Revision History

ISSUE	DATE	CONTENTS OF CHANGES	REMARK
ISSUE 1.0	2006.04	Initial release	
ISSUE 1.1	2008.02	Added the DECT (WTIB & WDIB)	

Table of Contents

■ Important Safety Instructions

Safety requirements

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

- Please read and understand all instructions.
- Follow all warnings and instructions marked on the product.
- Unplug this product from the wall outlet before cleaning. Just a damp cloth should be used for cleaning; do not use liquid or aerosol cleaners.
- Do not use this product near water, such as in a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product or personal injury.
- Slots and openings in the KSU 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 a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or other heat source. This product should not be placed in a built-in installation without proper ventilation.
- This product should be operated only from the type of power source indicated on the product label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord could be abused by people walking on it.
- Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
- Never push objects of any kind into this product through KSU slots or connectors 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.
- To reduce the risk of electric shock, do not disassemble this product. Instead, take it to a qualified person when service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risk. Incorrect reassemble can cause electric shock when the appliance is subsequently used.
- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
  - When the power supply cord or plug is damaged or frayed.
  - If liquid has been spilled into the product.
  - If the product has been exposed to rain or water.
  - 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.
  - If the product has been dropped or the KSU has been damaged.
  - If the product exhibits a distinct change in performance.
- Avoid using a telephone during an electrical storm. There may be a remote risk of electric shock from lightning.
- In the event of a gas leak, do not use the telephone near the leak.

Precaution

- Keep the system 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 ipLDK-20 System.
- This system should be kept free of dust, moisture, high temperature (more than 40 degrees) and vibration, and should not be exposed to direct sunlight.
- Never attempt to insert wires, pins, etc. into the system. If the system does not operate properly, the trouble has been repaired by an authorized LG-Nortel service center.
- Do not use benzene, paint thinner, or any abrasive powder to clean the KSU. Wipe it with a soft cloth.

CAUTION

- This system should only be installed and serviced by qualified service personnel.
- When a failure occurs which exposes any internal parts, disconnect the power supply cord immediately and return this system to your dealer.
- To prevent the risk of fire, electric shock or energy hazard, do not expose this product to rain or any type of moisture.
- To protect PCB from static electricity, discharge body static before touching connectors and/or components by touching ground or wearing a ground strap.

WARNING

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Disposal of old appliance

1. When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC.
2. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities.
3. The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.
4. For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or the shop where you purchased the product.

■ Manual Structure

This installation manual is designed to provide as general information for the ipLDK-20 System. It provides instructions for installing the hardware, and programming the ipLDK-20 System using keyset. This manual contains the following sections:

Section 1. Introduction
Provides general information on the ipLDK-20 System, including the system specifications and capacity.

Section 2. KSU Installation
Describes detailed instructions for planning the installation site and procedures to install the ipLDK-20 System.

Section 3. Board Installation
Describes general information and detailed instructions for installing boards and add-on boards.

Section 4. Expansion Module Installation
Describes general information and detailed instructions for installing expansion modules and add-on board.

Section 5. Terminal Connection
Describes the kinds of terminals, maximum distance, and the other device connections for the terminal.

Section 6. DECT installation
Describe the WTIB and WDIB and procedure to install the DECT.

Section 7. Starting the ipLDK-20 System
Provides general information for starting the system and basic preprogramming.

Section 8. Troubleshooting
Provides information on the ipLDK-20 System and troubleshooting.

SECTION 1. INTRODUCTION

1.1 The ipLDK-20 System highlights

Features of the ipLDK-20 System include:

- Flexible architecture
- Optional LAN Interface
- Stable & enhanced voice features
- Simple installation & efficient system management
  - Remote admin through BRI connection
  - Remote admin through PSTN modem
  - Remote admin through LAN connection
- Value-added features
  - Distinctive voice mail
  - CID (CO & SLT)
  - VOIP Service

1.2 System Connection Diagram

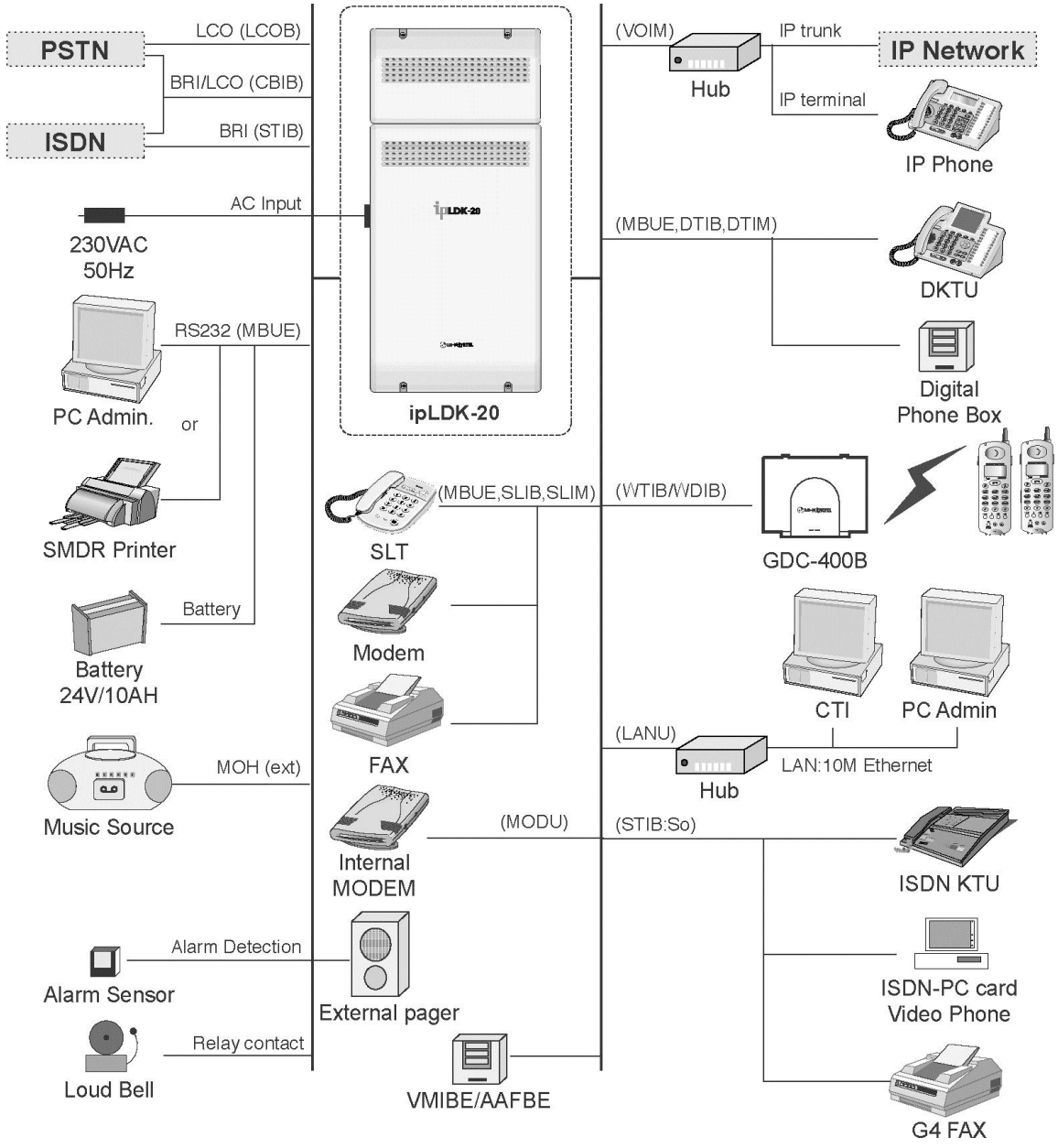


Figure 1.2 ipLDK-20 System Connection Diagram

1.3 System Components

ITEM		OPTION BOARD	DESCRIPTION
KSU			Key Service Unit
PSU			Power Supply Unit, 90W
Main Board	**MBUE**		Main Board Unit (4LCO, 1DKT, 3DKT/SLT, and 4SLT)
		CO boards	Central Office Line interface boards (LCOB, STIB, CBIB)
		EXT boards	Extension boards (DTIB, SLIB, EXTB)
CO Line Boards	**LCOB**		Loop Start CO Interface, 4 lines
		PRU4	Polarity Reversal detection Unit
		PRCPTU4	Polarity Reversal & Call Progress Tone detection Unit
		CPCU4	Caller-ID(FSK), Polarity Reversal & Call Progress Tone detection Unit
		CPCU4D	Caller-ID(DTMF), Polarity Reversal & Call Progress Tone detection Unit
	LCOB2		Loop Start CO Interface, 2 lines
		PRU4	Polarity Reversal detection Unit
		PRCPTU2	Polarity Reversal & Call Progress Tone detection Unit
		CPCU2	Caller-ID(FSK), Polarity Reversal & Call Progress Tone detection Unit
		CPCU2D	Caller-ID(DTMF), Polarity Reversal & Call Progress Tone detection Unit
	CBIB		Loop Start CO Interface, 2 lines Basic Rate Interface Board (T mode only), 1 line (2 channels)
		PRU4	Polarity Reversal detection Unit
		PRCPTU2	Polarity Reversal & Call Progress Tone detection Unit
		CPCU2	Caller-ID(FSK), Polarity Reversal & Call Progress Tone detection Unit
		CPCU2D	Caller-ID(DTMF), Polarity Reversal & Call Progress Tone detection Unit
	STIB		ISDN Basic Rate (S/T) Interface Board, 2 lines (4 channels)
	STIB1		ISDN Basic Rate (S/T) Interface Board, 1 line (2 channels)
Extension Boards	**DTIB4**		Digital Terminal Interface Board, 4 ports
	DTIB8		Digital Terminal Interface Board, 8 ports
	SLIB4		SLT Interface Board, 4ports
	SLIB8		SLT Interface Board, 8ports
	EXTB		Dummy extension board for VOIM
	WTIB		Wireless Terminal Interface Board, 4 ports
	WDIB		WTI (4 ports) + DKT (4ports)
Other Boards	**VMIB**		Voice Mail Interface Board, 3 channels
	AAFB		Auto Attendant Function Board, 2 channels
	VMIBE		Voice Mail Interface Board Enhanced, 4 channels
	AAFBE		Auto Attendant Function Board Enhanced, 3 channels
	LANU		LAN interface Unit (10Mbase-T only)
	MODU		MODEM unit (33Kbps)
Expansion Modules	**VOIM**		Voice over Internet protocol interface module (4 channels)
		VOIU	Voice over Internet protocol interface unit (4 channels)
	SLIM		SLT Interface module, 8 ports
	DTIM		Digital Terminal Interface module, 8 ports

1.4 Specifications

1.4.1 General specifications

ITEM	DESCRIPTION	SPECIFICATION
PSU	AC Voltage Input	230 +/-10% Volt AC @47-63Hz
	AC Power	90W
	AC Input Fuse	1.25A @ 250Volt AC
	DC Output Voltage	+5, -5, +30Volt DC
AC Adaptor for Expansion Module.	AC Voltage Input	230 +/-10% Volt AC @47-63Hz
	AC Input Fuse	1A @ 250Volt AC
	DC Output Voltage	48Volt DC
Battery Backup	Input Voltage	24 Volt DC
	Battery Fuse	5.0A @ 250Volt AC for basic KSU
		2.0A @ 250Volt AC for expansion module
	Charging Current	Max. 100mA
	Battery Load Current	Max. 4.5A (Basic KSU : Max.3A, Expansion module : Max.1.5A)
External Relay Contact		1A @ 30 Volt DC
PFT Relay Contact		1A @ 30 Volt DC
Music Source Input		0 dBm @ 600ohm
External Paging Port		0 dBm @ 600ohm
Ring Detect Sensitivity		30Vrms @ 16-55Hz
DTMF Dialing	Frequency Deviation	Less than +/-1.8%
	Signal Rise Time	Max.5ms
	Tone Duration, on time	Min.50ms
	Inter-digit Time	Min.30ms
Pulse Dialing	Pulse Rate	10 PPS
	Break/Make Ratio	60/40% or 66/33%
Operating Environment	Temperature	0(℃)-40(℃)
	Humidity	0-80%(non condensing)
Dimension	KSU	260mm(W)*410mm(H)*86mm(D)
	Expansion Module	260mm(W)*145mm(H)*86mm(D)
Weight	KSU	2.5Kg
	Expansion Module	DTIM/SLIM: 1.16Kg, VOIM: 0.58Kg
LANU	LAN Interface	10 Base -T Ethernet (IEEE 802.3)
	Speed	10 Mbps
	Duplex	Half duplex or Full duplex (Auto-Negotiation)
MODU	Analog modem	Bell, ITU-T, V.34, V.32BIS, V.90
		300bps up to 33Kbps speed rate
		Automatic rate negotiation
VOIM	LAN Interface	10 / 100 Base-T Ethernet (IEEE 802.3)
	Speed	10 Mbps or 100 Mbps (Auto-Negotiation)
	Duplex	Half Duplex or Full Duplex (Auto-Negotiation)
	VOIP Protocol	H.323 Revision 3
	Voice Compression	G.711/G.726/G729/G.723.1
	Voice/Fax Switching	T.38
	Echo cancellation	G.165

1.4.2 System Capacity

DESCRIPTION	CAPACITY/BOARD	TOTAL
Time Slots		96
CO Line Ports	4/MBUE(LCO) 2/LCOB2, 4/LCOB, 4/STIB, 4/CBIB or 8/VOIM	Max. 16 (Analog CO, ISDN BRI and/or IP trunk)
Max direct Station connections	8/MBUE 8/DTIB or 8/SLIB 8/DTIM, 8/SLIM, or 8/VOIM 16/WTIB, 24/WDIB	Max. 28
Max LAN port	1/LANU	1
Max MODEM Channel	1/MODU	1
Attendant Positions	5/System	
Intercom Links	Non-blocking	
Paging - All Call - Internal		 1 zone 5 zones
Station Speed Dial	100/station, 24 digits each	500
System Speed Dial	24 digits each	500
Last Number Redial	10	32 digits
CO Line Group	8	8
Station Group	10	10
Conference	3-Party	no limit
Music Source Input	1/MBUE	1
External Paging	1/MBUE	1
External Control Contact	2/MBUE	2
Alarm Input	1/MBUE	1
RS-232C Port	1/MBUE	1
DTMF Receiver	3/MBUE, 2/SLIB, 2/SLIM	7
Auto Fax detection	1/MBUE	1
Max. DECT Phone	16/WTIB	16
Max. DECT Phone + Max. DKT	16 WTI + 8 DKT/WDIB	24

SECTION 2. KSU INSTALLATION

2.1 Pre-Installation

Please read the following guidelines concerning installation and connection before installing the ipLDK-20 System. Be sure also to comply with applicable local regulations.

2.1.1 Safety installation instructions

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

- Never install the telephone wiring during a lightning storm.
- Never install the telephone jack in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Anti-static precautions should be taken during installation.

2.1.2 Installation precautions

The ipLDK-20 System is designed for wall mounting or a free-standing rack. Avoid installing in the following places.

- In direct sunlight and hot, cold, or humid places. Temperature range : 0 to 40℃
- Places where shocks or vibrations are frequent or strong.
- Dusty places, or places where water or oil may come into contact with the system.
- Near high-frequency generating devices such as sewing machines or electric welders.
- On or near computers, fax machines, or other office equipment, as well as microwave ovens or air conditioners.
- Do not obstruct the area around the ipLDK-20 System (for reasons of maintenance and inspection)
- Do not block the openings on the top of the ipLDK-20 System.
- Do not stack up the optional service boards.

2.1.3 Wiring precautions

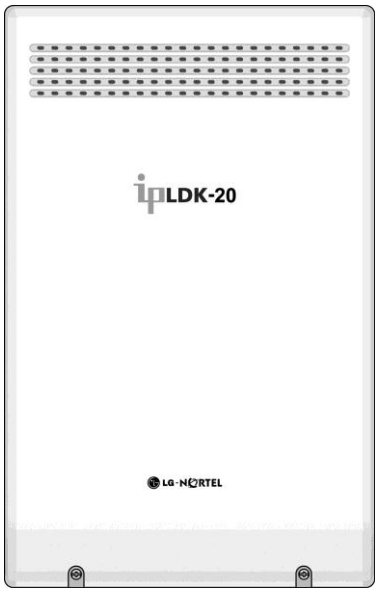
Be sure to follow these precautions when wiring.

