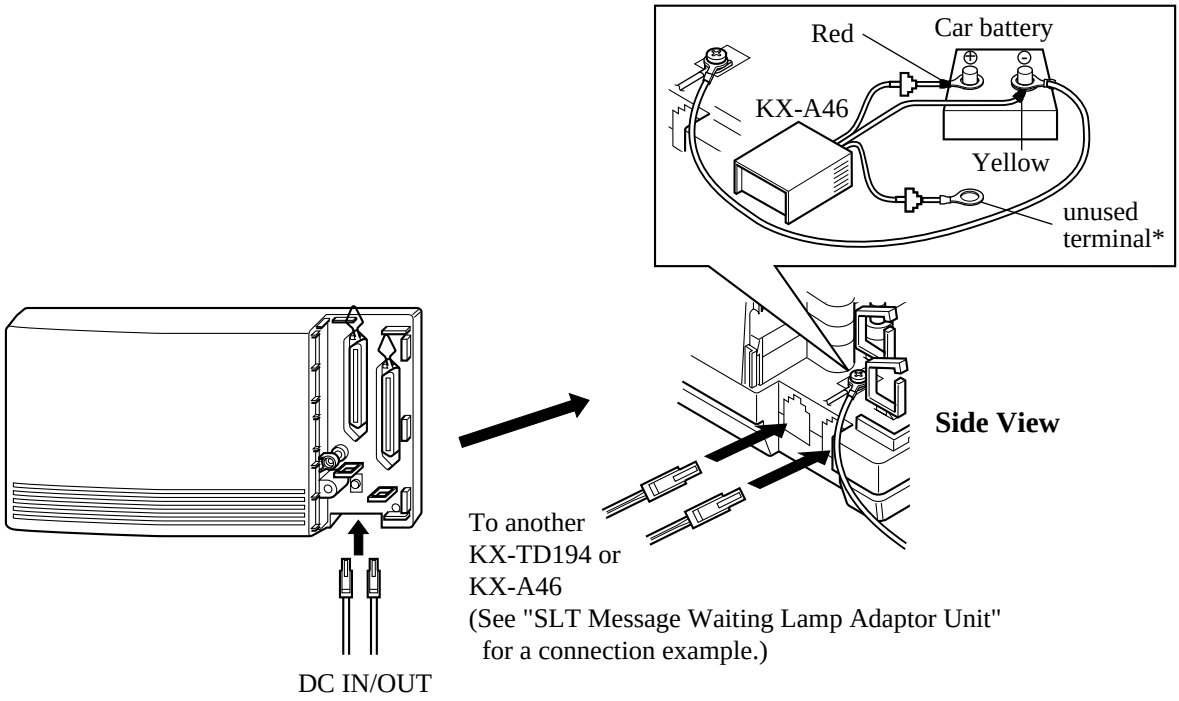
2. Insert the cables through the binders.



3. If two units are connected with the DC IN/OUT or a Battery Adaptor (KX-A46) is connected to the unit, insert the 4-pin connectors to the jacks as shown below.
Also connect the ground terminal of the unit to the minus (-) terminal of a car battery using an earth wire.

Note

Please make sure that the unused terminal* does not touch the car battery terminals.



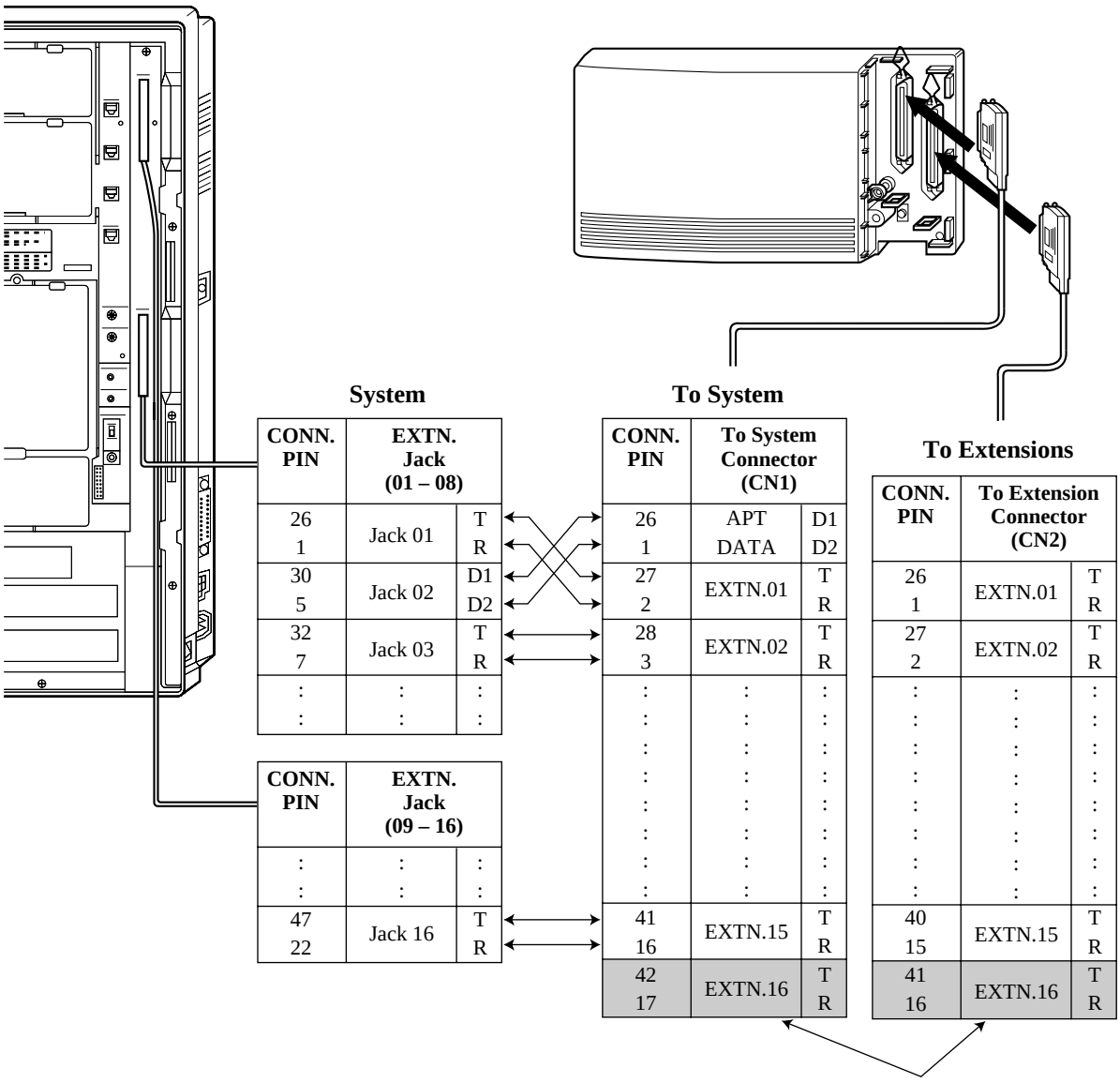
Pin Number Chart

Pin No.	To System Connector (CN1)		To Extension Connector (CN2)	
26 1	APT DATA	D1 D2	EXTN. 01	T R
27 2	EXTN. 01	T R	EXTN. 02	T R
28 3	EXTN. 02	T R	EXTN. 03	T R
29 4	EXTN. 03	T R	EXTN. 04	T R
30 5	EXTN. 04	T R	EXTN. 05	T R
31 6	EXTN. 05	T R	EXTN. 06	T R
32 7	EXTN. 06	T R	EXTN. 07	T R
33 8	EXTN. 07	T R	EXTN. 08	T R
34 9	EXTN. 08	T R	EXTN. 09	T R
35 10	EXTN. 09	T R	EXTN. 10	T R
36 11	EXTN. 10	T R	EXTN. 11	T R
37 12	EXTN. 11	T R	EXTN. 12	T R
38 13	EXTN. 12	T R	EXTN. 13	T R
39 14	EXTN. 13	T R	EXTN. 14	T R
40 15	EXTN. 14	T R	EXTN. 15	T R
41 16	EXTN. 15	T R	EXTN. 16	T R
42 16	EXTN. 16	T R		

Pin Connection Example

There are various pin connection patterns depending on the combination of the connecting units.

The example below is the case that one KX-TD194 is connected to the KX-TD1232 with a message waiting lamp can connected.

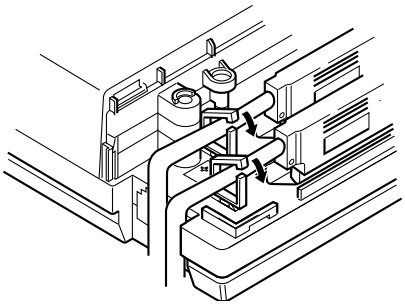


Note

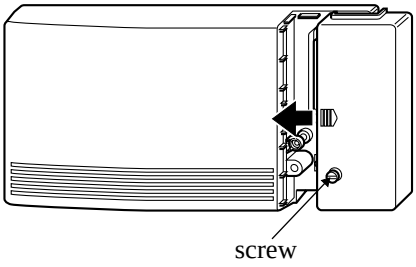
- The data port assignment on the system is required. *<SYS PRG [130]>* We recommend that you do not assign Jack 01 for the data port as it is usually assigned for the operator.
- The single line telephone jack assignment for corresponding KX-TD194 port is required. *<SYS PRG [132]>*

Closing the Front Cover

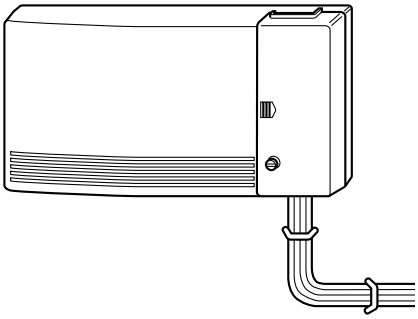
1. Fasten the binders.