- Do not wire the telephone cable in parallel with an AC power source, such as a computer, fax machine, etc. If the cables are run near those wires, shield the cables with metal tubing or use shielded cables and ground the shields.
- If the cables are run on the floor, use protectors to prevent the wires from being stepped on. Avoid wiring under carpets.
- Avoid using the same power supply outlet for computers, fax machines, and other office equipment to avoid induction noise interruption when using the ipLDK-20 near other machines.
- The power and battery switches of the ipLDK-20 System must be OFF during wiring. After the wiring is completed, the power switch may be turned ON.
- Incorrect wiring may cause the ipLDK-20 System to operate improperly.
- If an extension does not operate properly, disconnect the telephone from the extension line and then re-connect, or turn the power of the ipLDK-20 System OFF and ON again.
- Use twisted pair cable for CO line connection.

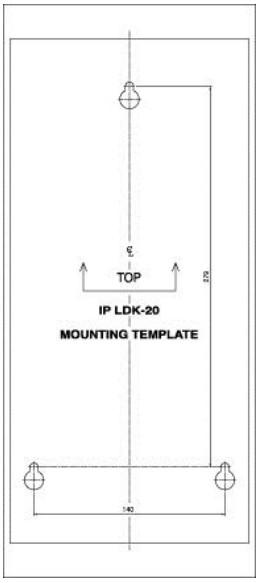
2.2 KSU Installation

2.2.1 Unpacking

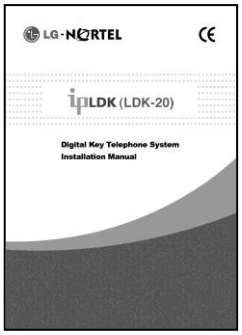
Open the box and verify the items shown in Figure 2.2.1 are included:



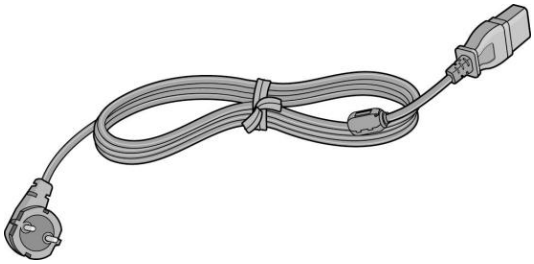
Key service unit



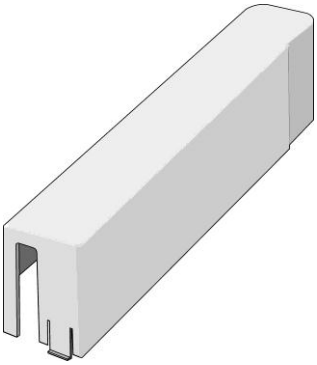
Mounting template



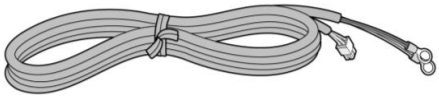
Manual



Power cord



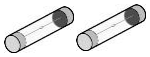
Cord cover(Optional)



Battery cable

Tie cable

Anchor plug



Fuse

Screw

Figure 2.2.1 Carton contents

2.2.2 KSU exterior and dimension

Figure 2.2.2 shows the exterior and dimensions of the KSU:

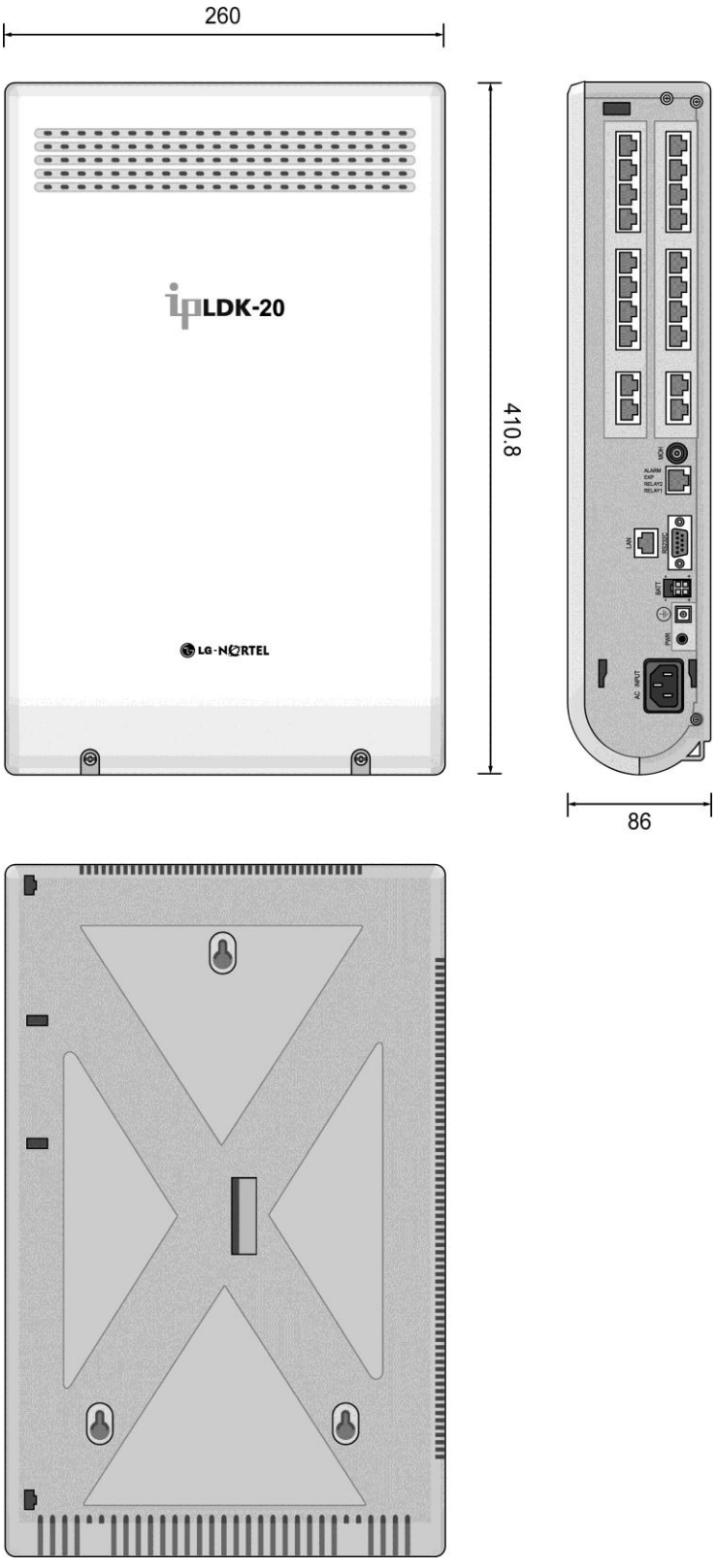


Figure 2.2.2 KSU exterior and dimension

2.2.3 KSU with expansion module exterior and dimension

Figure 2.2.3 shows the exterior and dimensions of the KSU:

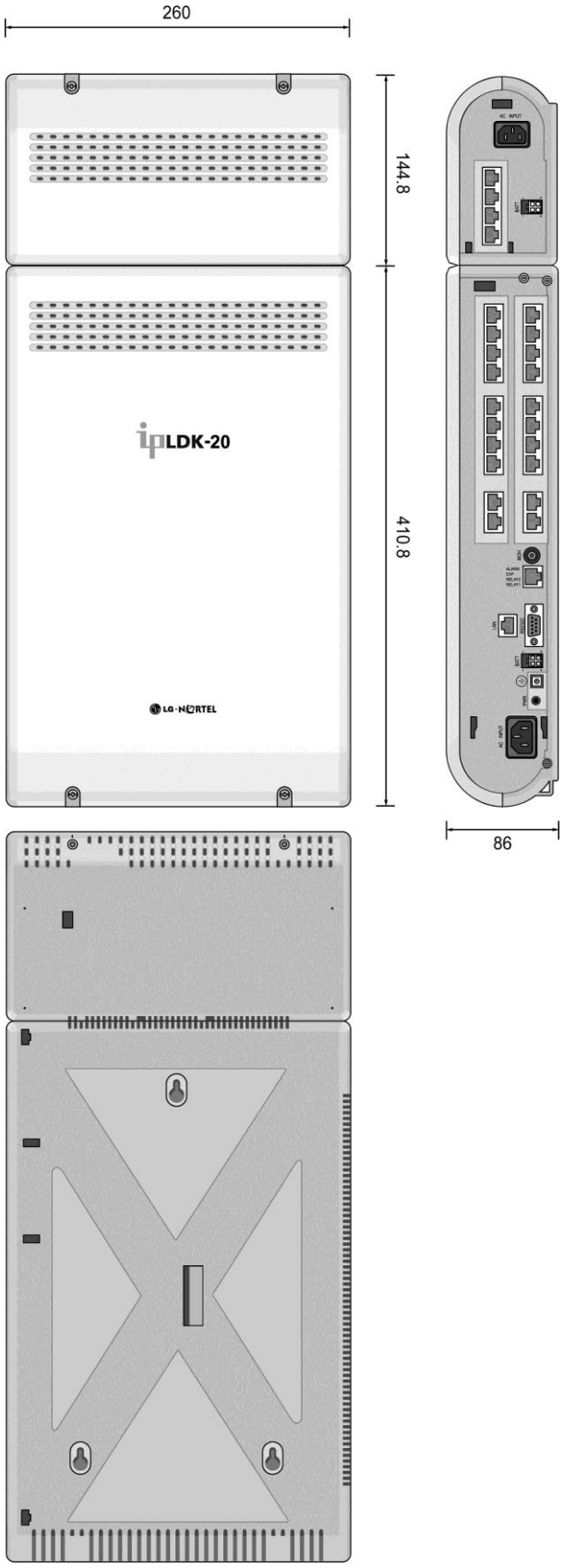


Figure 2.2.3 KSU with expansion module exterior and dimension

2.2.4 Opening and closing the front cover

2.2.4.1 Opening the front cover

1. Turn the screw counter-clockwise to loosen as shown in Figure 2.2.4.1.
2. Lift the front cover in the direction of the arrow as shown:

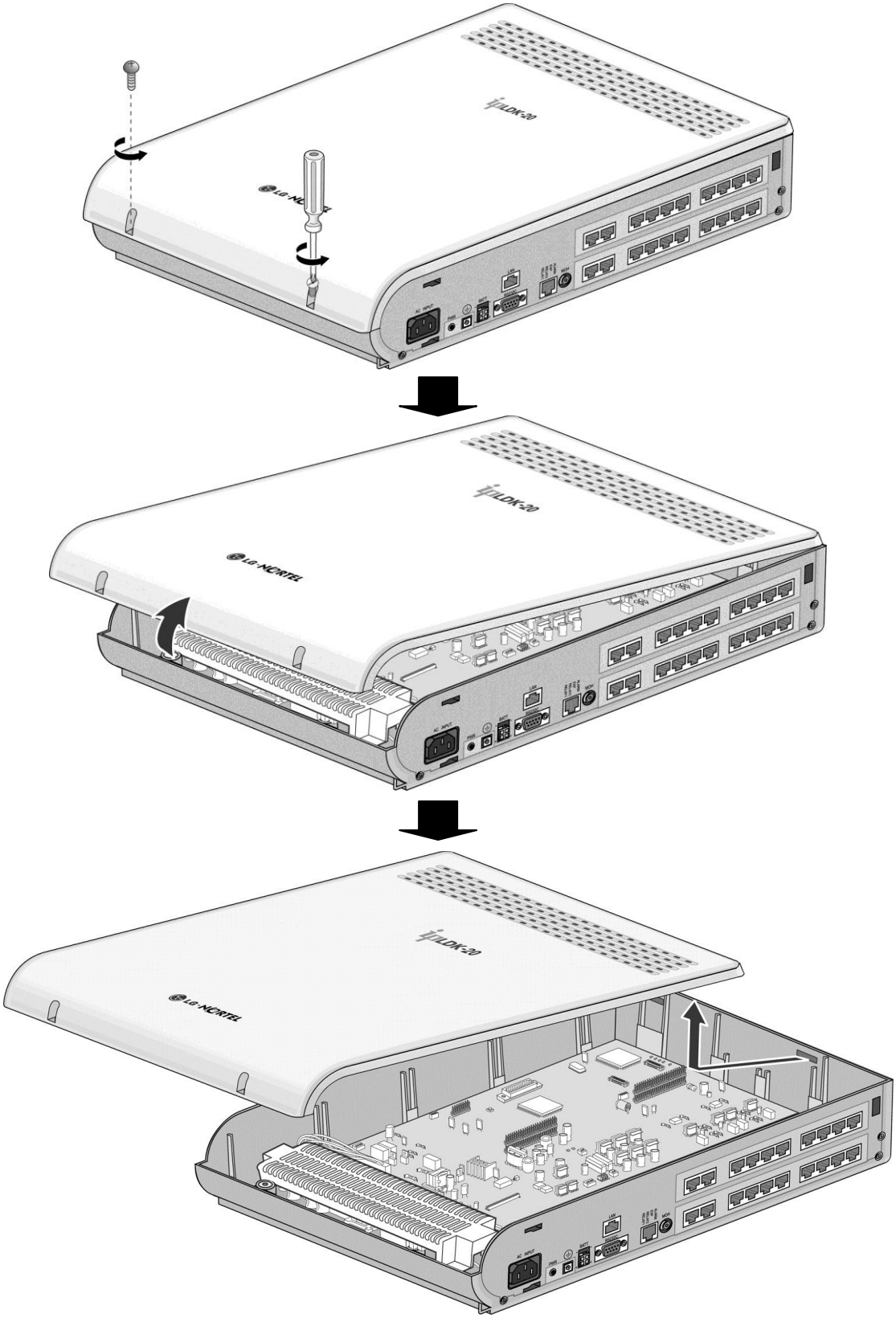


Figure 2.2.4.1 Opening the front cover

2.2.4.2 Closing the front cover

1. Insert the front cover into the slot on the KSU as show in Figure 2.2.4.2.
2. Then put the front cover down on the KSU in the direction of the arrow, as shown.
3. Turn the screws clockwise to tighten, as in the Figure.