2. Replace the cover and tighten the screw.

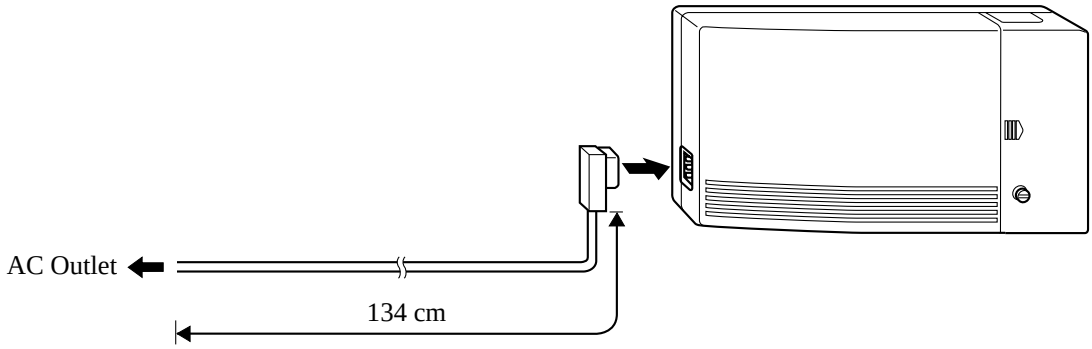


3. Tie together all of the connected cords and attach them to the wall so that the cords cannot be pulled out of the system.



Starting the unit

Plug the AC cord into the system AC inlet and an AC outlet.
Avoid sharing the AC outlet of this system with other office equipment. Use a dedicated AC outlet only.



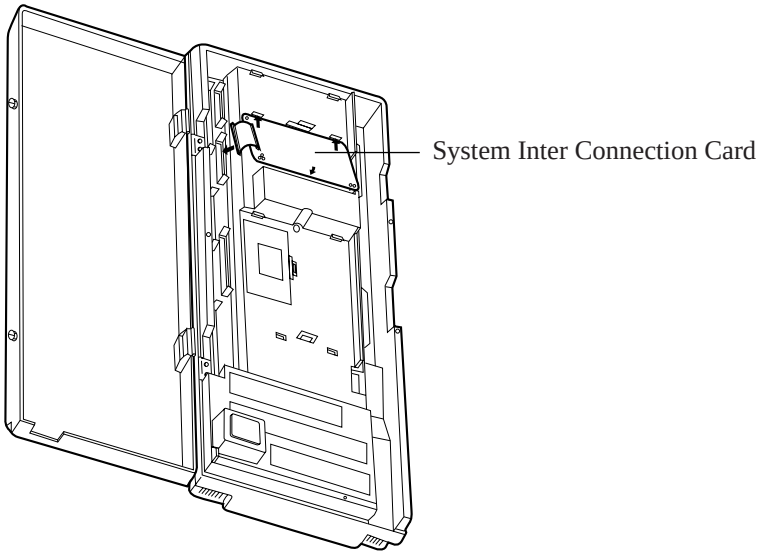
CAUTION

The power supply cord is used as the main disconnect device. Ensure that the socket-outlet is located/installed near the equipment and is easily accessible.

2.4.12 System Connection*1

To connect two main units, use two optional System Inter Connection Cards (KX-TD192) and the Connection Cable (included in the cards).

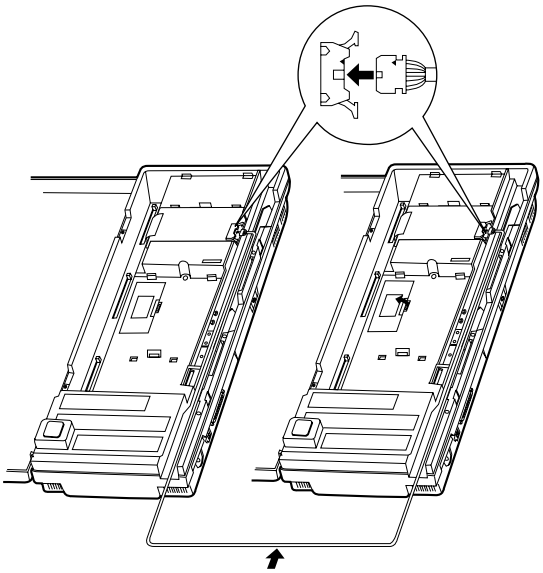
1. Insert the upper side of the System Inter Connection Card into two hooks on the main unit (Master System).
2. Press down the two corners of the lower side of the System Inter Connection Card.
3. Connect the cord to the System Inter Connection Card connector.



4. Open the latch on the card.
5. Repeat steps 1 through 4 for the Slave System, using the other card.
6. Insert one Connection Cable end into the Master System and insert the other end into the Slave System.

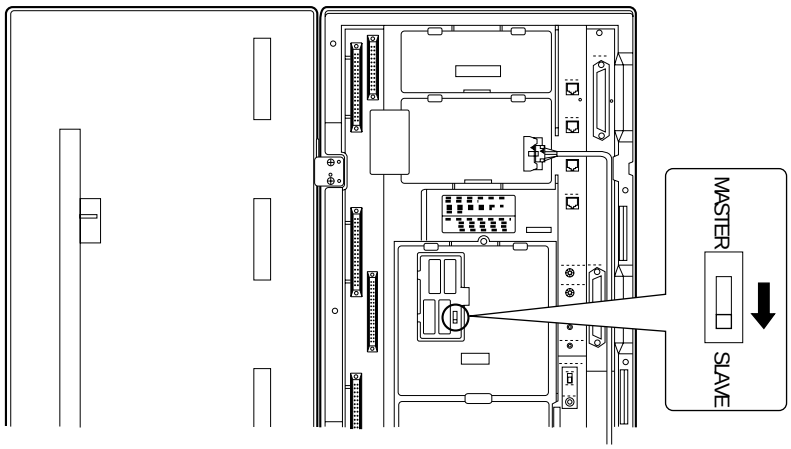
*1 Available for the KX-TD1232 only.

7. Close the latches on both systems.



Connection Cable

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



9. Turn the power on.

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 System extension to a Slave System extension.
- To turn the power on for the first time, refer to Section 2.7.1 Starting the System for the First Time.
- The master and slave must have the same version software. Otherwise, System Connection will not work properly.

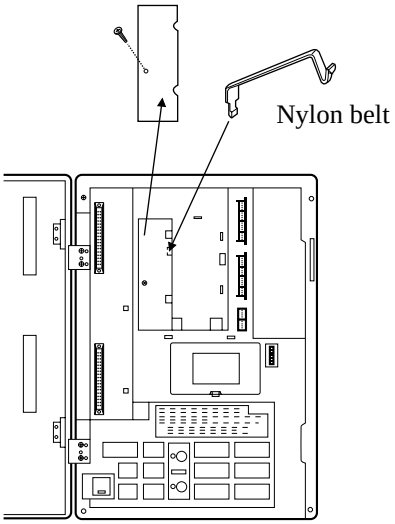
Feature Reference

System Connection

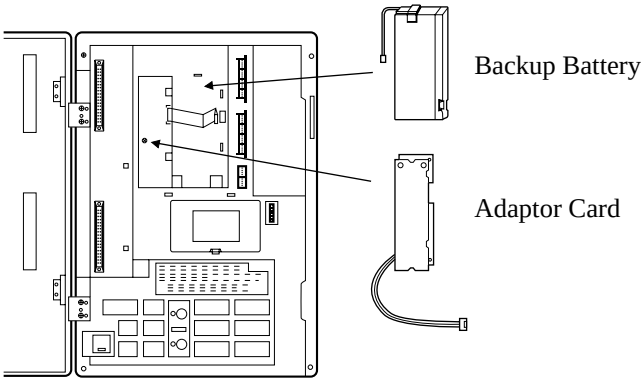
2.4.13 Backup Battery and Adaptor Card Connection[*1]

The optional Backup Battery and Adaptor Card (KX-A216) is a backup power supply to operate all the features in the event of a power failure. In case of power failure, the battery automatically maintains the power to the main unit instantly for about 10 minutes. The battery charges automatically by itself when it is discharged. You can choose KX-A216 or KX-A46 for a backup power supply. For connection of KX-A46, refer to Section 2.4.14 Battery Adaptor Connection.

1. Loosen the screw of the adaptor card cover and remove the adaptor card cover from the main unit. Then attach the nylon belt.



2. Insert the battery and adaptor card into the frame.[*2]



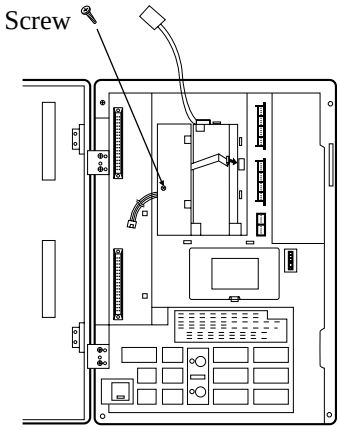
Note

Make sure of the polarities of the battery.

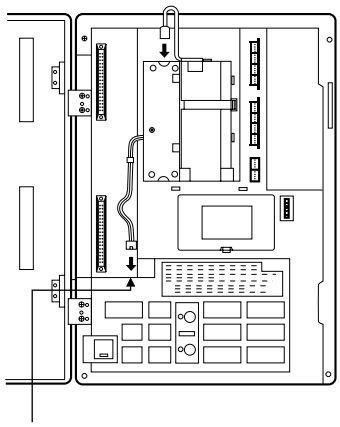
[*1] Available for the KX-TD816 only.

[*2]

3. Fasten the nylon belt to fix the battery. Fix the adaptor card by a screw (included).



4. Connect the cord of battery to the adaptor card. Remove the backup battery connector cover on the main unit. Then connect the cord of the adaptor card to the backup battery connector.



2.4.14 Battery Adaptor Connection

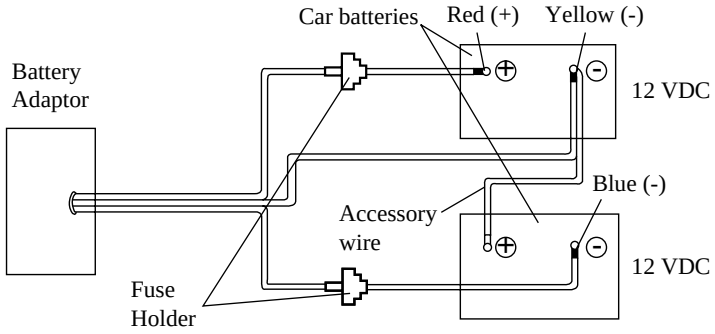
User-supplied car batteries can be used as a backup power supply in the event of a power failure. In case of a power failure, the batteries automatically maintain power to the main unit. The optional Battery Adaptor (KX-A46) is required.
The Battery Adaptor should not be exposed to direct sunlight. Keep the adaptor and car batteries away from heating appliances and fire. Place car batteries in a well ventilated place.

Connection

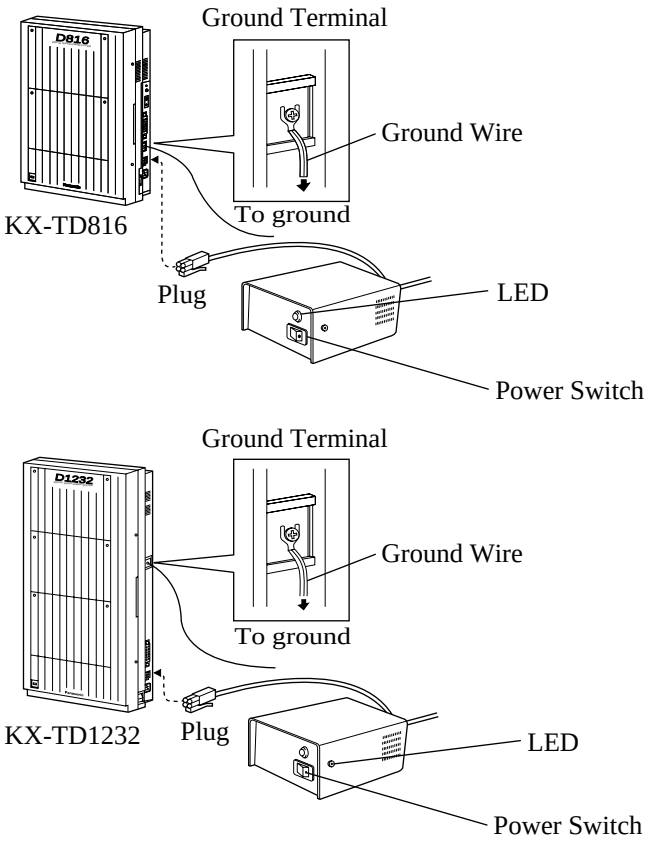
When connecting the battery adaptor, keep the following in mind.

- Check the polarities of batteries and wires.
- Make sure that you do not short the batteries and wires.
- To connect the two batteries, use an accessory wire.

1. Assemble the cords and two car batteries (12 VDC each) as shown.



2. Insert the plug of the battery adaptor into the battery adaptor connector on the main unit. Connect the ground wire to the ground terminal on the main unit.



3. Turn on the power switch of the battery adaptor.

Wall Mounting

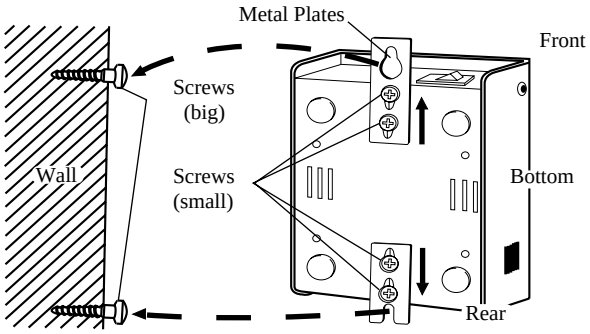
1. Drive the four small accessory screws into the bottom of the unit.

2. Place the metal plates so that the screw heads insert into the slots as shown.

3. Slide the metal plates in the direction of the arrows, and drive the screws.

4. Place the template on the wall to mark two screw positions, and install the big screws into the wall.

5. Hook the battery adaptor onto the screw heads.



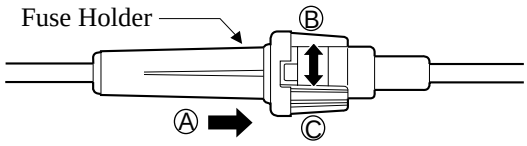
Mounting on Concrete or Mortar Walls;

At step **4**, drill two holes and drive the anchor plugs with a hammer, flush to the wall, and install the big screws into the anchor plugs.

Note

- If the Power LED does not go on, check the main unit, battery adaptor, batteries and wiring connection.
- After connection of the battery adaptor, keep the power switch on unless when the main unit is turned off. (Batteries will discharge.)
- To charge the discharged batteries, use a proper charging unit.
- Power Fuse: (8 A, 32 V) × 2
  If the Power LED light goes off during a power failure, the power fuse may have been blown. To change the fuse:

  1. Turn the power switch off.
  2. Turn the fuse holder in the direction of Arrow Ⓑ while pushing it in the direction of Arrow Ⓐ.
  3. Change the fuse.
  4. Turn the fuse holder in the direction of Arrow Ⓒ while pushing it in the direction of Arrow Ⓐ.
  5. Turn the power switch on.



- Back-up Duration: depends on the amp-hour rating of the batteries used.
  E.g. When using two 12 VDC batteries 20 amp-hour, maintenance-free, car batteries, the power is maintained for about three hours.

2.5 Auxiliary Connection for Power Failure Transfer

2.5.1 Auxiliary Connection for Power Failure Transfer

Power Failure Transfer connects specific single line telephones to selected outside lines in the event of system power failure, as follows:

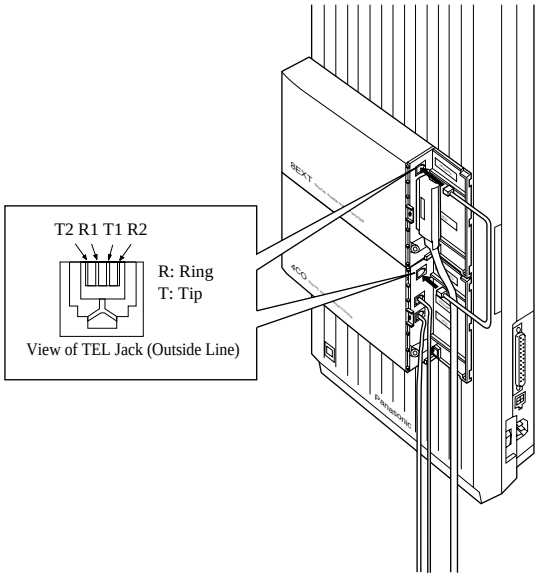
KX-TD816

Outside Line 01 — Extension (T, R) Jack 01 /
Outside Line 02 — Extension (T, R) Jack 02 /
Outside Line 05 — Extension (T, R) Jack 09 /
Outside Line 06 — Extension (T, R) Jack 10
Connections of outside lines 1, 2 and the respective extensions require no auxiliary connection. Outside lines 05 and 06 require auxiliary connection to implement this feature.

KX-TD1232

Outside Line 01 — Extension (T, R) Jack 01 /
Outside Line 02 — Extension (T, R) Jack 02 /
Outside Line 03 — Extension (T, R) Jack 09 /
Outside Line 04 — Extension (T, R) Jack 10 /
Outside Line 09 — Extension (T, R) Jack 17 /
Outside Line 10 — Extension (T, R) Jack 18
Connections of outside lines 01 through 04 and the respective extensions require no auxiliary connection. Outside lines 09 and 10 require auxiliary connection to implement this feature.

Insert the modular plugs of connection cords (4-conductor wiring) to the modular jacks of 4-CO Line Unit and Extension Line Unit 1.
(In the case of KX-TD816, one Extension Line Unit is available.)



Note

- In the event of a power failure, system memory is protected by a factory-provided lithium battery. There is no memory loss except the memories of Camp-on, Saved Number Redial, Last Number Redial, Call Park and Message Waiting.
- The system changes the current connection to this connection automatically when the power supply stops.
- If DC power is available from backup batteries if AC power fails, the system does not change the current connection to the above connection.
- The KX-TD1232 is illustrated as the main unit, and the KX-TD170 and KX-TD180 are illustrated as the expansion units.

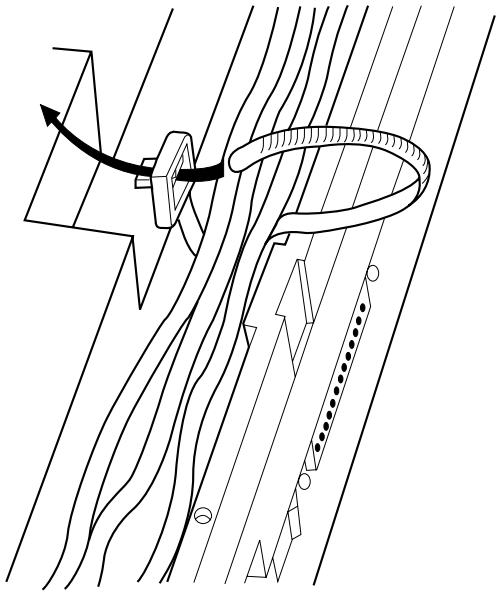
Features Guide References

Power Failure Transfer

2.6 Closing the Front Cover

2.6.1 Closing the Front Cover

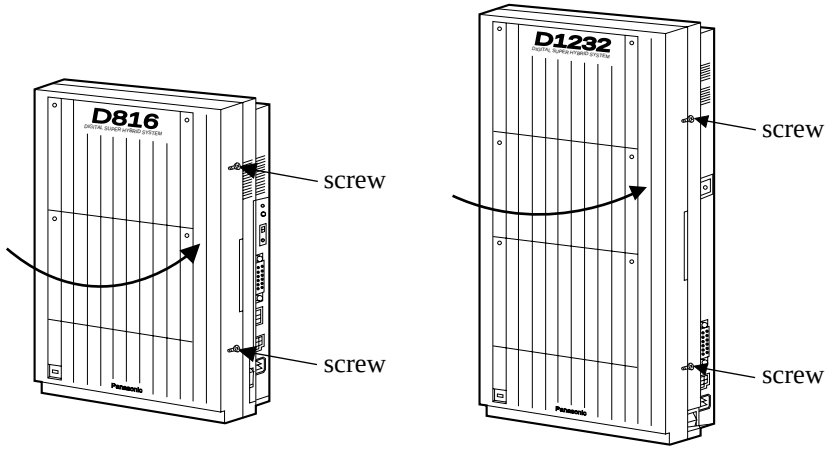
1. Fasten all the cables and cords with the cord fastener.