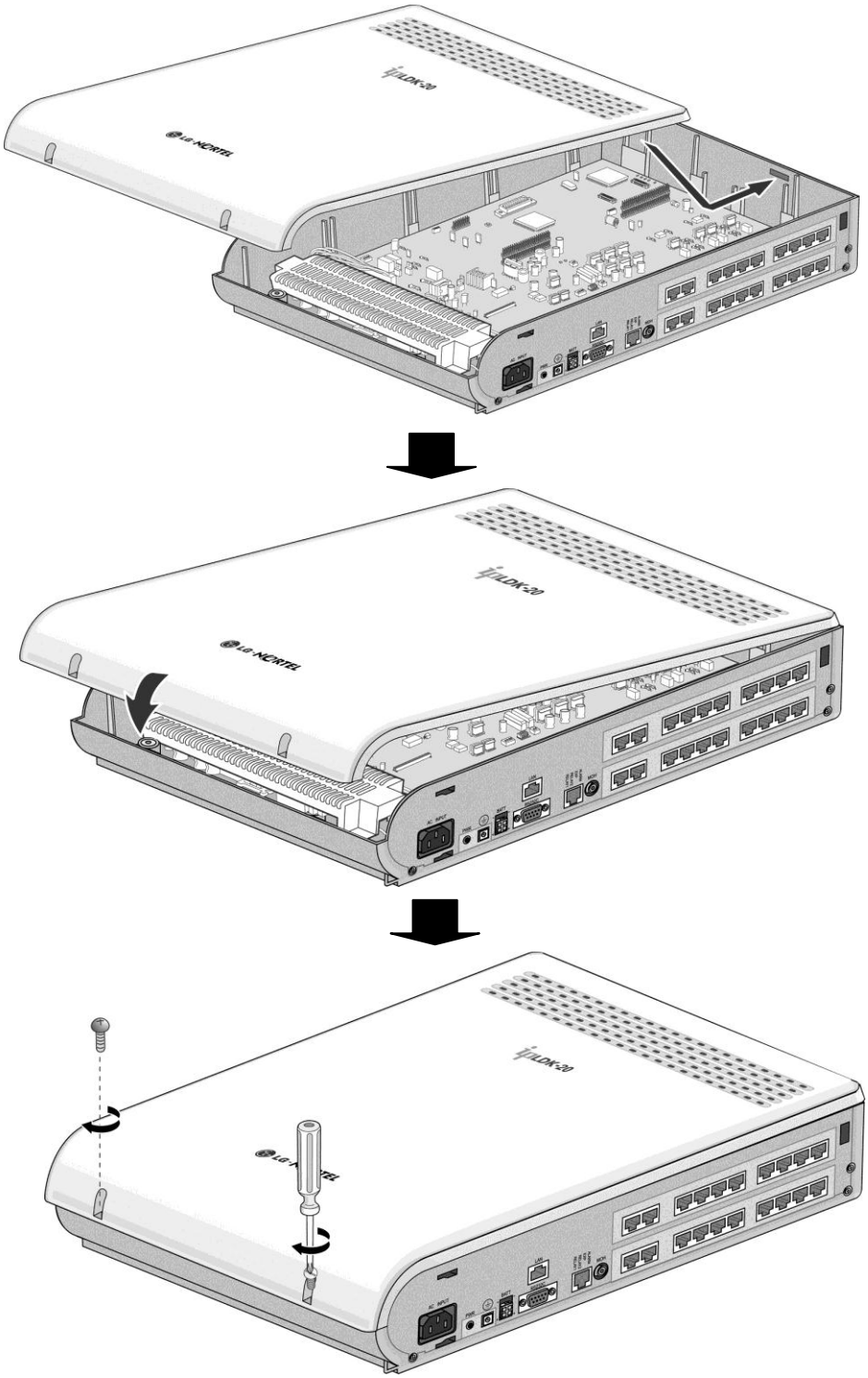


Figure 2.2.4.2 Closing the front cover

※ NOTE

For safety reasons, close the front cover and tighten the screws prior to operating the ipLDK-20 System.

2.2.5 Frame ground connection

It is very important the frame of the ipLDK-20 system is grounded:

1. Turn the screw counter-clockwise to loosen. Then insert the grounding wire.
2. Tighten the screw. Then connect the grounding wire to ground source as shown in Figure 2.2.5.

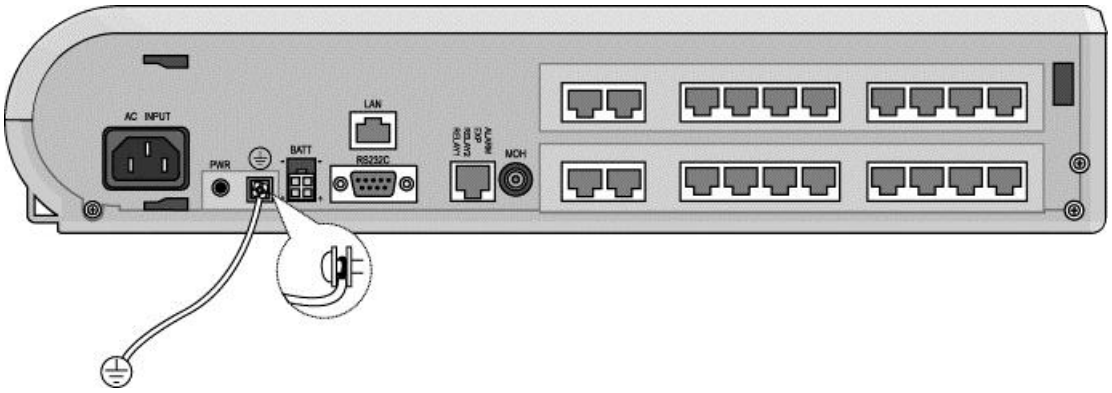


Figure 2.2.5 Grounding the KSU

CAUTION

- The equipment should be connected to a socket-outlet with a protective ground connection.
- For ground wire, green-and-yellow insulation is required, and the cross-sectional area of the conductor must be more than UL 1015 AWG# 18 (1.0mm). It is recommended that the ground wire be shorter than 1 meter (3.28 feet).
- Proper grounding is very important to protect the ipLDK-20 system from external noise or to reduce the risk of electrocution in the event of lightning strike.
- Be sure to comply with applicable local regulations.

2.2.6 Power Supply Unit (PSU) installation

The PSU has been installed in the KSU as a default when shipped.

Before installation, make sure that the KSU not plugged into an outlet. The PSU is located at the left-most area of the KSU, and is capable of providing three kinds of power sources to MBUE through the 7PIN connector, CN19 (refer to the following table).

The AC Input Voltage and Fuse Rating

RANGE OF INPUT VOLTAGE	CONNECT TO	FUSE RATINGS
207V AC - 253V AC	CN19 on the MBUE	1.25A @250V

PSU Capacity

PSU TYPE	+5V DC	-5V DC	+30V DC
PSU (SMPS)	3.0A	100mA	1.9A

1. Make sure that the ground wire(Green & Yellow) of PSU is contacted to GND point on the MBUE by tightening the screw as shown in Figure 2.2.5a.

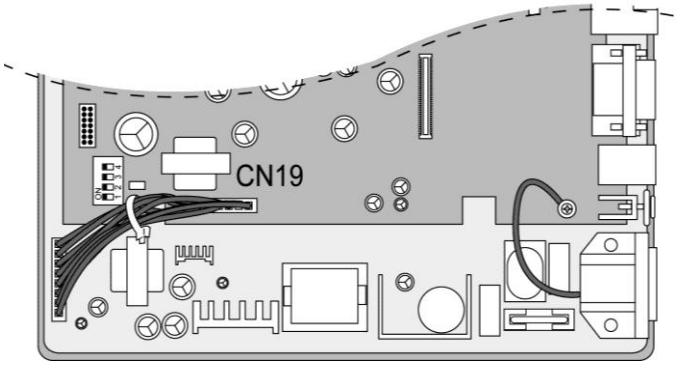


Figure 2.2.6a PSU Installation

2. Place the PSU cover on the PSU as shown in Figure 2.2.6b. Then turn the screws clockwise to tighten, and secure.

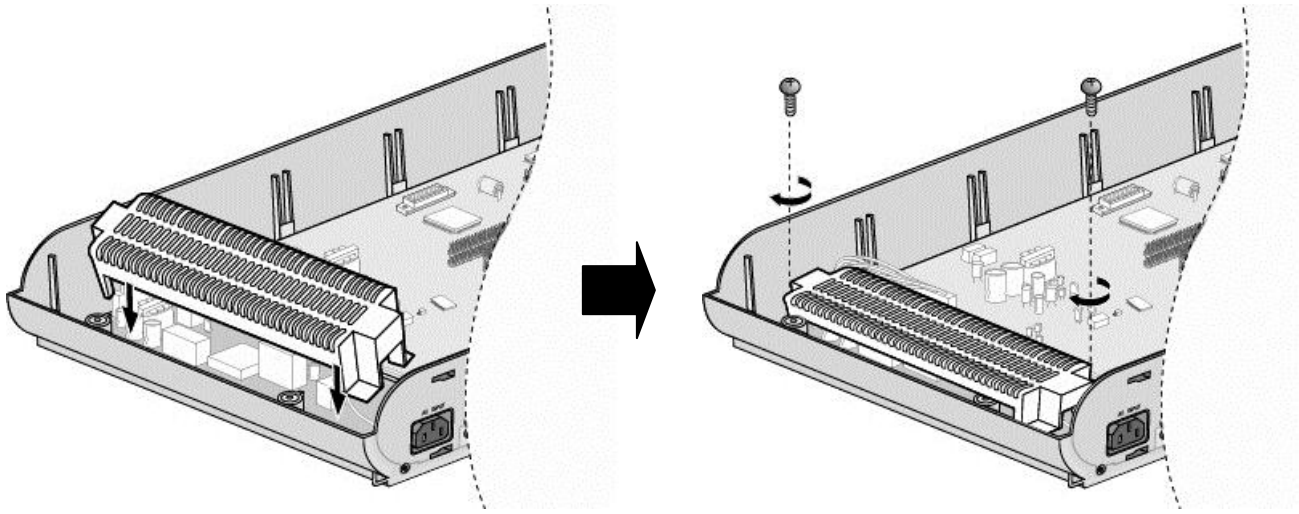


Figure 2.2.6b PSU Installation

2.2.7 External backup batteries installation

In case of power failure, the external backup batteries automatically maintain uninterrupted power for the ipLDK-20 system. The external batteries must provide 24 Volts DC. This is generally accomplished by connecting two 12 Volt batteries in a series arrangement.

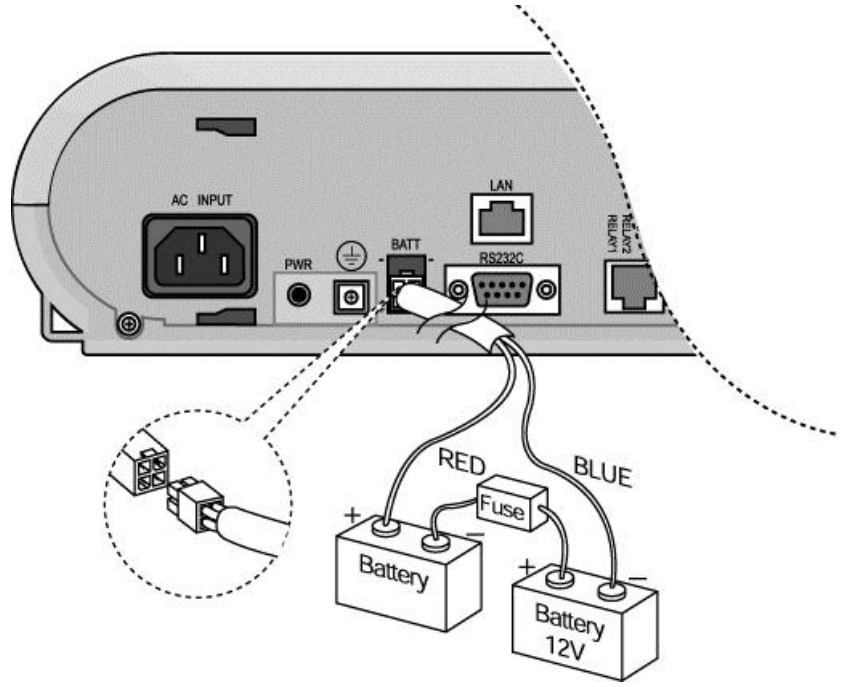


Figure 2.2.7 External Back Up Battery Installation

※ ***Note*** *: The cable for connecting the battery is supplied with the KSU.*

Operation of the batteries is controlled by the MBUE. This ipLDK-20 MBUE will provide charging current to the batteries during normal AC power operation at a maximum of about 100mA. During battery operation, the battery operation of MBUE will be stopped if the AC power re-applied or the battery voltage is too low to maintain full-system operation.

The external batteries can maintain system operation as needed depending on several elements such as, battery charge status, condition and capacity of the batteries, and system configuration (number of station ports).

CAUTION

- It is recommended to use an external backup battery fuse (5A @250V) between battery and system.
- Recommended battery capacity is 24V/10AH MF battery; the ipLDK-20 system should operate more than 3 hours with batteries that are in good condition.
- Carefully check the battery polarity with cable colors (RED and BLUE) when connecting the battery to the system.
- Make sure that you do not short-out the external backup batteries or cables.
- There is a danger of explosion if external backup batteries are incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

2.2.8 KSU mounting

2.2.8.1 Wall mounting

1. Install 3 anchor plugs in the wall using the mounting template included for accurate placement (Figure 2.2.8.1a).
2. Attach the mounting template with the included 3 screws.
3. Hook the KSU onto the screws, making sure that the system slides down securely (Figure 2.2.8.1b).

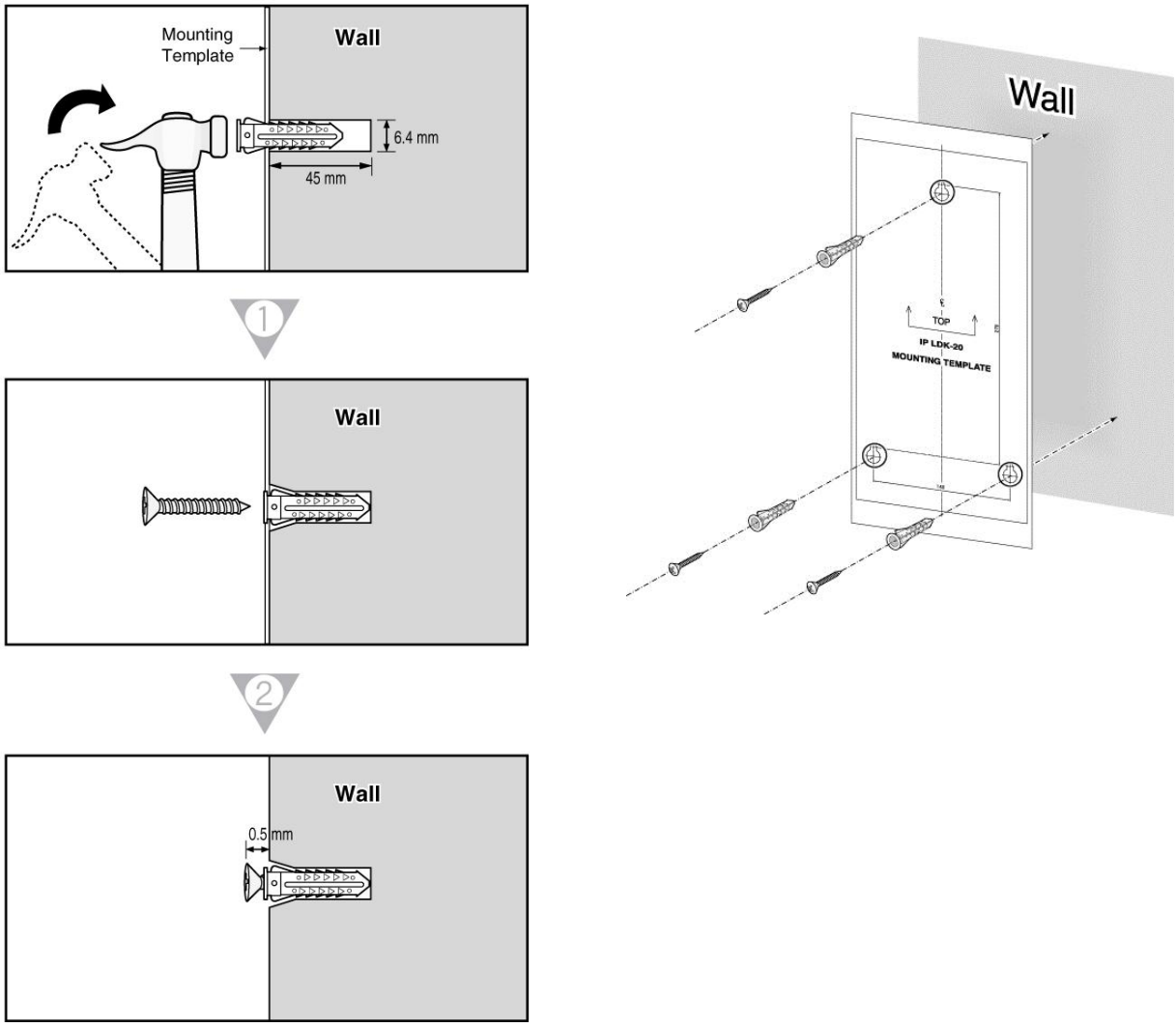


Figure 2.2.8.1a Mounting Template

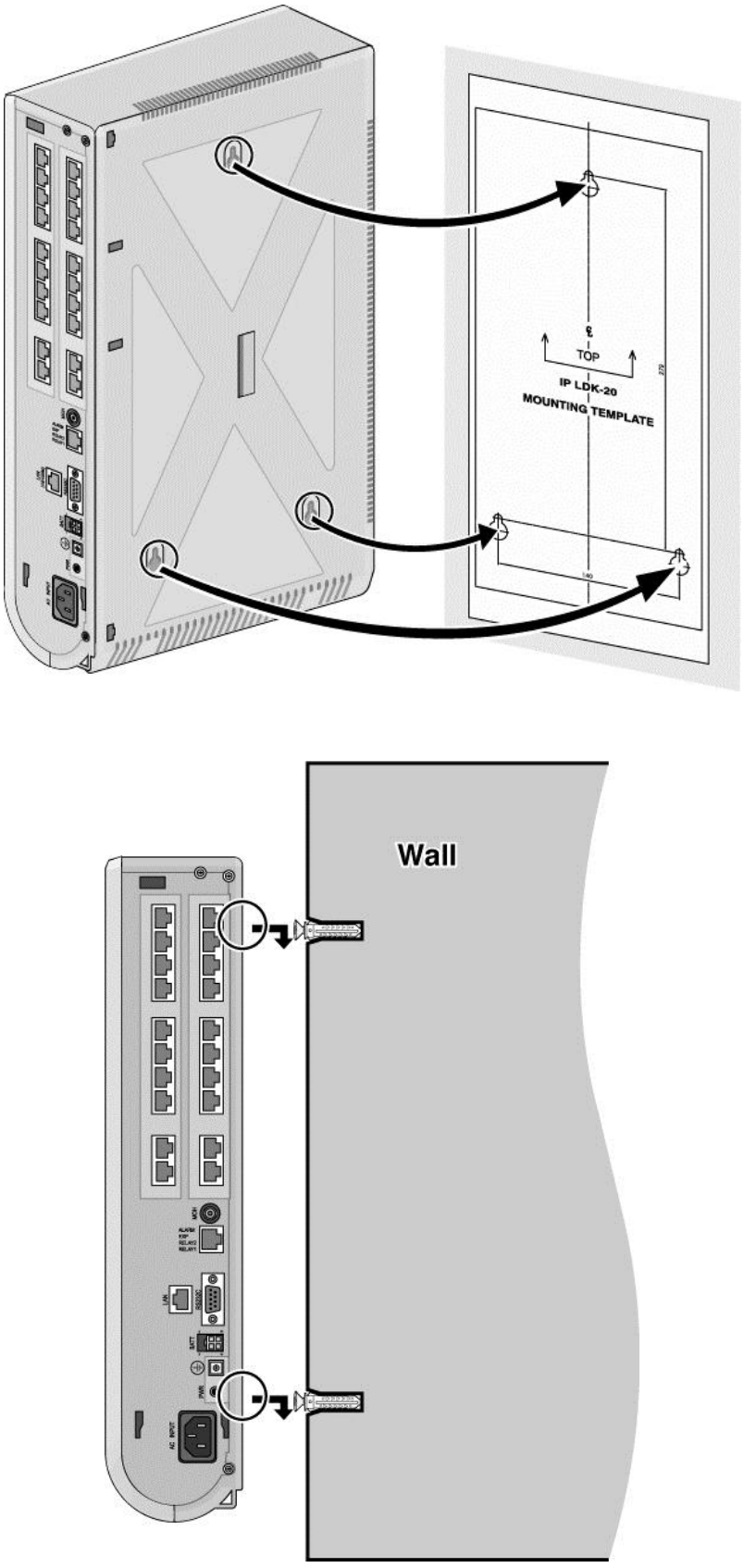


Figure 2.2.8.1b KSU Wall Mounting

※ Note : Be careful not to drop the KSU.

2.2.8.2 Rack mounting

1. Attach the rack bracket to the bottom of the ipLDK-20 system as shown in Figure 2.2.8.2a, and attach it to the system securely by tightening the screws clockwise.

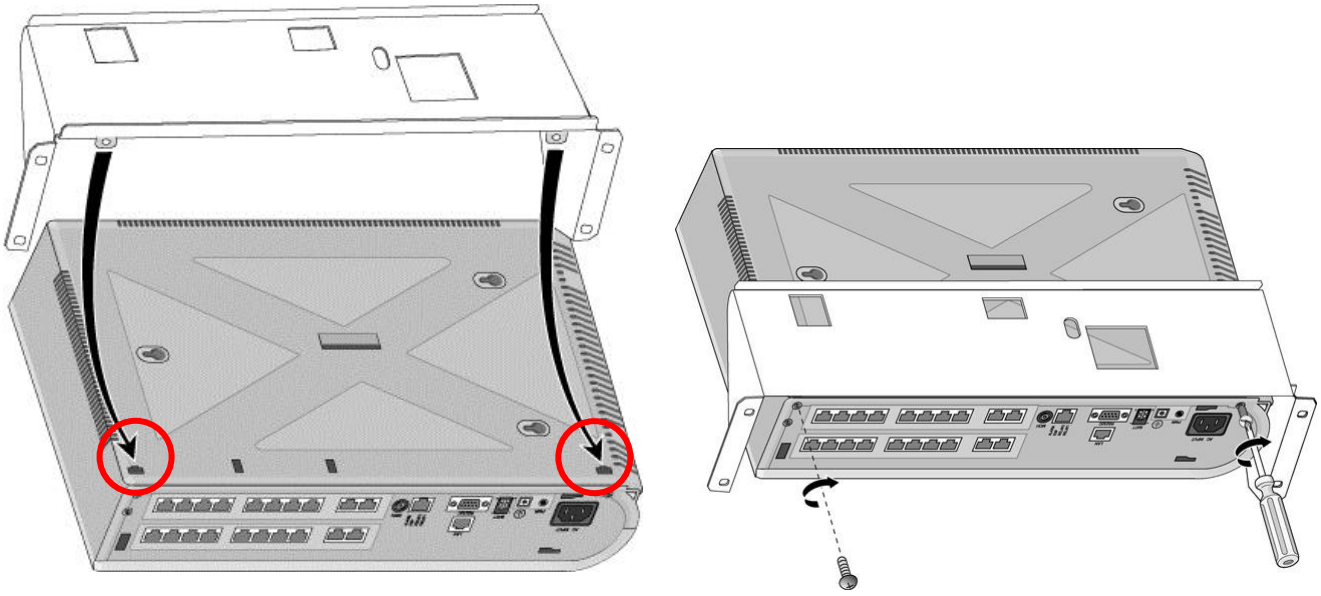


Figure 2.2.8.2a Rack Bracket

2. To attach the ipLDK-20 system to the rack, affix the bracket with the 4 screws provided (Figure 2.2.8.2b).

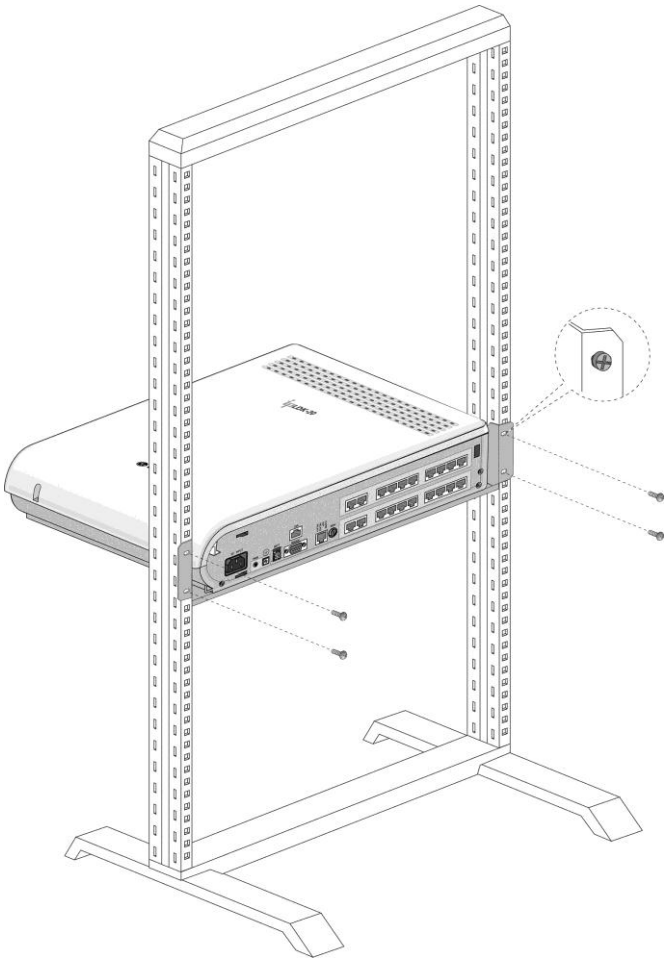


Figure 2.2.8.2b KSU Rack Mounting

SECTION 3. BOARD INSTALLATION

3.1 Installation of the Boards

Prior to Board Installation, the following should be considered:

CAUTION

- Power must be turned OFF.
- To protect the system from static electricity, do not touch the boards. To discharge static, touch a grounded object, or wear a grounding strap.
- Insert boards carefully to avoid bending connector pins (male pins on MBUE).

To install the board, perform the following Steps:

1. Before inserting the board, remove the dummy, shown #1 in Figure 3.1.
2. Holding the board as shown in #2 of the diagram, insert the board in the direction of the arrow carefully so that the board securely engages with the connector on the main board (#3).

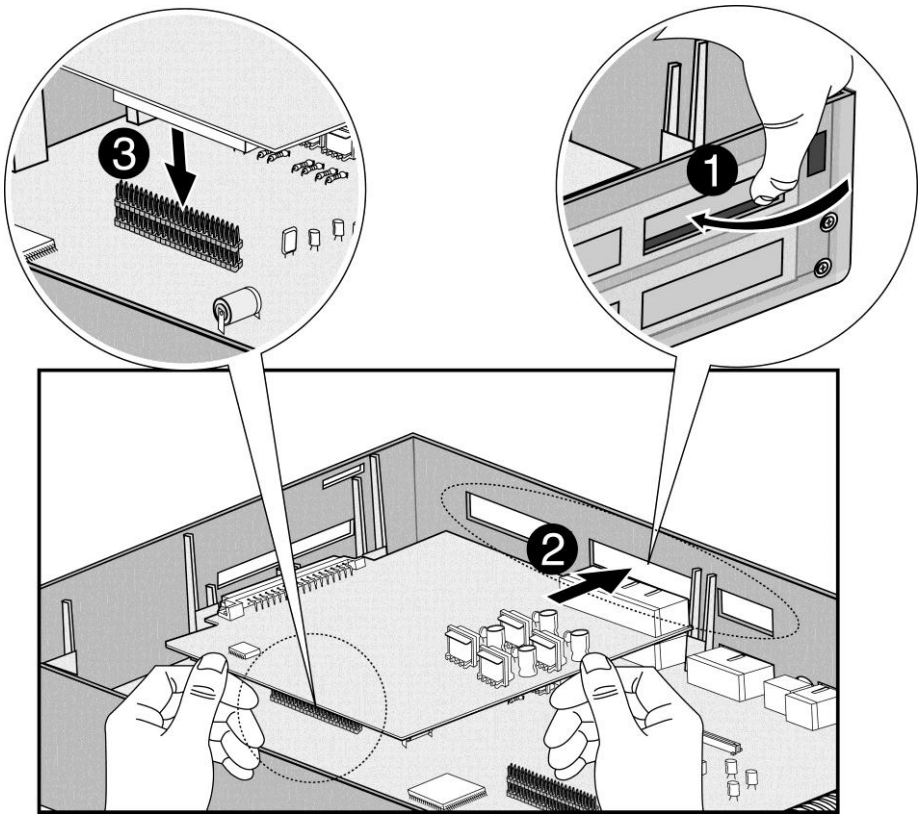


Figure 3.1 Board Installation

3.2 MBUE (Main Board Unit)

Description

The MBUE controls communication between the peripheral interfaces, supervises all resources in the system, controls the gain adjustment of the PCM signal, generates the system tones, and manages system call processing.
The MBUE (Figure 3.2a) incorporates the main control of the system, and is composed of the main microprocessor (RAM and ROM), the PCM management (the CO/Extension interface circuits), and miscellaneous functional circuits.

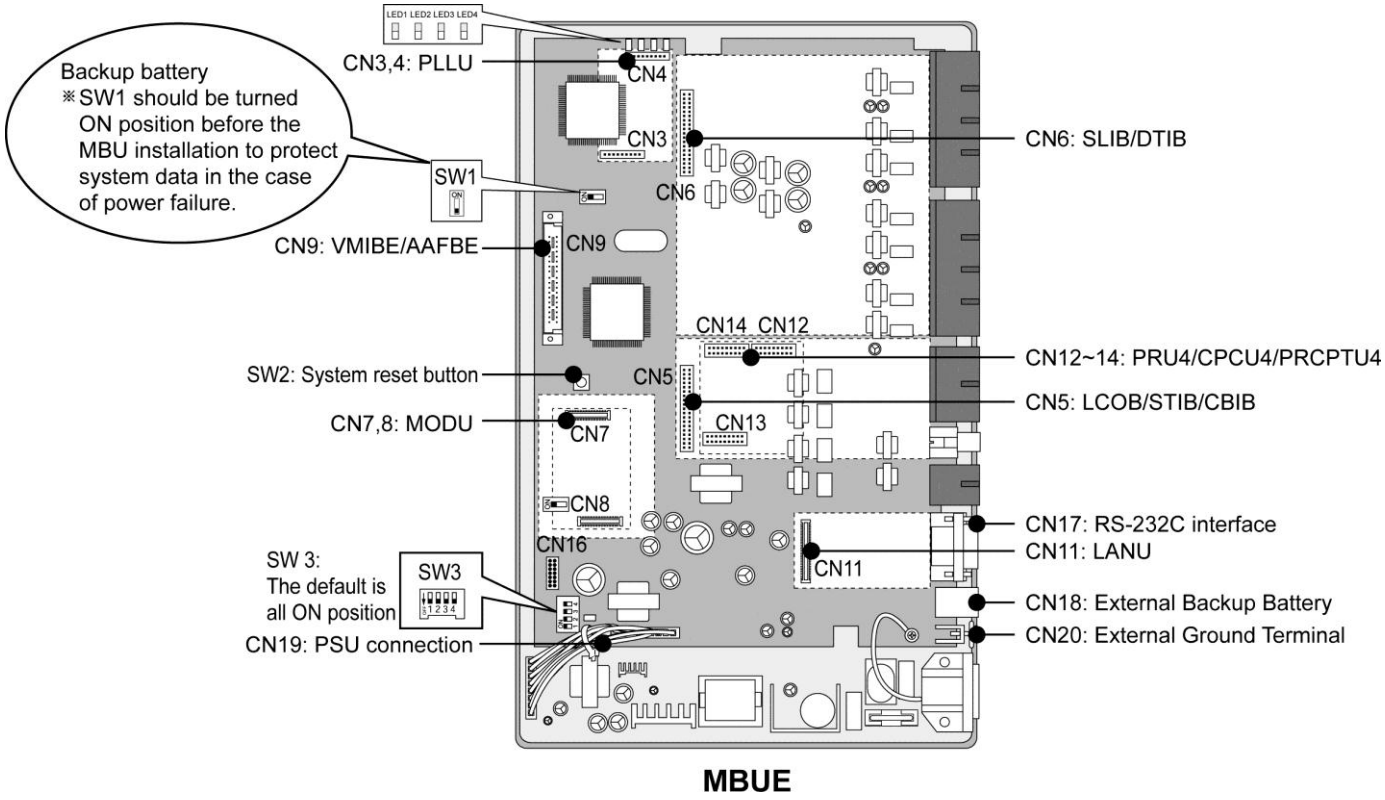


Figure 3.2a MBUE

Figure 3.2a shows the MBUE, which provides Loop start CO line interface (LCO) circuits, Digital keyset and SLT interface circuits, DTMF receivers, Ring Generation Unit, two external relay contacts, one alarm detection circuit, one external PAGE port, internal/external MOH circuit, the peripheral device decoding circuit, the master clock generation circuit, the RS-232C interface circuit, the system battery backup circuit, as well as the system's PCM voice processing circuit that has a flash memory for PCM tone generation and PCM Gain control.