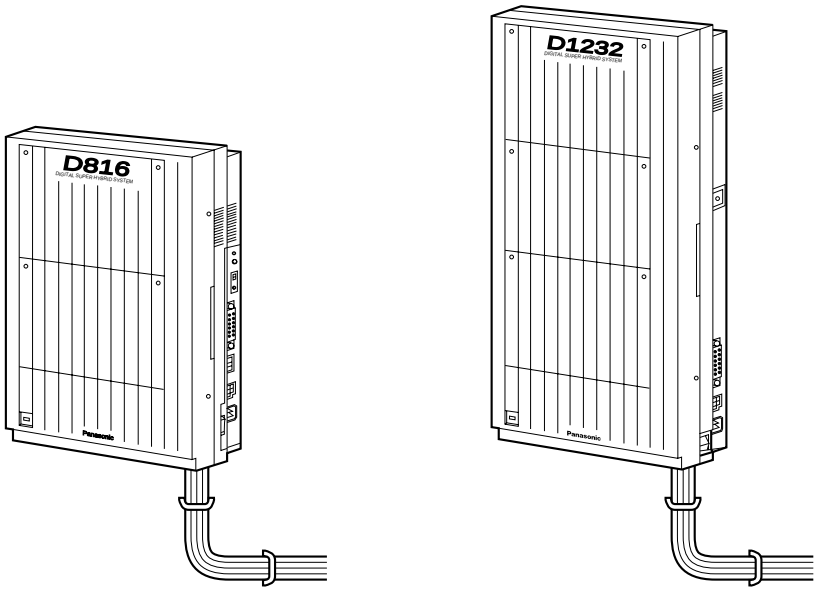
2. Replace the cover and tighten the screw.

Note

Be sure to tighten two screws, or the unit may not work properly.



3. Tie together all of the connected cords and attach them to the wall so that the cords cannot be pulled out of the main unit.



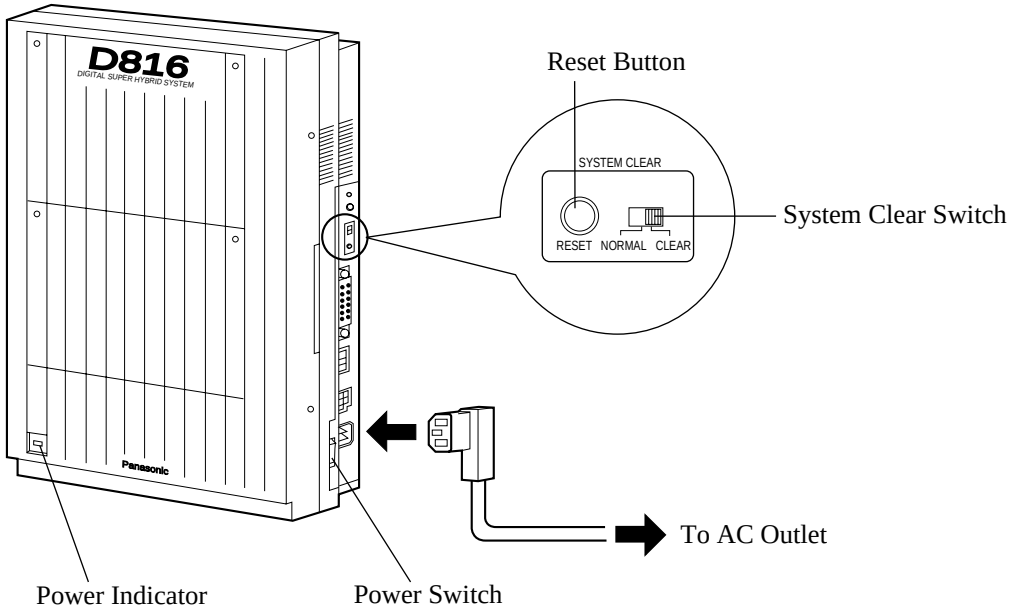
2.7 Starting the System for the First Time

2.7.1 Starting the System for the First Time

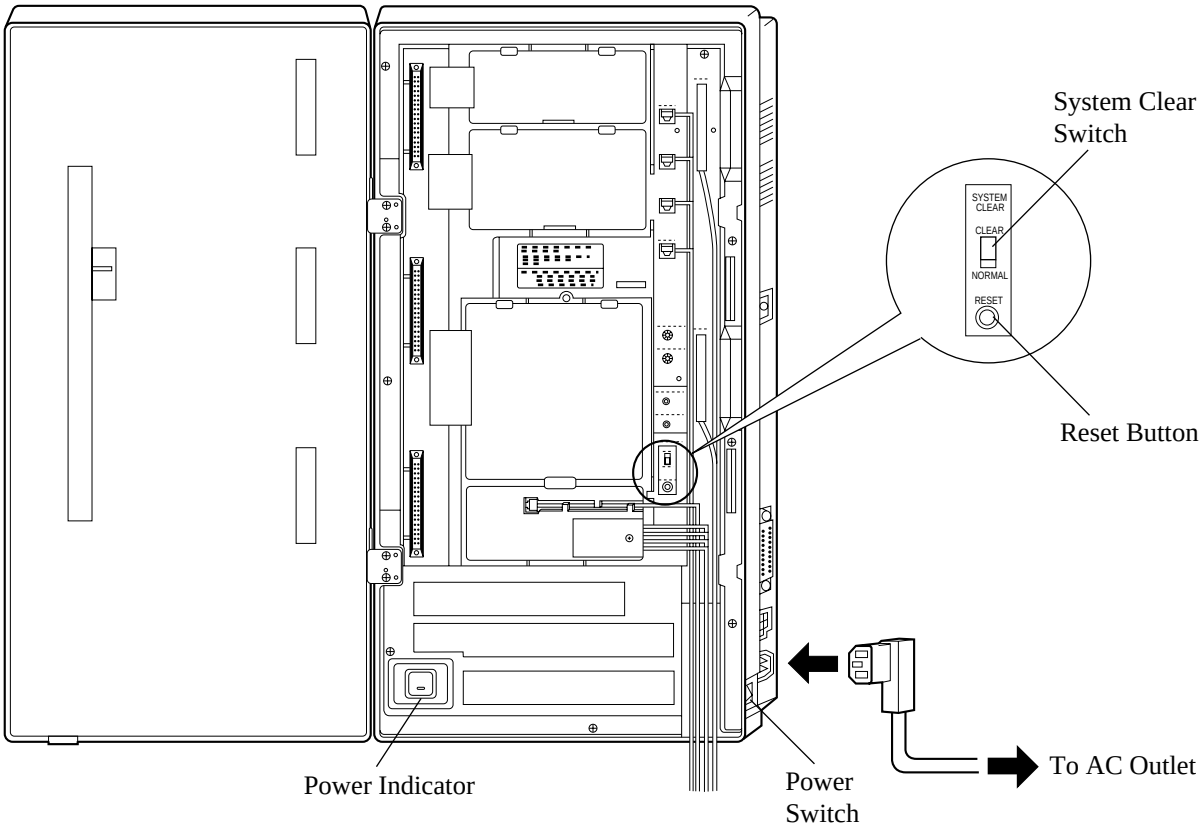
1. Set the Power Switch to the "OFF" position.
2. Set the System Clear Switch to the "CLEAR" position.
3. Plug the AC power cord into the system and an AC outlet.
4. Turn the Power Switch on.
5. Press the Reset Button with a pointed tool.
   (The power indicator will flash.)
6. Slide the System Clear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

The system will be initialised with default values. The system will also check the outside 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 6 while the power indicator is flashing (within approximately 10 seconds). Otherwise, the system will not start up with the default values.

CAUTION

Once you start up the system and you turn the power off, do not perform the above procedure to start the system again. Otherwise, your programmed data will be cleared. To start the system, just turn the Power Switch on.

The power outlet should be located near this equipment and easily accessible.

2.8 System Restart

2.8.1 System Restart

After starting the system, if the system does not operate properly, restart the system.
Before restarting the system, try the system feature again to confirm whether there definitely is a problem or not.
System Restart 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 is not cleared by System Restart.

1. Make sure that the System Clear Switch is set to the "NORMAL" position.

2. Press the Reset Button with a pointed tool.

Notice

After pressing the Reset Button, if you notice that the System Clear Switch is set to the "CLEAR" position, never slide the System Clear Switch to the "NORMAL" position within 20 seconds. Otherwise, all the system programming data are reset to default values (Refer to Section 2.9.1 System Data Clear). Wait at least 30 seconds, then slide to the "NORMAL" position. Then the system will work as before.

If the system still does not operate properly, please see Section 5.1.4 Using the Reset Button.

2.9 System Data Clear

2.9.1 System Data Clear

After storing or changing the system programming data, it is possible to clear your programming data stored in the system, if required. The system will restart with the default setting.

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 (within approximately 10 seconds).

Notice

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

Section 3

ISDN Installation

3.1 ISDN Network Outline

3.1.1 Overview

To use the ISDN Line Service, the following unit can be installed to the system.

2-ISDN S0 Line Unit (KX-TD280)

This unit adds two Basic Rate Interface (BRI) ISDN S0 lines. One KX-TD280 can be connected to the KX-TD816 and KX-TD1232.

6-ISDN S0 Line Unit (KX-TD286)

This unit adds six Basic Rate Interface (BRI) ISDN S0 lines. One KX-TD286 can be connected to the KX-TD816 and KX-TD1232.
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).

Primary Rate Interface ISDN Expansion Unit (KX-TD290)

This unit adds one Primary Rate Interface (PRI) ISDN line. One PRI ISDN line adds 30 outside lines (outside lines 25 through 54) to the system. This unit can only be installed to the KX-TD1232 Master system.
When this unit is installed to the system, the maximum number of available outside lines is limited to 38. In the case of System Connection, the basic and extended outside line in the Slave system cannot be used.

Notice

- The ISDN Line Units (e.g. KX-TD280) are 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 the Features Guide 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.
- The KX-TD290 is working in PCM30 mode only.
- **ISDN Interface**
  ISDN provides the following two interfaces.
  Basic Rate Interface (BRI):
  BRI provides two 64 kbps B channels for voice / data transmission and one 16 kbps D channel for signalling (2B + D).
  Primary Rate Interface (PRI):
  PRI provides thirty 64 kbps B channels for voice / data transmission and one 64 kbps D channel for signalling (30B + D).

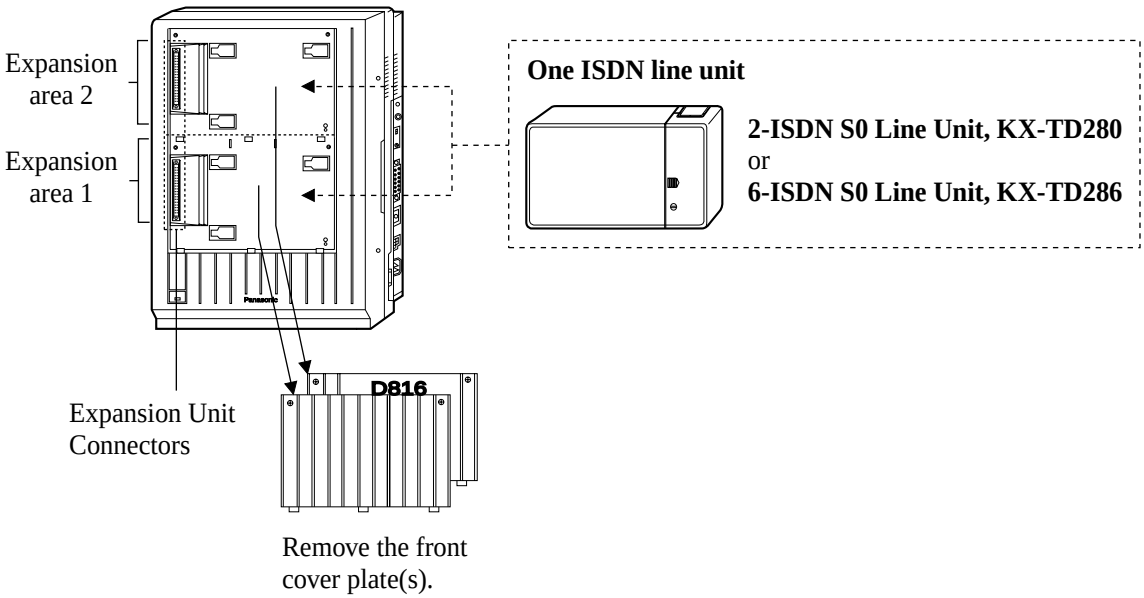
3.2 ISDN Line Connection

3.2.1 Location of the Units

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. The ISDN line unit should not be installed only to the Slave system.

KX-TD816

One ISDN Line Unit (KX-TD280 or KX-TD286) can be installed to any expansion area.



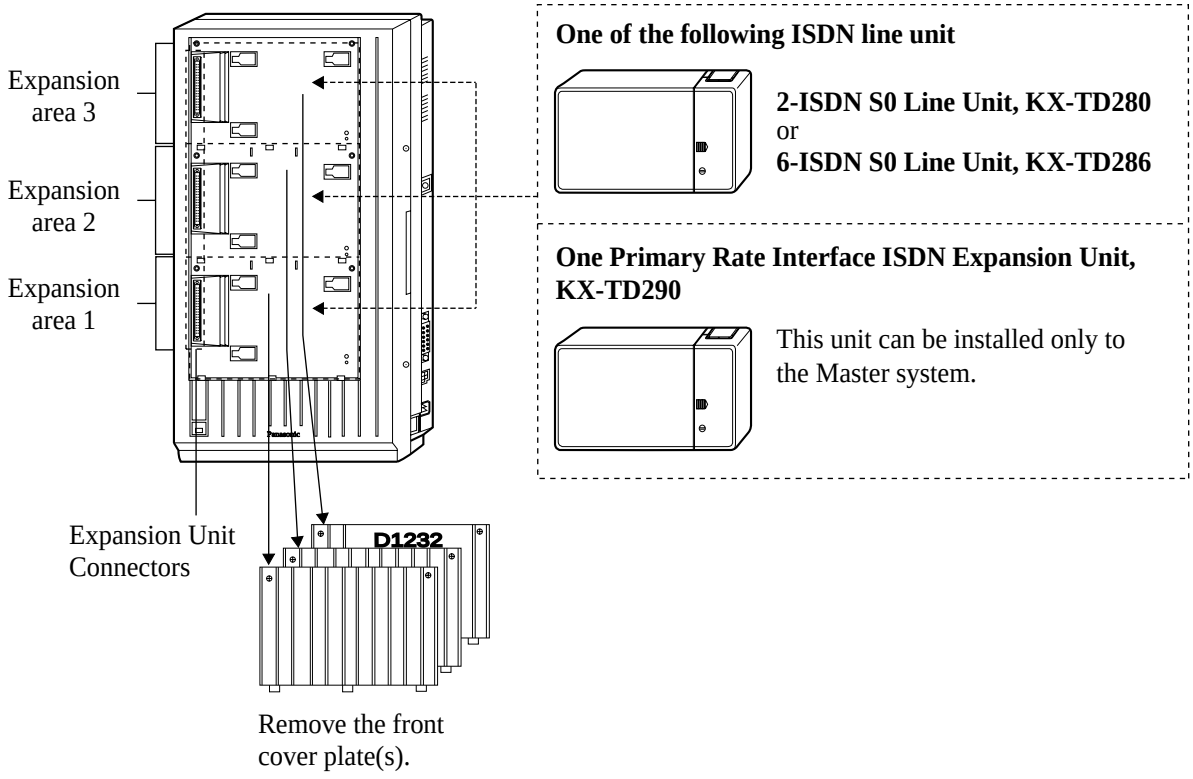
Note

- System Programming is required for expansion unit location.
  <SYS PRG [109]>
  Default : Area 1 = 4-CO Line Unit
  Area 2 = 8-Station Line Unit
- 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.
- For unit combinations, refer to Section 1.4.2 Expansion Unit Combination.

KX-TD1232

One ISDN Line Unit (KX-TD280 or KX-TD286) and/or one PRI ISDN Line Unit (KX-TD290) can be installed to any expansion area.
If you use the KX-TD170 or KX-TD174 with the KX-TD290, you must use the KX-TD170-② or KX-TD174-②. The former unit does not work properly with the KX-TD290.
Please see the back of the unit and check "②" is marked.

Example



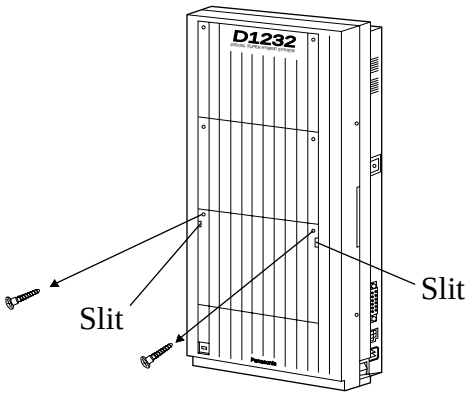
Note

- System Programming is required for expansion unit location.
  <SYS PRG [109]>
  Default : Area 1 = 4-CO Line Unit
  Area 2 and 3 = 8-Station Line Unit
- 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.
- For unit combinations, refer to Section 1.4.2 Expansion Unit Combination.

3.2.2 Installing the Unit

Step 6 is different for each unit.
The ISDN unit should not be installed only to the Slave system.
The KX-TD1232 is illustrated as the main unit.

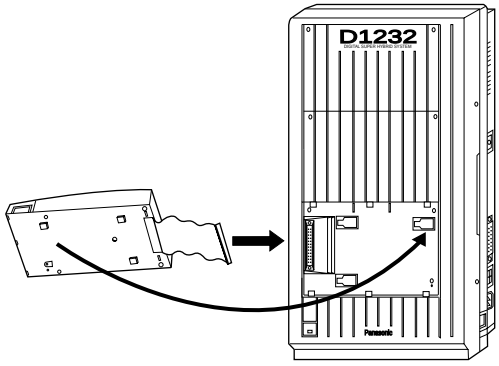
1. Loosen two screws on the cover plate. Insert fingers into the slits to remove the cover plate.



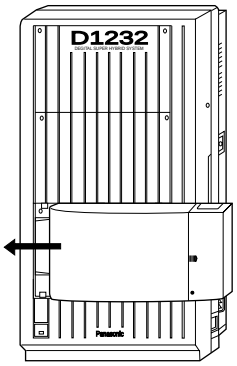
Note

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

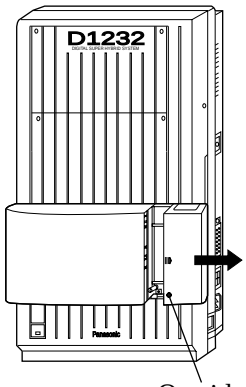
2. Connect the cabinet cord to the connector in the main unit firmly.



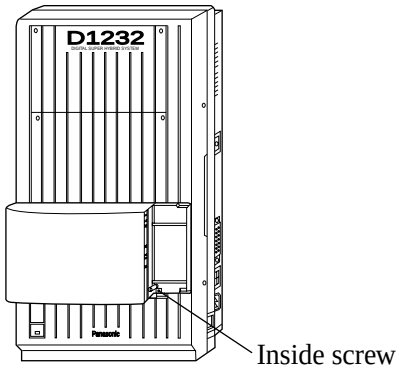
3. Hook the cabinet to the main unit and slide the cabinet to the left until it is secured.



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



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

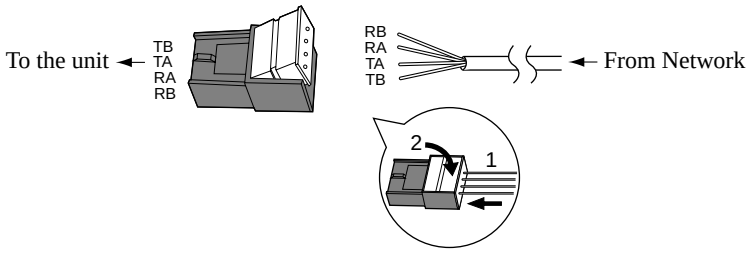


Note

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

6. If a KX-TD280 or KX-TD286 is to be installed:

a) 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 outside lines.