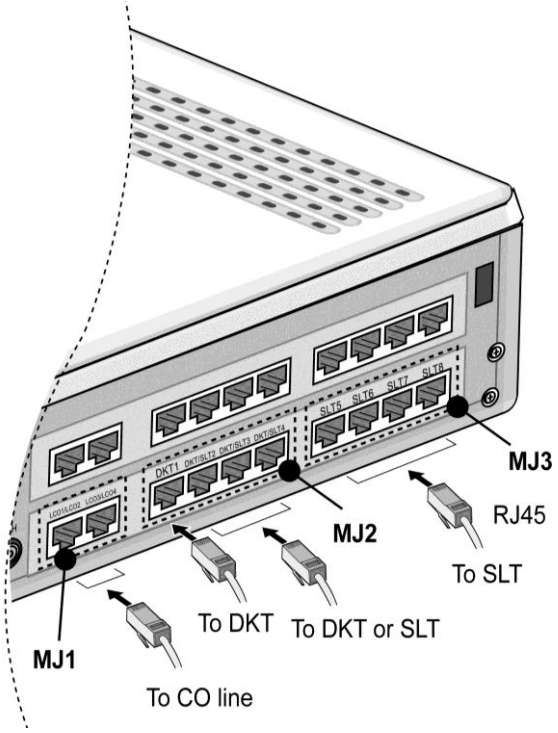


Figure 3.2b Connection

The MBUE is installed in the KSU and provides various kinds of connectors and RJ45 modular jacks for the connection of peripheral boards and miscellaneous functions (refer to the following Table).

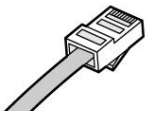
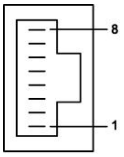
Connector/Modular Jack/Switch Functions

SWITCH/CONNECTOR	FUNCTIONS	REMARK
CN3 & CN4	PLLU installation	For STIB
CN5	CO board (LCOB, STIB, CBIB) installation	
CN6	Extension board (DTIB, SLIB, EXTB) installation	
CN7 & CN8	MODU installation	
CN9	VMIBE/AAFBE installation	
CN11	LANU installation	
CN12, CN13 & CN14	PRU4, PRCPTU4, CPCU4/CPCU4D installation	
CN16	JTAG Port for emulator	
CN17	RS-232C interface	
CN18	System Backup Battery connection	
CN19	PSU connection (+5V, -5V, +30V)	
CN20	External GND Terminal	
MJ1	4LCOs connection (port1:LCO1/LCO2, port2:LCO3/LCO4)	
MJ2	1DKT and 3DKT/SLTs connection	
MJ3	4SLTs connection	
MJ4	External Relays, External Paging, and Alarm Sensor	
PJ1 (Red)	External MOH connection	
SW1	Lithium Battery ON/OFF switch for Memory and RTC	Default: OFF
SW2	System reset button	
SW3	4 poles DIP switch for software usage	Default: all ON
SW4	1 pole DIP switch for JTAG reset	Reserved

3.2.1 Modular Jack(MJ1~MJ3) Pin Assignment

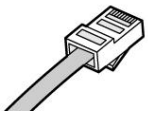
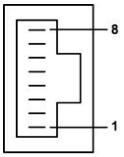
3.2.1.1 MBUE MJ1(CO)

MBUE MJ1

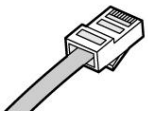
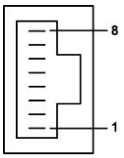
CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2	CO1-R, CO1-T
		3	Reserved
		4,5	CO2-R, CO2-T
		6,7,8	Reserved

3.2.1.2 MBUE MJ2 & MJ3(Extension)

MBUE MJ2-1(DKT)

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2,3	Reserved
		4	DKT-R
		5	DKT-T
		6,7,8	Reserved

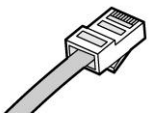
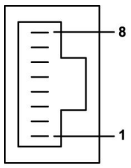
MBUE MJ2-2, 3 & 4(DKT or SLT)

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2	DKT-R, DKT-T
		3	Reserved
		4,5	SLT-R, SLT-T
		6,7,8	Reserved

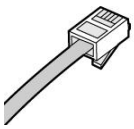
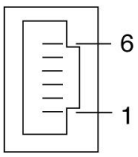
CAUTION

When installing DKT or SLT on Hybrid Ports (MJ2-2, 3 & 4), keep the above pin assignment. Otherwise, the DKT or SLT will not operate normally.

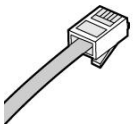
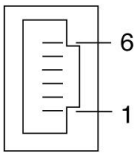
MBUE MJ3(SLT)

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2,3	Reserved
		4,5	SLT-R, SLT-T
		6,7,8	Reserved

TERMINAL DKT

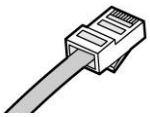
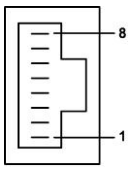
CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

TERMINAL SLT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

3.2.1.3 MJ4 Pin Assignment

MBUE

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2	Relay1-R, Relay1-T
		3,4	Relay2-R, Relay2-T
		5,6	EXT_PAGE-R, EXT_PAGE-T
		7,8	Alarm-R, Alarm-T

3.2.1.4 SW3 Functions and LED Indications

SWITCH	FUNCTION	OFF	ON(DEFAULT)
3-1	Administration Programming Access	Disable	Enable
3-2	Command/Event Trace (The purpose of testing software)	Enable	Disable
3-3	SMDI (Simplified Message Desk Control –Voice Mail)	SMDI ON	SMDI OFF
3-4	Database default on power up	Disable	Enable

Before programming the system, switch 3-4 should be placed in the ON position and power cycled-OFF and –ON to initialize the system database to default. Once the database has been initialized, switch 3-4 should be placed in the OFF position to protect the database.
After putting the lithium battery switch (SW1) into ON to protect RAM/RTC data, install the option boards to the MBUE.

CAUTION

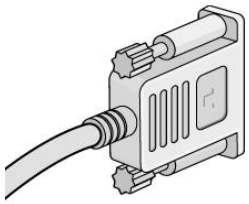
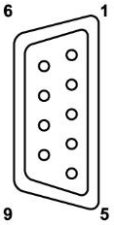
- The DIP switch, SW1 should be turned ON to protect system data in case of a power failure.
- The system will not function properly if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer instructions.
- The 4th pole (switch 4) of SW3 should be OFF to protect the features being programmed in Admin programming after the system power up and initialization.

LED INDICATIONS

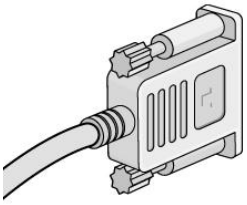
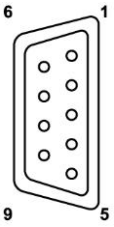
LED	MEANING
LD1 (RED)	Periodic toggle – ON: 2 sec., OFF: 100m sec.
LD2 (RED)	Periodic toggle – ON: 2 sec., OFF: 100m sec.
LD3 (RED)	Timer, Flashing every 100msec
LD4 (RED)	LCD active updating, Flashing every 300msec
LD6 (RED)	The status of Main SYSTEM Power

3.2.1.5 CN17 Pin assignment

MBUE

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RS-232C 		1	Reserved	
		2	TD	Transmitted Data
		3	RD	Received Data
		4	DSR	Data Set Ready
		5	SG	Signal Ground
		6	DTR	Data Terminal Ready
		7	CTS	Clear To Send
		8	RTS	Request To Send
		9	Reserved	

PC

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RS-232C 		1	Reserved	
		2	RD	Received Data
		3	TD	Transmitted Data
		4	DTR	Data Terminal Ready
		5	SG	Signal Ground
		6	DSR	Data Set Ready
		7	RTS	Request To Send
		8	CTS	Clear To Send
		9	Reserved	

3.2.2 Add-On Boards

PRU4 (Polarity Reversal detection Unit)

Description

The PRU4 can be optionally mounted on MBUE, and provides 4 channels of Polarity Reversal detection for call metering.

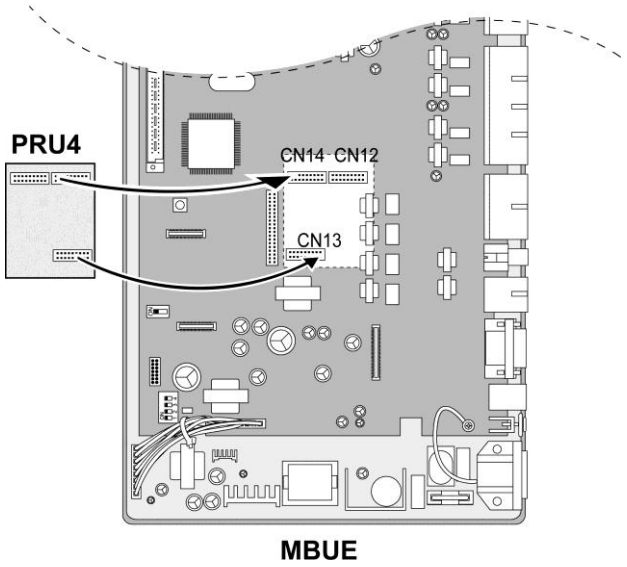


Figure 3.2.2a PRU4

PRCPTU4 (PR and CPT detection Unit)

Description

The PRCPTU4 can be optionally mounted on MBUE, and provides 4 channels of polarity reversal detection for call metering and call progress tone detection to support ACNR feature (Automatic Called Number Redial).

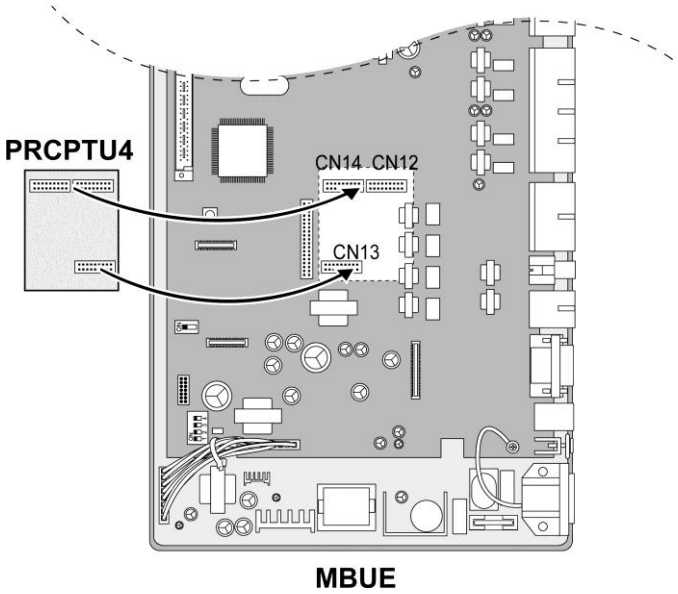
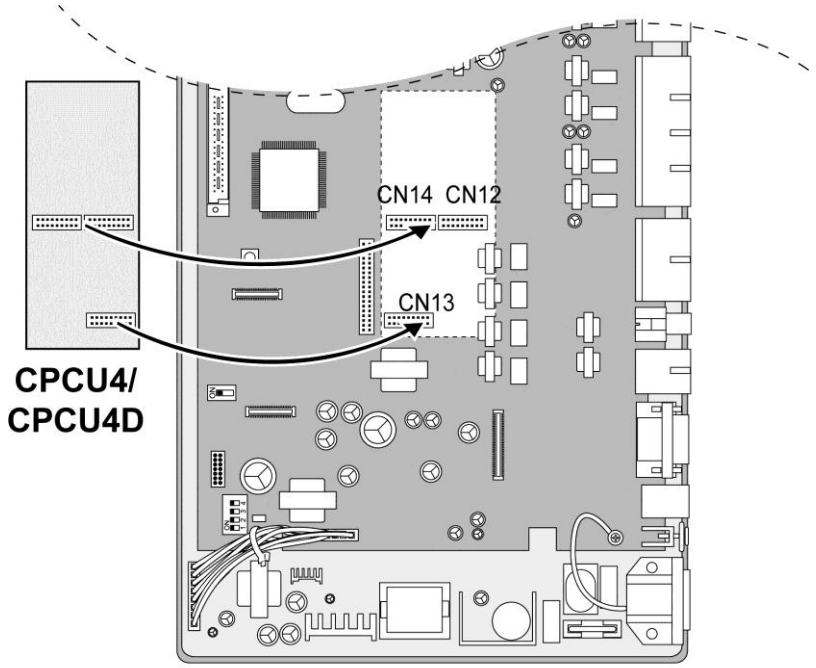


Figure 3.2.2b PRCPTU4

CPCU4 (FSK CID, PR and CPT detection Unit)/CPCU4D (DTMF CID, PR and CPT detection Unit)

Description

The CPCU4/CPCU4D can be optionally mounted on MBUE, and provides 4 channels of Polarity Reversal detection for call metering, call progress tone detection to support the ACNR feature (Auto Called Number Redial) and FSK CID(CPCU4) or DTMF CID signal detection(CPCU4D).



MBUE

Figure 3.2.2c CPCU4/CPCU4D

※ NOTE

The PRU4, PRCPTU4 and CPCU4/CPCU4D cannot be mounted on the MBUE at the same time. Select the appropriate board for your application to install and use.

3.3 Installation of the CO Line Board

BOARD	LINE	CONNECTOR TYPE	DESCRIPTION	CABLE	REMARK
LCOB	2 ports (4 LCO)	RJ45	Loop Start CO Line Interface	2 wire	
LCOB2	1 ports (2 LCO)	RJ45	Loop Start CO Line Interface	2 wire	
STIB	2 ports (2 BRI)	RJ45	ISDN Basic Rate Interface (2B+D)	4 wire	Port1: S/T Port2: T
STIB1	1 port (1 BRI)	RJ45	ISDN Basic Rate Interface (2B+D)	4 wire	S/T
CBIB	2 ports (1 BRI+2 LCO)	RJ45	ISDN Basic Rate Interface (2B+D) + Loop Start CO Line Interface	4 wire (Port 1) 2 wire (Port 2)	T mode

3.3.1 LCOB (CID Loop Start CO line Interface Board)

Description

The LCOB can be installed on the LCOB/STIB/CBIB connector, and provides 4 CO/PBX Loop Start CO Line interfaces that support Pulse/DTMF signaling. Each Interface contains ring and loop current detection circuits, A/D and D/A conversions, and pulse signaling circuitry.

LCOB can be optionally equipped with add-on boards: CPCU4 (FSK CID, Polarity Reversal & Call Progress Tone detection Unit 4) to detect FSK signal for the incoming Caller-ID, polarity reversal and call progress tone; CPCU4D (DTMF CID, Polarity Reversal & Call Progress Tone detection Unit 4) to detect DTMF signal for the incoming Caller-ID, polarity reversal and call progress tone; PRCPTU4 (Polarity Reversal & Call Progress Tone detection Unit 4) to monitor polarity reversal and call progress tone; or PRU4 (Polarity Reversal detection Unit 4) to monitor polarity reversal.

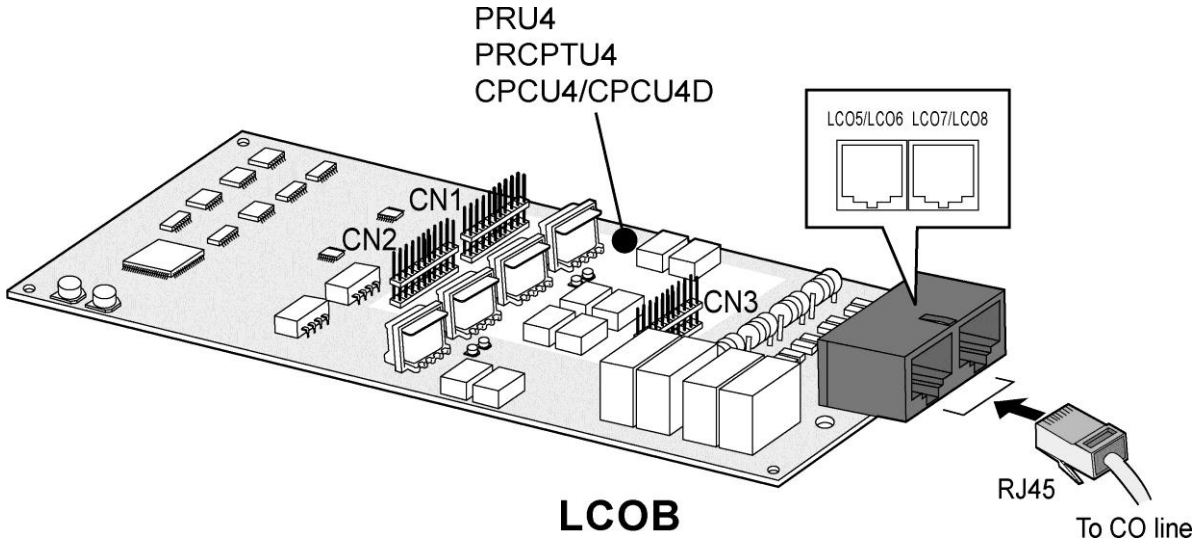


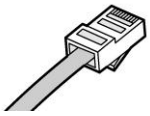
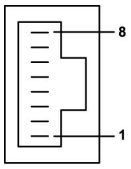
Figure 3.3.1 LCOB

※ NOTE

The PRU4, PRCPTU4 and CPCU4/CPCU4D cannot be mounted on the LCOB at the same time. Select the appropriate board for your application to install and use.

3.3.1.1 Pin Assignment

LCOB

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2	CO1-R, CO1-T
		3	Reserved
		4,5	CO2-R, CO2-T
		6,7,8	Reserved

CONNECTOR FUNCTIONS

CONNECTOR	FUNCTION	REMARK
CN2 and CN3	PRCPTU4 or PRU4 connection	
CN1, CN2 and CN3	CPCU4 / CPCU4D connection	
MJ1	RJ45 type CO line connection	

3.3.1.2 Add-On Boards

PRU4 (Polarity Reversal detection Unit)

Description

The PRU4 can be optionally mounted on LCOB, and provides 4 channels of Polarity Reversal detection for call metering.

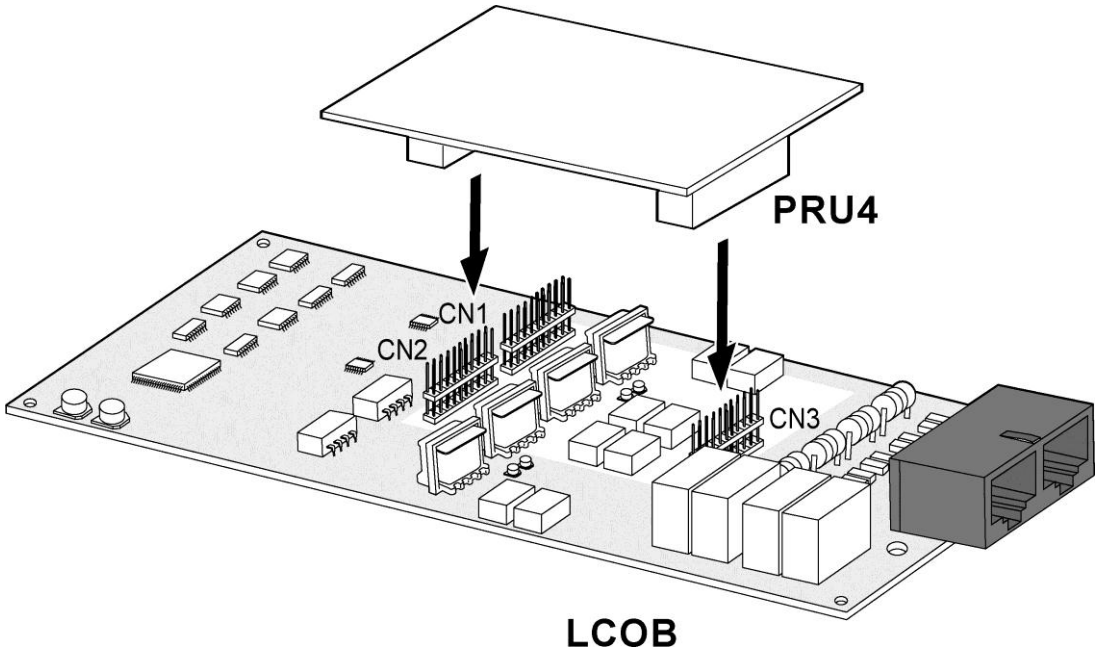


Figure 3.3.1.2a PRU4

PRCPTU4 (PR and CPT detection Unit)

Description

The PRCPTU4 can be optionally mounted on LCOB, and provides 4 channels of polarity reversal detection for call metering and call progress tone detection to support ACNR feature (Automatic Called Number Redial).

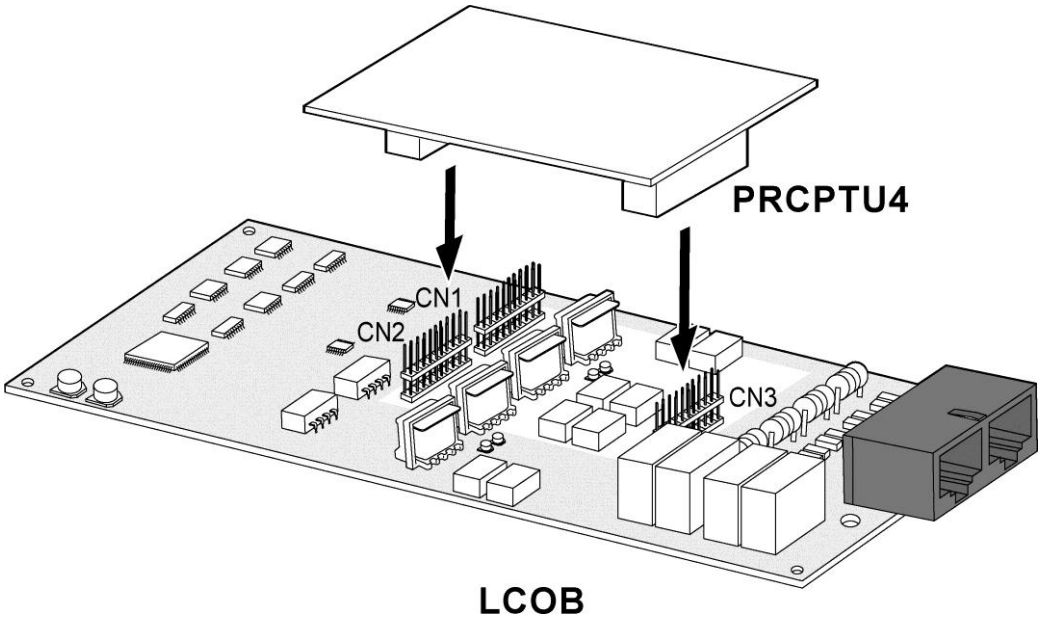


Figure 3.3.1.2b PRCPTU4

CPCU4 (FSK CID, PR and CPT detection Unit) / CPCU4D(DTMF CID, PR and CPT detection Unit)

Description

The CPCU4/CPCU4D can be optionally mounted on LCOB, and provides 4 channels of Polarity Reversal detection for call metering, call progress tone detection to support the ACNR feature (Auto Called Number Redial) and FSK CID signal detection(CPCU4) or DTMF CID signal detection(CPCU4D).

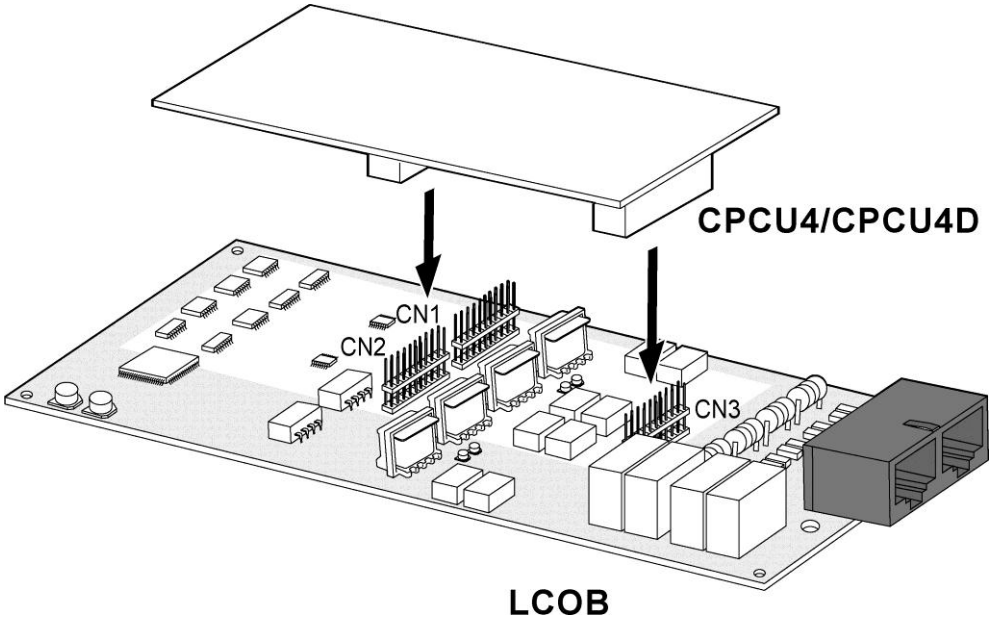


Figure 3.3.1.2c CPCU4/CPCU4D

3.3.2 LCOB2(CID Loop Start CO line Interface Board)

Description

The LCOB2 can be installed on the LCOB/STIB/CBIB connector, and provides **2** CO/PBX Loop Start CO Line interfaces that support Pulse/DTMF signaling. Each Interface contains ring and loop current detection circuits, A/D and D/A conversions, and pulse signaling circuitry.

LCOB2 can be optionally equipped with add-on boards: CPCU2 (FSK CID, Polarity Reversal & Call Progress Tone detection Unit 2) to detect FSK signal for the incoming Caller-ID, polarity reversal and call progress tone; CPCU2D (DTMF CID, Polarity Reversal & Call Progress Tone detection Unit 2) to detect DTMF signal for the incoming Caller-ID, polarity reversal and call progress tone; PRCPTU2 (Polarity Reversal & Call Progress Tone detection Unit 2) to monitor polarity reversal and call progress tone; or PRU4 (Polarity Reversal detection Unit 4) to monitor polarity reversal.

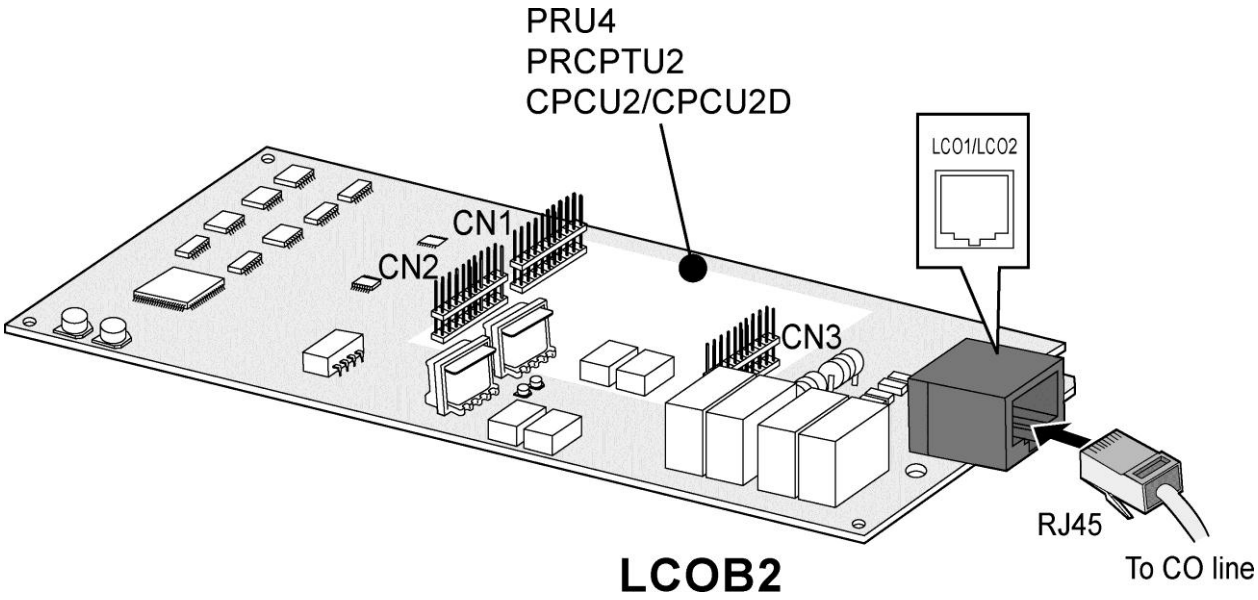


Figure 3.3.2 LCOB2

※ NOTE

-. The LCOB2 is exactly same with LCOB except that CO interface circuits of second port, CO3 & CO4, are not assembled.

-. The CPCU2/CPCU2D, PRU4 and PRCPTU2 cannot be mounted on the LCOB2 at the same time. Select the appropriate board for your application to install and use. The PRU2 is not provided.

-. For Pin assignment and Add-on boards installation, please refer to that of LCOB.

3.3.3 STIB (Basic Rate Interface Board: Selectable S/T interface)

Description

STIB should be installed on the LCOB/STIB/CBIB connector, and supports ISDN Basic Rate T-interface or S-interface. The 1st BRI port can be operated to T-mode or S-mode and the 2nd port can only be set to T-mode.

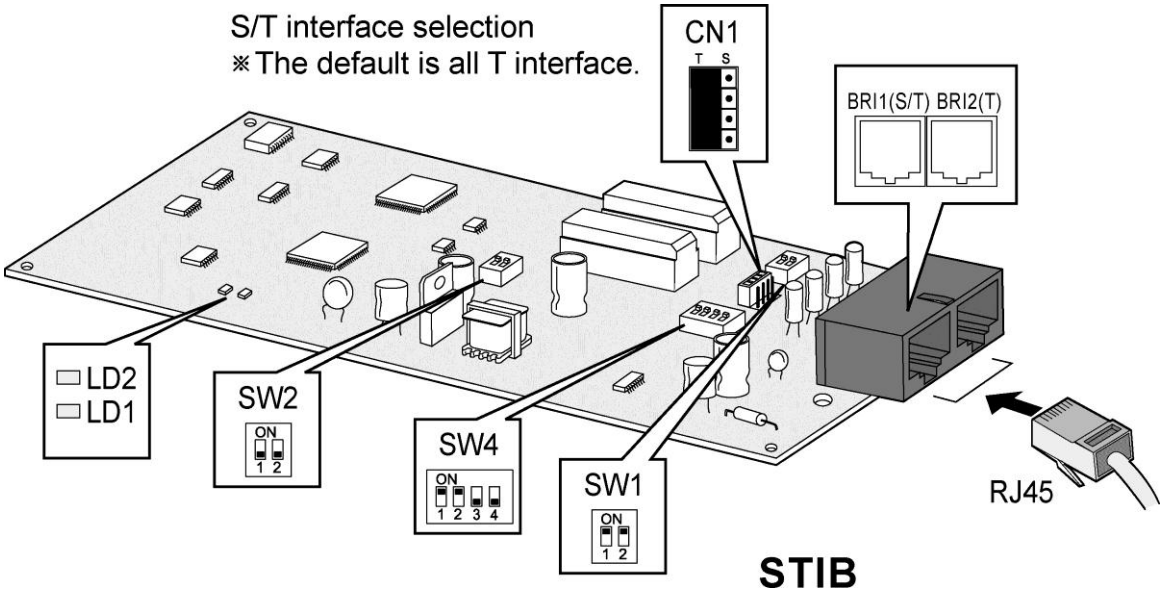


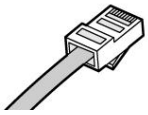
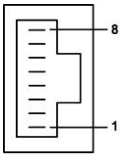
Figure 3.3.2 STIB

S/T Interface selection on BRI1 (Port 1): Default = T Interface
- SW2: Default = all OFF position
- SW4: Default = 1, 2 pins ON position and 3, 4 pins OFF position

BRI2 (Port 2): Default = T Interface only.
- SW1: Default = ON position

3.3.2.1 Pin assignment

T MODE

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		1,2	Reserved	
		3	TX+	Transmit Data
		4	RX+	Receive Data
		5	RX-	Receive Data
		6	TX-	Transmit Data
		7,8	Reserved	