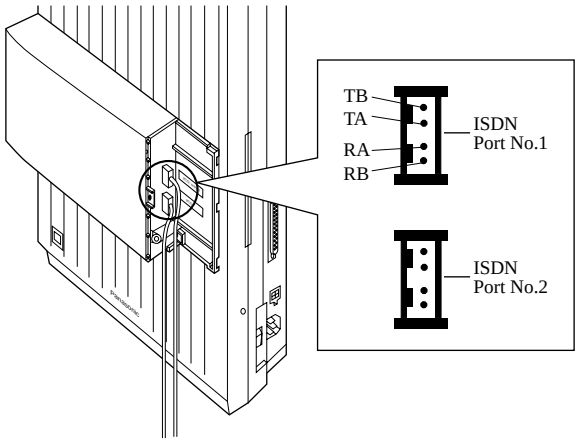


Note

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

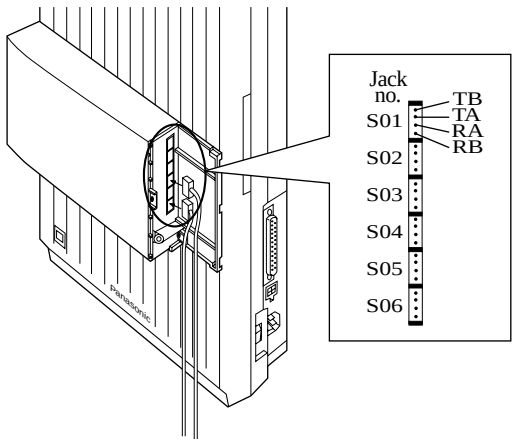
b) Insert the plug into a jack on the unit.
Connect a grounding wire to the ground terminal on the KX-TD280 or KX-TD286.

KX-TD280



To Terminal Board or Modular Jacks from the Central Office

KX-TD286



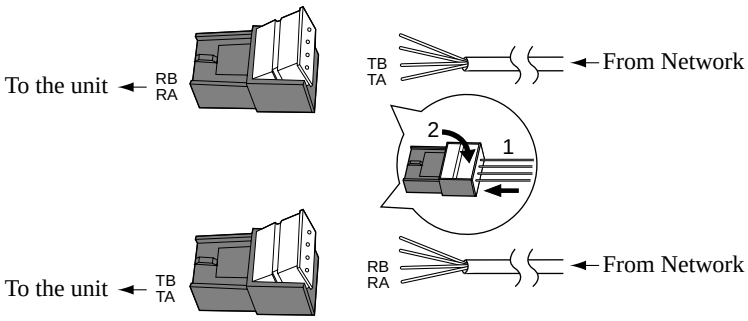
To Terminal Board or Modular Jacks from the Central Office

Note

All ports of the KX-TD280 and KX-TD286 can also be used for internal ISDN lines. For the KX-TD816, jack numbers S05 and S06 of the KX-TD286 are fixed as internal ISDN lines. To connect internal ISDN lines, refer to Section 3.2.3 Internal ISDN S0 Line Connection.

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

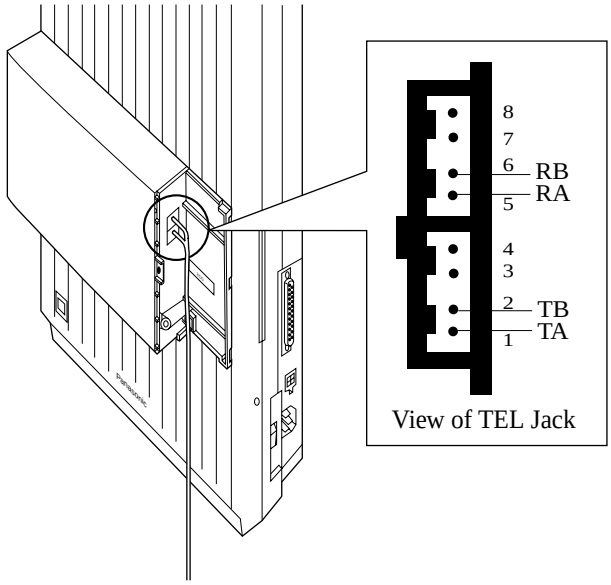
a) Prepare the required plugs. Two 4-pin plugs are included with the KX-TD290.



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 a grounding wire to the ground terminal on the extension expansion unit.

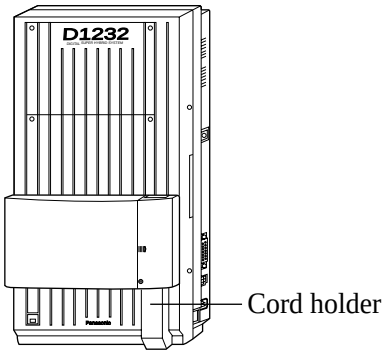


To Terminal Board or Modular Jacks from the Central Office

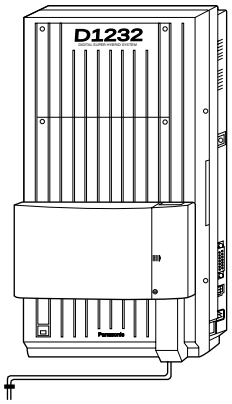
7. Tie all of the cords into a bundle. If other cords are exposed in the upper cabinets, tie them also.

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

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

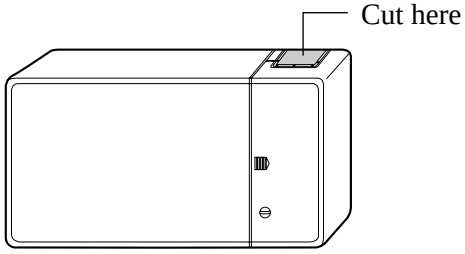


10. Fix the cords to the wall as shown so that the front cover can be opened.



Note

If two or three expansion units are installed, cut the cabinet covers on the lower cabinets to allow the cords from the upper cabinet to go down through the cabinet covers. To protect the cords, smooth the cut edges.



Programming Guide References

[109] Expansion Unit Type

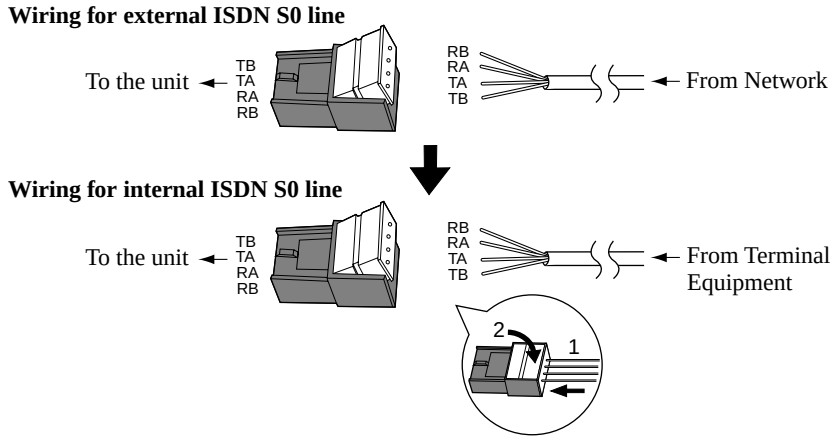
3.2.3 Internal ISDN S0 Line Connection

The ISDN S0 Bus on the 2-ISDN S0 Line Unit (KX-TD280) and the 6-ISDN S0 Line Unit (KX-TD286) can be used as internal S0 bus. Each port can be used as either external or internal ISDN S0 Lines. Some System Programmes are required to use the S0 bus as internal ISDN S0 lines beforehand.

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.

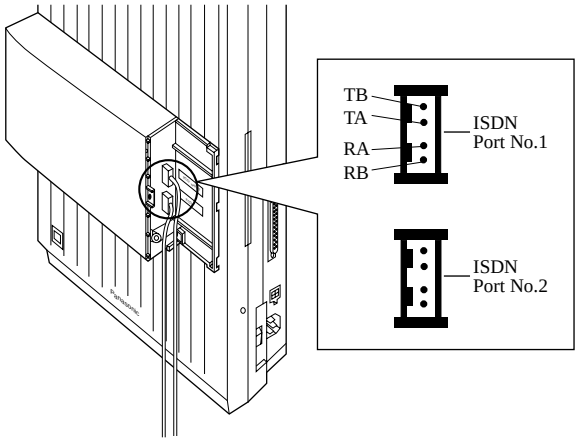


Note

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

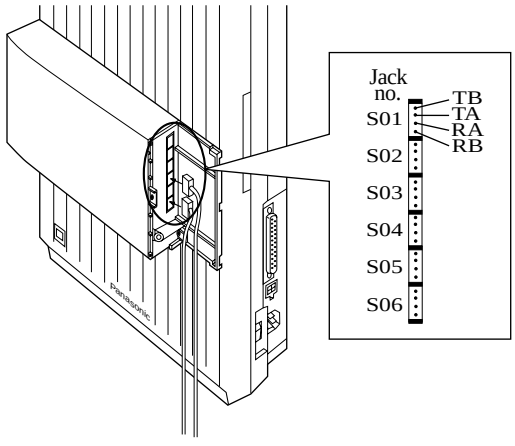
2. Insert the plug into an ISDN S0 port on the unit.

KX-TD280



To ISDN equipment

KX-TD286



To ISDN equipment

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 [423] ISDN Port Type and other required programmes in System Programming.
6. Press the Reset Button with a pointed tool on the main unit.