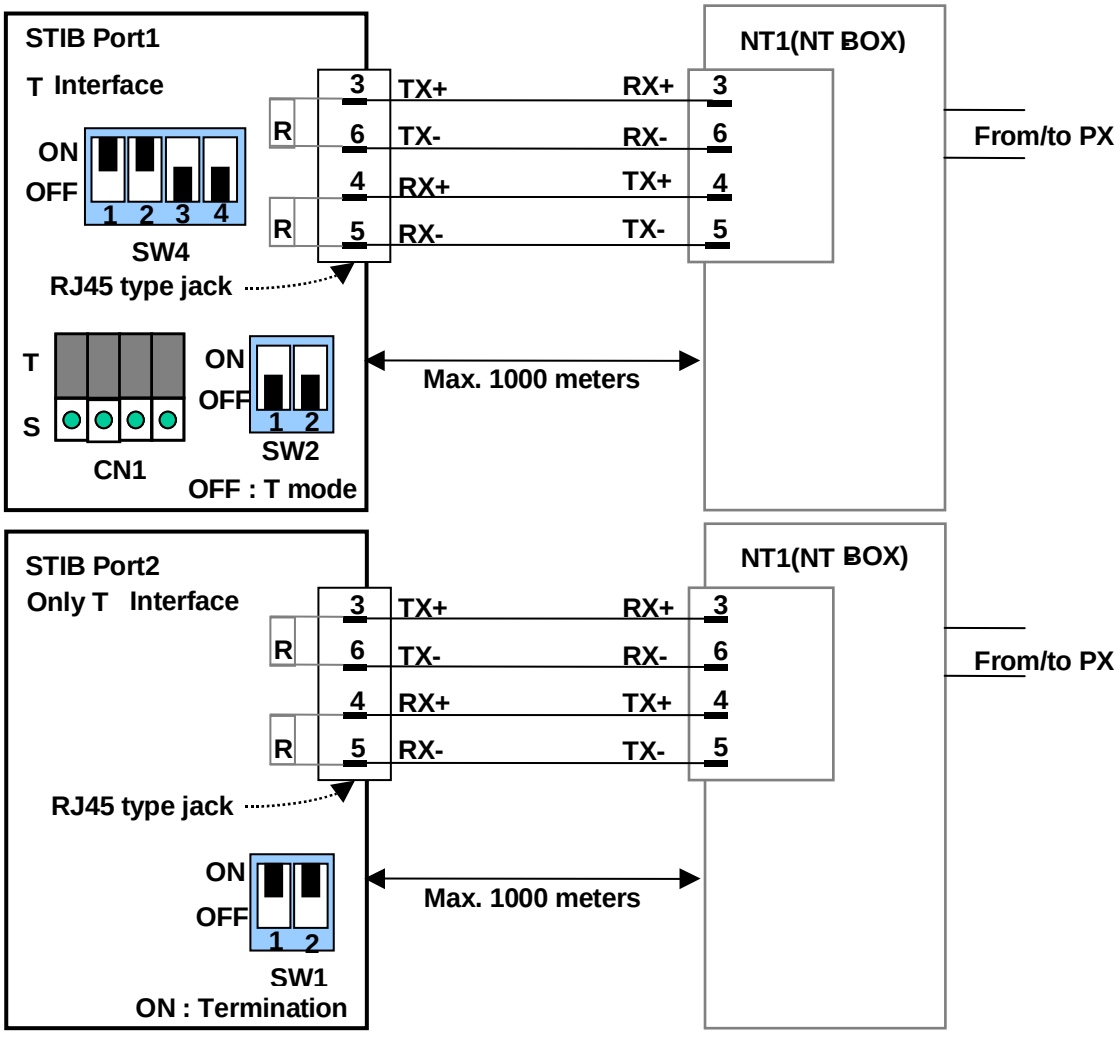
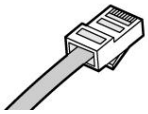
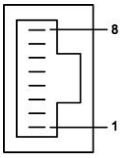


Figure 3.3.2.1a T Mode(STIB Line Connector and Terminating Resistors)

S MODE

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		1,2	Reserved	
		3	RX+	Receive Data
		4	TX+	Transmit Data
		5	TX-	Transmit Data
		6	RX-	Receive Data
		7,8	Reserved	

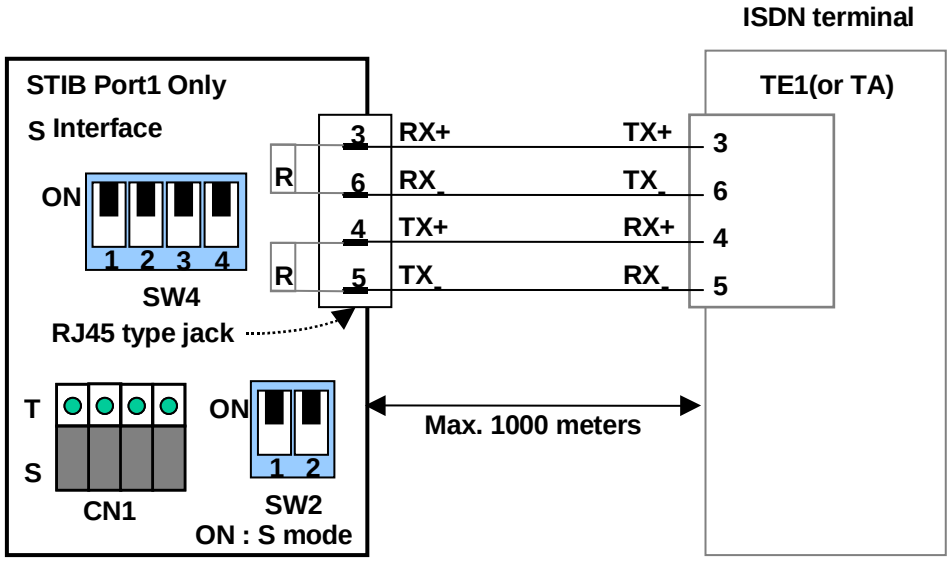


Figure 3.3.2.1b S Mode(STIB Line Connector and Terminating Resistors)

LED INDICATIONS

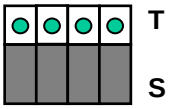
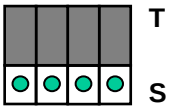
LED		STATUS		LINE NO.	REMARK
		ON	OFF		
LD1	RED	ERROR	IDLE	1	BRI
	GREEN	IN-USE			
LD2	RED	ERROR	IDLE	2	BRI
	GREEN	IN-USE			

3.3.2.2 Line Connector and Terminating Resistors

SW 1 AND SW4'S 1, 2 PIN SETTING : DEFAULT = ALL ON POSITION

LINE NO	RJ45 TYPE JACK	TERMINATING RESISTORS			REMARK
		SWITCH	PIN1, 2 ON	PIN1, 2 OFF	
Line 1	MJ1-1	SW4	Termination	Open	
Line 2	MJ1-2	SW1	Termination	Open	

T OR S SWITCH SETTING

LINE NO	MODE	SWITCH AND CONNECTOR			REMARK
		SW4 PIN 3, 4	SW2	CN1	
Line 1	S	ON	ON	 T S	
	T	OFF	OFF	 T S	Default
Line 2	T Only				

※NOTE

- SW4(Pin 3, 4 : -40V Power Feeding.
- SW2: The mode Change of the BRI transceiver.
- CN1: Set four 2pin jumpers like the above figure according to each mode.

3.3.4 STIB1 (Basic Rate Interface Board: Selectable S/T interface)

Description

STIB1 should be installed on the LCOB/STIB/CBIB connector, and provides one S/T interface port. The BRI port can be operated to T-mode or S-mode by selection.

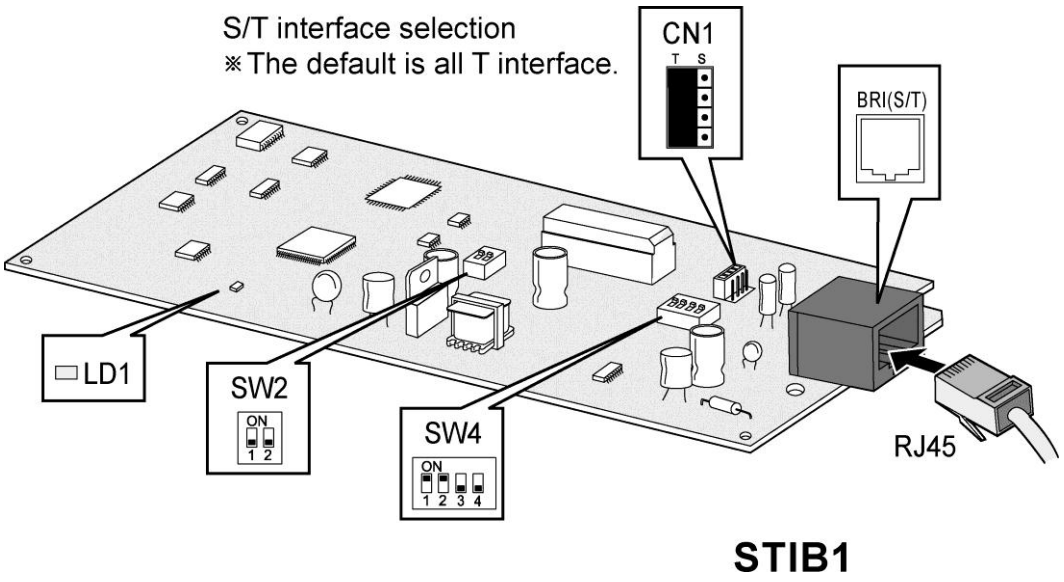


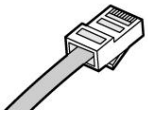
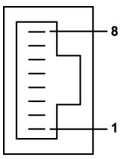
Figure 3.3.4 STIB1

S/T Interface selection on BRI1(Port 1): Default = T Interface

- SW2 : Default = all OFF position
- SW4 : Default = 1, 2 pins ON position and 3, 4 pins OFF position
- CN1 : Default = T position

3.3.4.1 Pin assignment

T MODE

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		1,2,7,8	RESERVED	
		3	TX+	Transmit Data
		4	RX+	Receive Data
		5	RX-	Receive Data
		6	TX-	Transmit Data

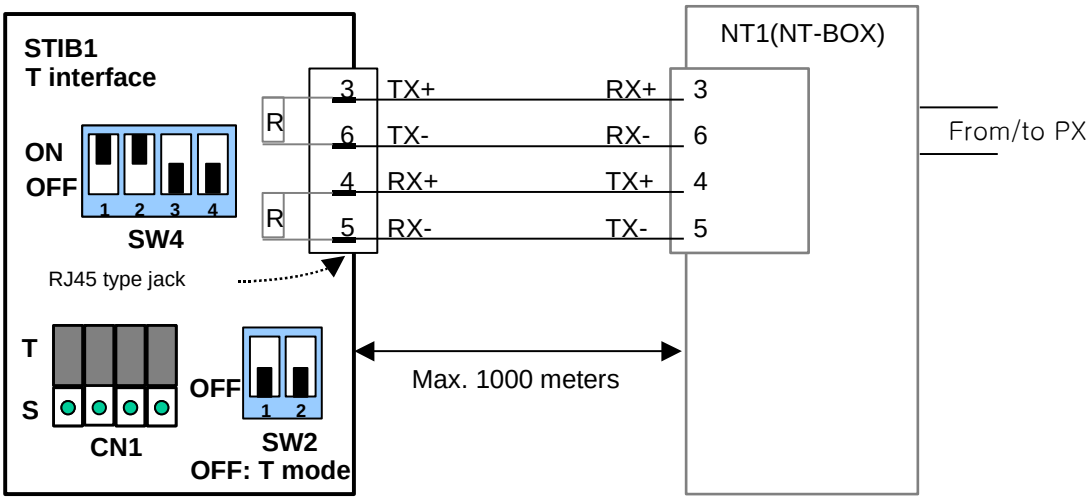
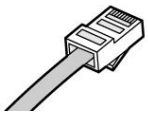
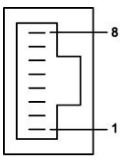


Figure 3.3.4.1a T Mode(Basic STIB1 Line Connector and Terminating Resistors)

S MODE

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		1,2,7,8	RESERVED	
		3	RX+	Receive Data
		4	TX+	Transmit Data
		5	TX-	Transmit Data
		6	RX-	Receive Data

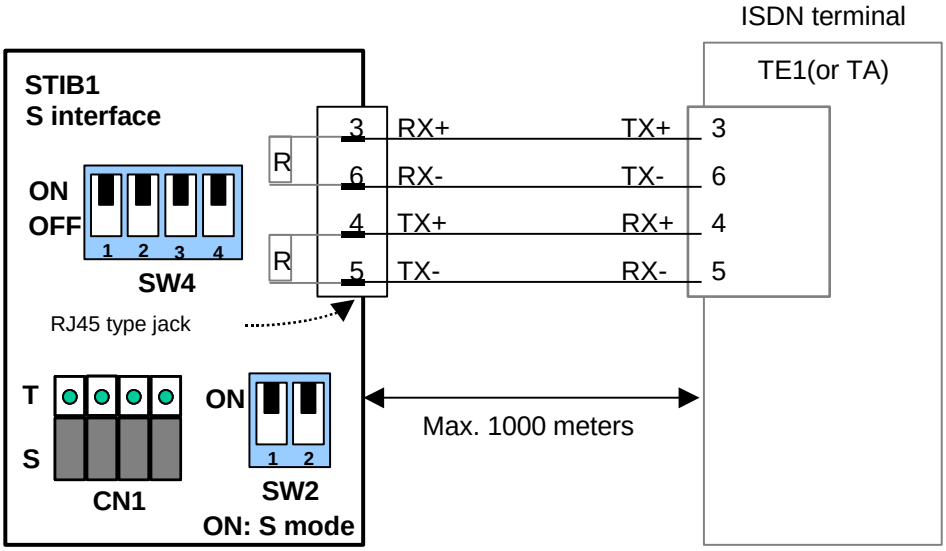


Figure 3.3.4.1b S Mode(STIB1 Line Connector and Terminating Resistors)

LED INDICATION

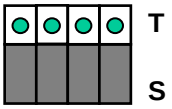
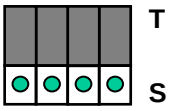
LED		STATUS		LINE NO.	REMARK
		ON	OFF		
LD1	RED	ERROR	IDLE	1	CBIB
	GREEN	IN-USE			

3.3.4.2 Line Connector and Terminating Resistors

SW4'S 1, 2 PIN SETTING : DEFAULT = ALL ON POSITION

LINE NO	RJ45 TYPE JACK	TERMINATING RESISTORS			REMARK
		SWITCH	PIN1, 2 ON	PIN1, 2 OFF	
Line 1	MJ1	SW4	Termination	Open	

T OR S SWITCH SETTING

LINE NO	MODE	SWITCH AND CONNECTOR			REMARK
		SW4 PIN 3, 4	SW2	CN1	
Line 1	S	ON	ON		
	T	OFF	OFF		DEFAULT

※NOTE

- SW4(Pin 3, 4 : -40V Power Feeding.
- SW2: The mode Change of the BRI transceiver.
- CN1: Set four 2pin jumpers like the above figure according to each mode.

3.3.5 CBIB (CID Loop Start CO line + Basic Rate Interface Board)

Description

The CBIB can be installed on the LCOB/STIB/CBIB connector, and provides 2 CO/PBX Loop Start CO Line interfaces that support pulse/DTMF signal and one port of ISDN Basic Rate Interface T-mode. CO Interface circuit contains ring and loop current detection circuits, A/D and D/A conversions, and pulse signaling circuit.

The analog LCO port of the CBIB can be optionally equipped with add-on boards (Figure 3.3.3): CPCU2 (FSK CID, Polarity Reversal & Call Progress Tone detection Unit 2) to detect FSK signal for the incoming Caller-ID, polarity reversal and call progress tone; CPCU2D (DTMF CID, Polarity Reversal & Call Progress Tone detection Unit 2) to detect DTMF signal for the incoming Caller-ID, polarity reversal and call progress tone; PRCPTU2 (Polarity Reversal & Call Progress Tone detection Unit 2) to monitor polarity reversal and call progress tone; or PRU4 (Polarity Reversal detection Unit 4) to monitor polarity reversal.