Note

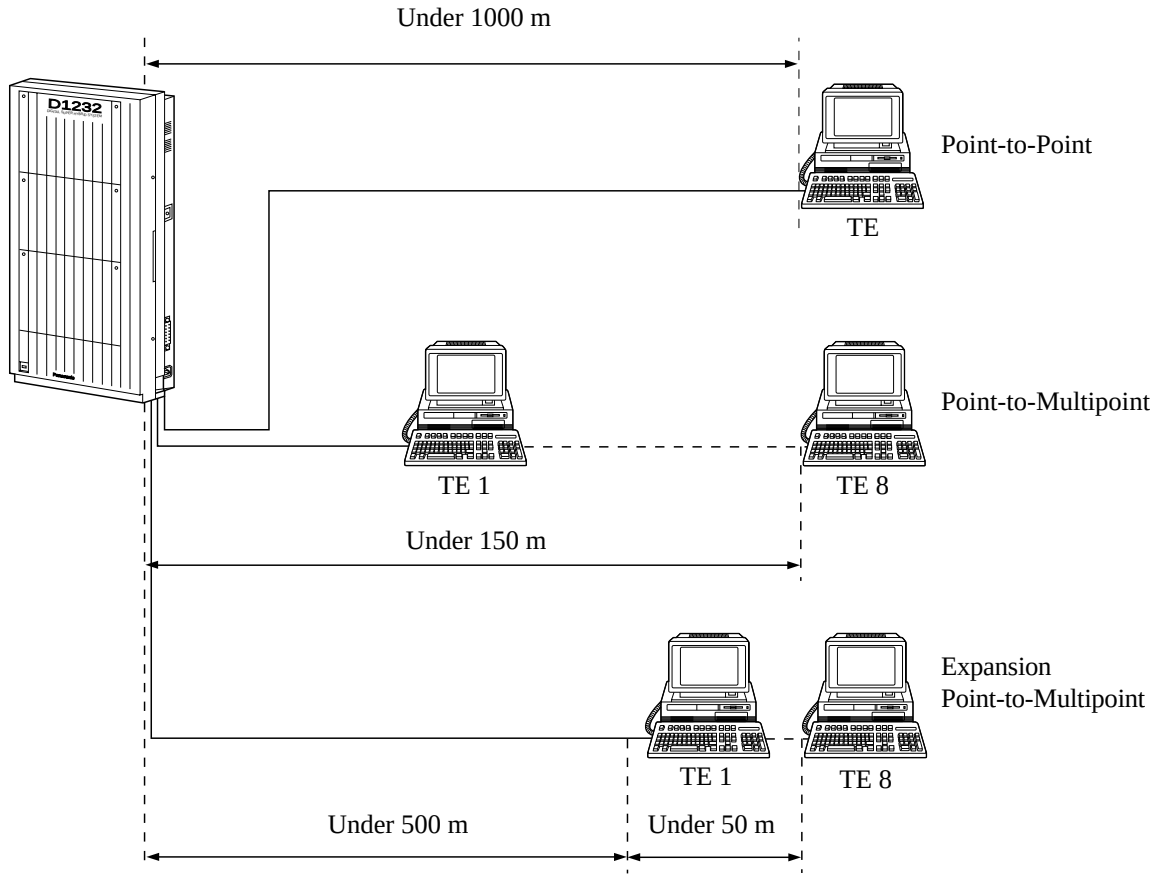
For installing the KX-TD280 or KX-TD286 to main unit, refer to the Section 3.2.2 Installing the Unit respectably.

Features Guide References

Integrated Services Digital Network (ISDN) Extension

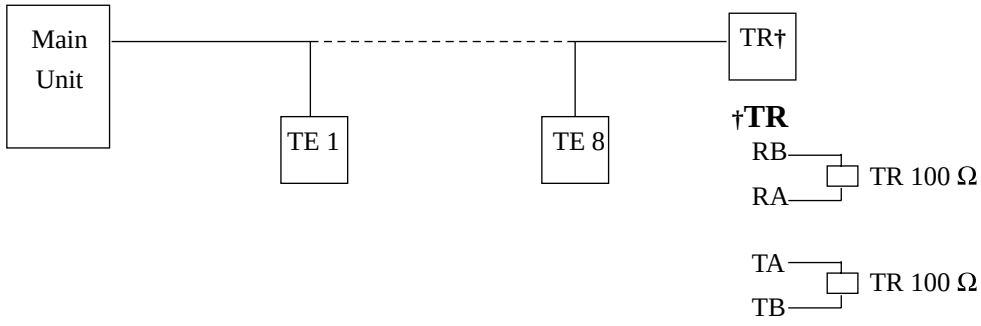
Maximum cabling distance of S0 bus connection

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.

Section 4

E1 Installation

4.1 E1 Line Service Outline

4.1.1 Overview

To use the E1 Line Service, the following unit is required.

E1 Unit (KX-TD188)
This unit adds one E1 line which adds 30 channels (outside lines 24 through 54) to the system. One KX-TD188 can installed to the KX-TD1232 Master system.
When this unit is installed to the system, the maximum number of available outside line is limited to 38. In the case of System Connection, the basic or extended outside line in the Slave system cannot be used.

4.2 E1 Line Installation

4.2.1 Location of the Unit

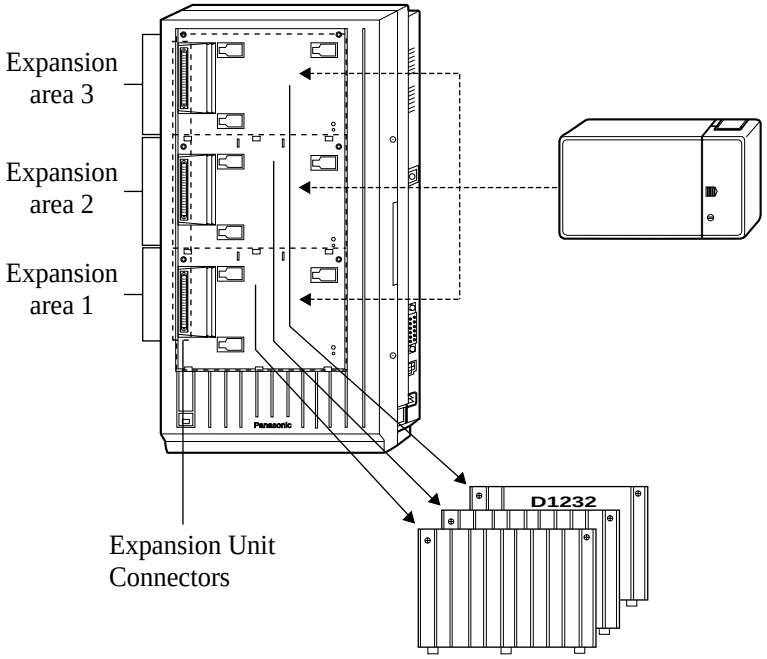
Precautions To protect the printed circuit boards (P-boards) from static electricity, do not touch parts on the P-boards in the main unit and on the optional unit.

One E1 Unit (KX-TD188) can be installed to any expansion area on the KX-TD1232 Master System.

If you use the KX-TD170 or KX-TD174 with the KX-TD188, you must use the KX-TD170-② or KX-TD174-②. The former unit does not work properly with the KX-TD188.

Please see the back of the unit and check "②" is marked.

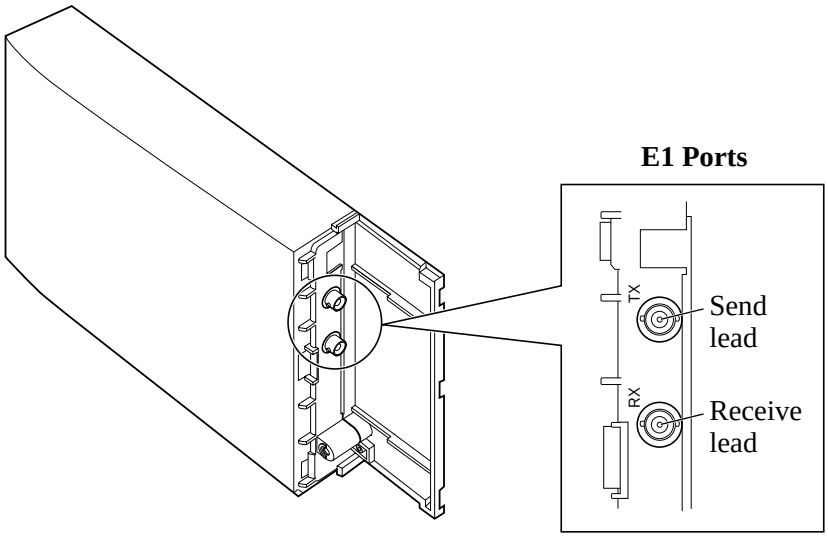
Example



Note

- System Programming is required for expansion unit location.
  <SYS PRG [109]>
  Default : Area 1 = 4-CO Line Unit
  Area 2 and 3 = 8-Station Line Unit
- For unit combination, refer to Section 1.4.2 Expansion Unit Combination.

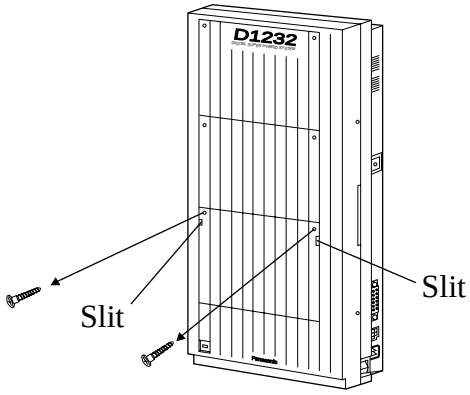
4.2.2 Location of Interfaces



4.2.3 Installing the Unit

Installing one unit to the system allows one E1 line to be connected to outside lines 25 through 54 for the KX-TD1232 Master System.

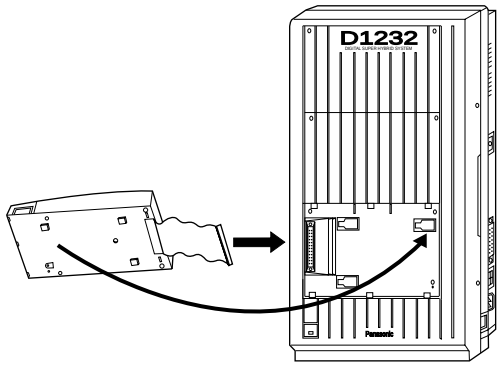
1. Loosen two screws on the cover plate. Insert fingers into the slits to remove the cover plate.



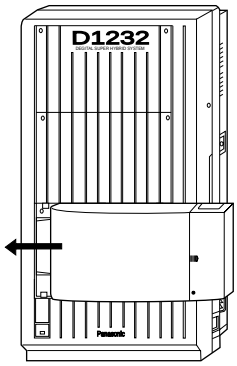
Note

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

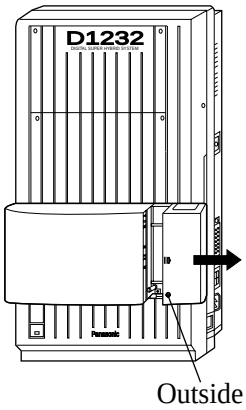
2. Connect the cabinet cord to the connector in the main unit firmly.



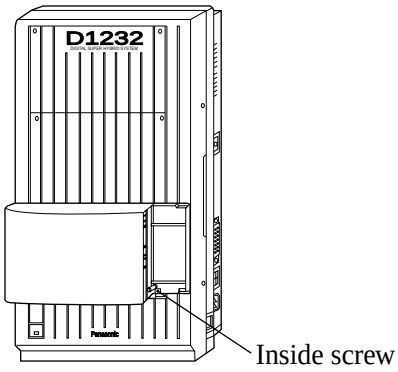
3. Hook the cabinet to the main unit and slide the cabinet to the left until it is secured.



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



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



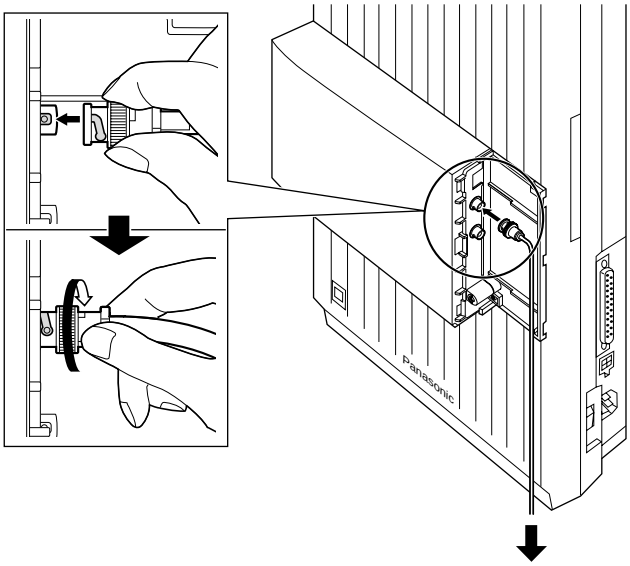
Note

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

6. Insert the coaxial plug of the telephone line cords (2 coaxial cables) into the coaxial jack (E1 port).

a. Align the plug with the jack and push in the plug.

b. Twist the plug until it locks on the connector.

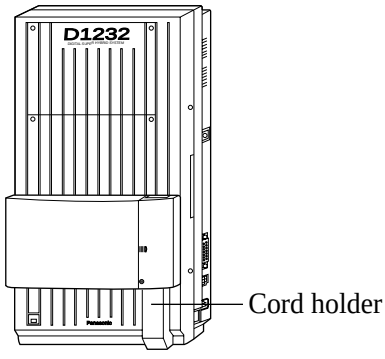


To Coaxial Connectors
from Network

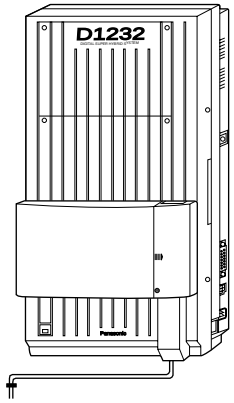
7. Tie all of the cords into a bundle. If other cords are exposed in the upper cabinets, tie them also.

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

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

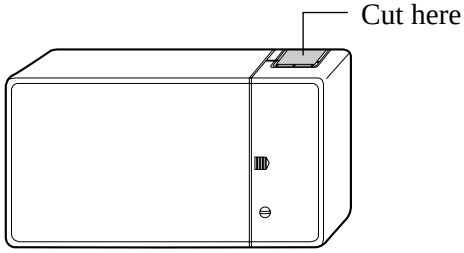


10. Fix the cords to the wall as shown so that the front cover can be opened.



Note

If two or three expansion units are installed, cut the cabinet covers on the lower cabinets to allow the cords from the upper cabinet to go down through the cabinet covers. To protect the cords, smooth the cut edges.



Programming References

[109] Expansion Unit Type

Section 5

Troubleshooting

5.1 Troubleshooting

5.1.1 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 the extension and plug it into the same extension port using a short telephone cord. If the telephone does not work, the connection between the system and the extension must be repaired.
	A telephone with an A-A1 relay is connected.	Use a 2 wire cord. Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position.
	Bad extension.	Take the extension and plug it into another extension port that is working. If the telephone does not work, replace the phone.
Incorrect 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 outside line access number (9/0, 81 through 88) into programming.

5.1.2 Connection

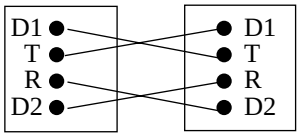
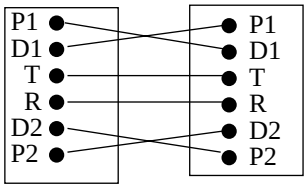
Can you dial an extension?

No

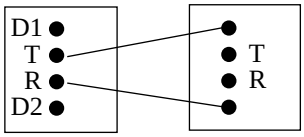
Yes

(Continued on the following.)

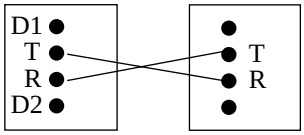
Connection between the system and a proprietary telephone:

CAUSE	SOLUTION
The T/R is connected to the D1/D2.  KX-TD816/ KX-TD1232 extension	Use the correct cord (inner 2 wires are for T/R and the outer 2 wires are for D1/D2).
*The P1/P2 is connected to the D1/D2.  KX-TD1232 extension	Use the correct cord (2 second wires from the outside are for D1/D2 and the 2 outer wires are for P1/P2).

Connection between the system and a single line telephone:

CAUSE	SOLUTION
The T/R is connected to the D1/D2.  KX-TD816/ KX-TD1232 extension	Use the correct cord (inner 2 wires are for T/R). • If a telephone equipped with an A-A1 relay is connected to the system, set the A-A1 relay switch of the telephone to "OFF".

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

CAUSE	SOLUTION
The "T" is connected to the "R".  KX-TD816/ KX-TD1232 extension	Reverse the connections of the T/R.

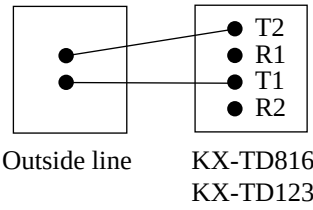
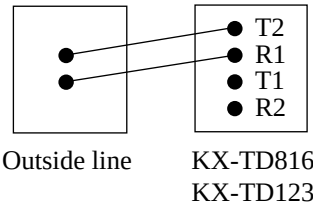
*: Available for the KX-TD1232 only.

(Continued from the previous.)

Can you dial out on an outside line?

No

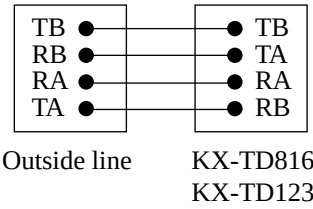
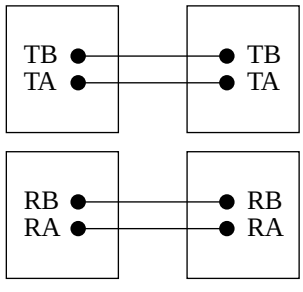
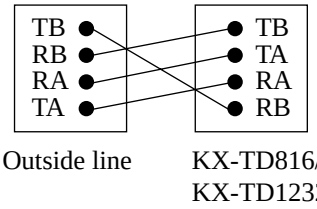
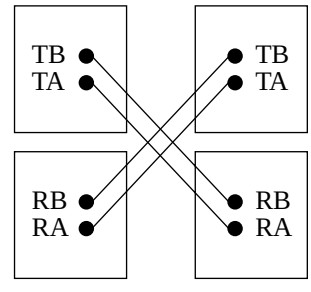
Connection between the central office and the system:

CAUSE	SOLUTION
Outside lines are connected to the T2/T1.  Outside lines are connected to the T2/R1.  	Reconnect the outside lines to the T1/R1 or T2/R2 of the telephone jack using 2-conductor wiring.

Can you dial out on an ISDN line?

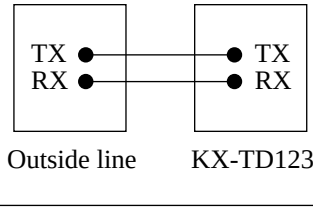
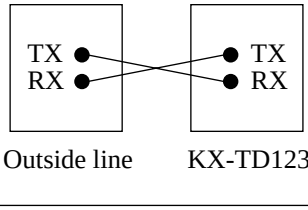
No

Connection between the central office and the system:

CAUSE	SOLUTION
• **For KX-TD280, KX-TD286** Wrong wiring combination. <Example>  • **For KX-TD290** Wrong wiring combination.  	Reconnect correctly as follows.  Reconnect correctly as follows. 

Connection between the central office and the system:

Can you dial out on an E1 line? — No →

CAUSE	SOLUTION
Wrong wiring combination.  	Reconnect correctly as follows. 

5.1.3 Operation

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
• When using the speakerphone mode with a analogue proprietary telephone, nothing is audible.	• The HANDSET / HEADSET selector is set to the "HEADSET" position.	• When the headset is not used, set the HANDSET / HEADSET selector to the "HANDSET" position.
• When using the speakerphone/monitor 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 a power failure, extensions connected to jack numbers 01, 02, 09, 10 for KX-TD816, and 01, 02, 09, 10, 17, 18 for KX-TD1232 do not operate.	• A digital or analogue proprietary telephone (DPT / APT) is connected to the jack. • The dialling mode (tone or pulse) is improper.	• Disconnect the DPT or APT and connect a single line telephone. • Set the Tone / Pulse switch to the other position.
During system connection operation for KX-TD1232, originating an intercom/ outside call from one system to the other system is not possible.	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 Programme [005] Flexible CO Button Assignment in the Programming Guide.

5.1.4 Using the 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.

Note

- When the System Clear Switch is set to "NORMAL", pressing the Reset Button causes the following:
  1. Camp-on is cleared.
  2. Calls on Hold are terminated.
  3. Calls on Exclusive Hold are terminated.
  4. Calls in progress are terminated.
  5. Call Park is cleared.
  All other data stored in memory is not cleared.
- When the System Clear Switch is set to the "CLEAR" position, you must press the Reset Button with caution. 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.

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).
3. If the system still does not work, switch the power off and on again after five minutes.
4. If the system still does not work,
  a) Switch the power off.
  b) Set the System Clear Switch to the "CLEAR" position.
  c) Switch the power on.
  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, switch the power off. If car batteries are connected to the system, disconnect them, too. Then consult an authorised service person.
  When the power supply stops, certain extensions are automatically connected straight to specific outside lines:

KX-TD816

Extension (T, R) of jack number 01: Outside line 01

Extension (T, R) of jack number 02: Outside line 02

Extension (T, R) of jack number 09: Outside line 05

Extension (T, R) of jack number 10: Outside line 06

KX-TD1232

Extension (T, R) of jack number 01: Outside line 01

Extension (T, R) of jack number 02: Outside line 02

Extension (T, R) of jack number 09: Outside line 03

Extension (T, R) of jack number 10: Outside line 04

Extension (T, R) of jack number 17: Outside line 09

Extension (T, R) of jack number 18: Outside line 10

Connect single line telephones to the above extension jacks.

Section 6

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Warning:
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Kyushu Matsushita Electric Co., Ltd.
1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka 812-8531, Japan

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