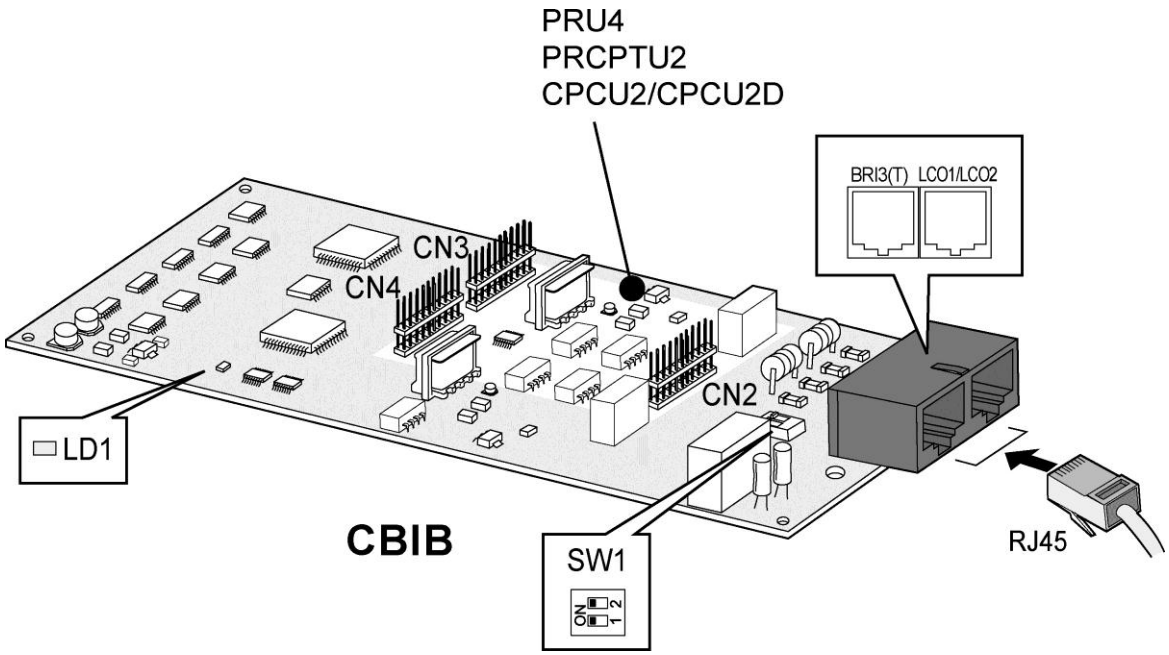


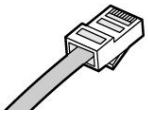
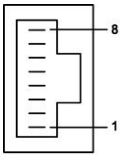
Figure 3.3.3 CBIB

※NOTE

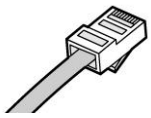
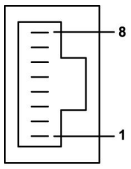
- SW1: The default is ON position.
- The PRU4, the PRCPTU2 and the CPCU2/CPCU2D can not be mounted on the CBIB at the same time. Select the board that is appropriate for your application to install and use. The PRU2 is not provided.

3.3.5.1 Pin Assignment

CBIB 1'ST PORT FOR BRI T-MODE

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		1,2	Reserved	
		3	TX+	Transmit Data
		4	RX+	Receive Data
		5	RX-	Receive Data
		6	TX-	Transmit Data
		7,8	Reserved	

CBIB 2'ND PORT FOR LCO

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2	CO1-R, CO1-T
		3	Reserved
		4,5	CO2-R, CO2-T
		6,7,8	Reserved

VARIOUS CONNECTORS FUNCTIONS

CONNECTOR	FUNCTION	REMARK
CN2 and CN4	PRCPTU2 or PRU4 connection	
CN2, CN3 and CN4	CPCU2/CPCU2D connection	
MJ1	RJ45 type CO line connection.	

LED INDICATION

LED		STATUS		LINE NO.	REMARK
		ON	OFF		
LD1	RED	ERROR	IDLE	1	
	GREEN	IN-USE			

3.3.5.2 Add-On Boards

PRU4 (Polarity Reversal detection Unit)

Description

The PRU4 can be optionally mounted on CBIB, and provides 4 channels of Polarity Reversal detection for call metering.

PRCPTU2 (PR and CPT detection Unit)

Description

The PRCPTU2 can be optionally mounted on CBIB, and provides 2 channels of Polarity Reversal detection for call metering and Call Progress Tone detection to support the ACNR feature (Automatic Called Number Redial).

CPCU2 (FSK CID, PR and CPT detection Unit) / CPCU2D (DTMF CID, PR and CPT detection Unit)

Description

The CPCU2/CPCU2D can be optionally mounted on CBIB, and provides 2 channels of Polarity Reversal detection units for call metering, Call Progress Tone detection to support the ACNR feature (Auto Called Number Redial), and FSK CID signal detection(CPCU2) or DTMF CID signal detection(CPCU2D).

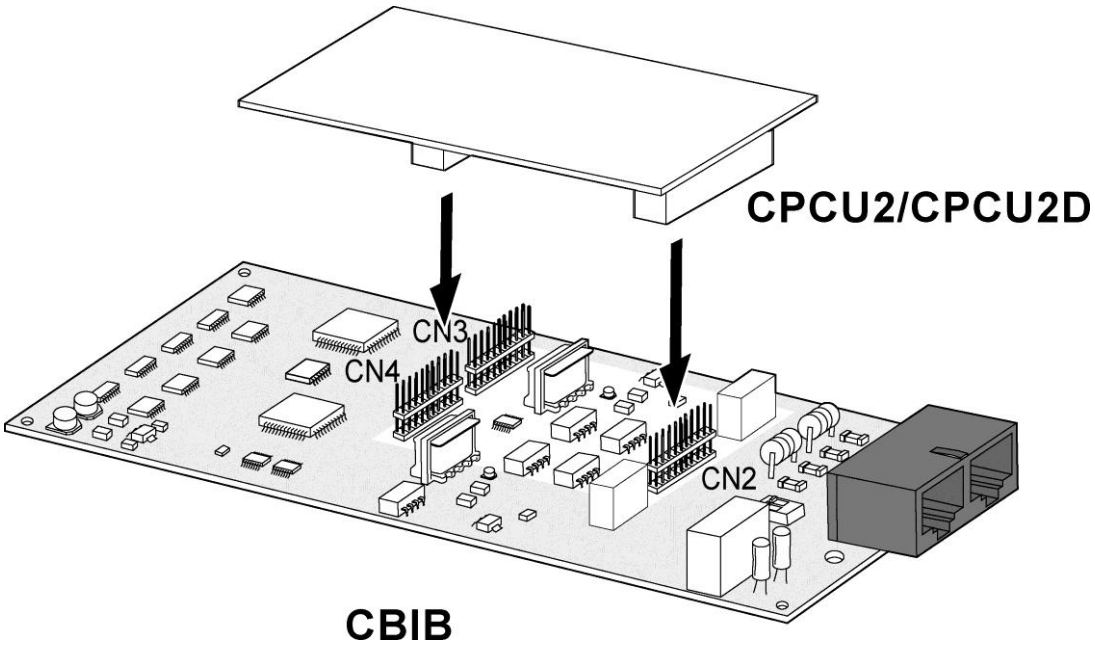


Figure 3.3.3.2 CPCU2/CPCU2D

3.4 Installation of the Extension Board

BOARD	PORT	CONNECTOR TYPE	REMARK
DTIB4	4 DKT ports	RJ45	Digital Terminal Interface : 4 ports
DTIB8	8 DKT ports	RJ45	Digital Terminal Interface : 8 ports
SLIB4	4 SLT ports	RJ45	Single line telephone Interface : 4 ports
SLIB8	8 SLT ports	RJ45	Single line telephone Interface : 8 ports
EXTB	Dummy	Dummy	Dummy extension board for VOIM

3.4.1 DTIB4 (Digital Terminal Interface Board)

Description

DTIB4 can be installed on the SLIB/DTIB connector, and provides 4 Digital Keyset ports that are used for 2-wire connections for Digital Keysets. It has a module connector, MJ1, which is used to connect Digital Keyset lines to the DTIB4 and a din connector, CN2, to connect expansion modules like VOIM, SLIM, and DTIM.

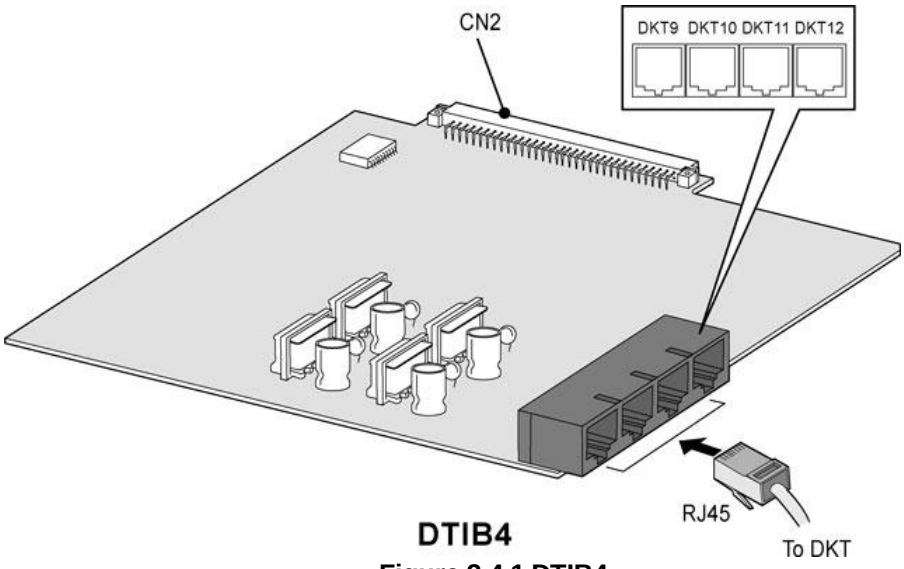
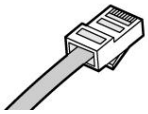
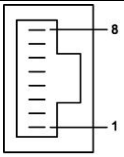


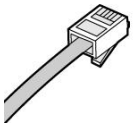
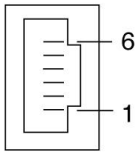
Figure 3.4.1 DTIB4

3.4.1.1 Pin assignment

DTIB4

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		1,2,3	Reserved	
		4	DKT_R	RING
		5	DKT_T	TIP
		6,7,8	Reserved	

DKT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

3.4.2 DTIB8 (Digital Terminal Interface Board)

Description

DTIB8 can be installed on the SLIB/DTIB connector, and provides 8 Digital Keyset ports that are used for 2-wire connections to Digital Keysets. It has module connectors, MJ1 and MJ2, that are used to connect Digital Keyset lines to the DTIB8 and a din connector, CN2, to connect expansion modules like VOIM, SLIM, and DTIM.

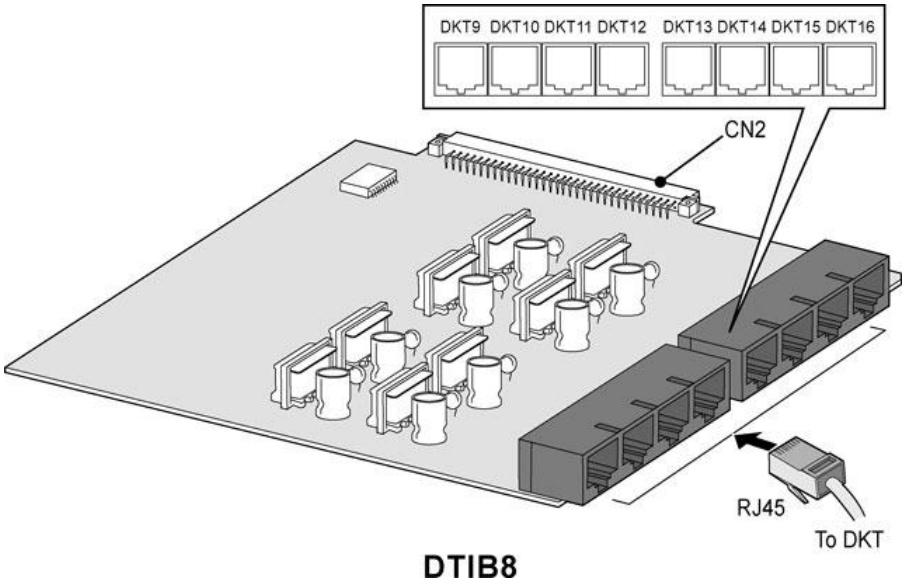
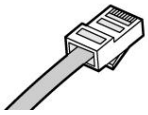
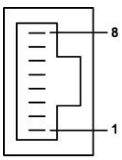


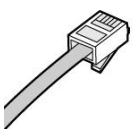
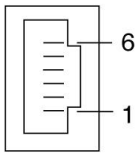
Figure 3.4.2 DTIB8

3.4.2.1 Pin assignment

DTIB8

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		1,2,3	Reserved	
		4	DKT_R	RING
		5	DKT_T	TIP
		6,7,8	Reserved	

DKT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

3.4.3 SLIB4 (Single Line Interface Board)

Description

SLIB4 can be installed on the SLIB/DTIB connector, and provides 4 SLT ports, and 2 DTMF receivers. The SLIB4 and SLT are connected with a RJ45 Modular Jack, MJ3 and SLIB4 has a din connector, CN3, to connect expansion modules like VOIM, SLIM, and DTIM.

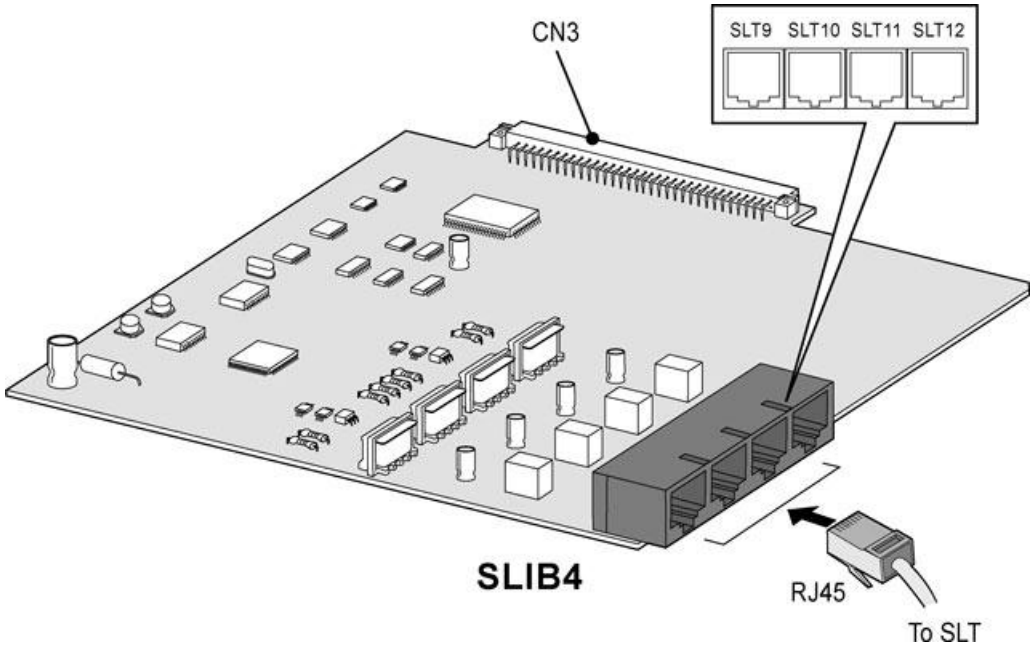
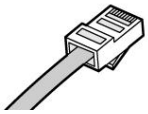
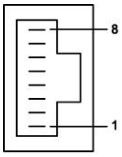


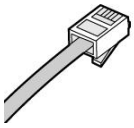
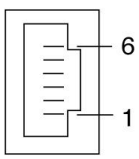
Figure 3.4.3 SLIB4

3.4.3.1 Pin assignment

SLIB4

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2,3	Reserved
		4	SLT_RING
		5	SLT-TIP
		6,7,8	Reserved

SLT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

3.4.4 SLIB8 (Single Line Interface Board)

Description

SLIB8 can be installed the SLIB/DTIB connector, and provides the 8 SLT ports and 2 DTMF receivers. The SLIB8 and SLT are connected with a RJ45 Modular Jack, MJ2 & MJ3 and SLIB8 has a din connector, CN3, to connect expansion modules like VOIM, SLIM, and DTIM.

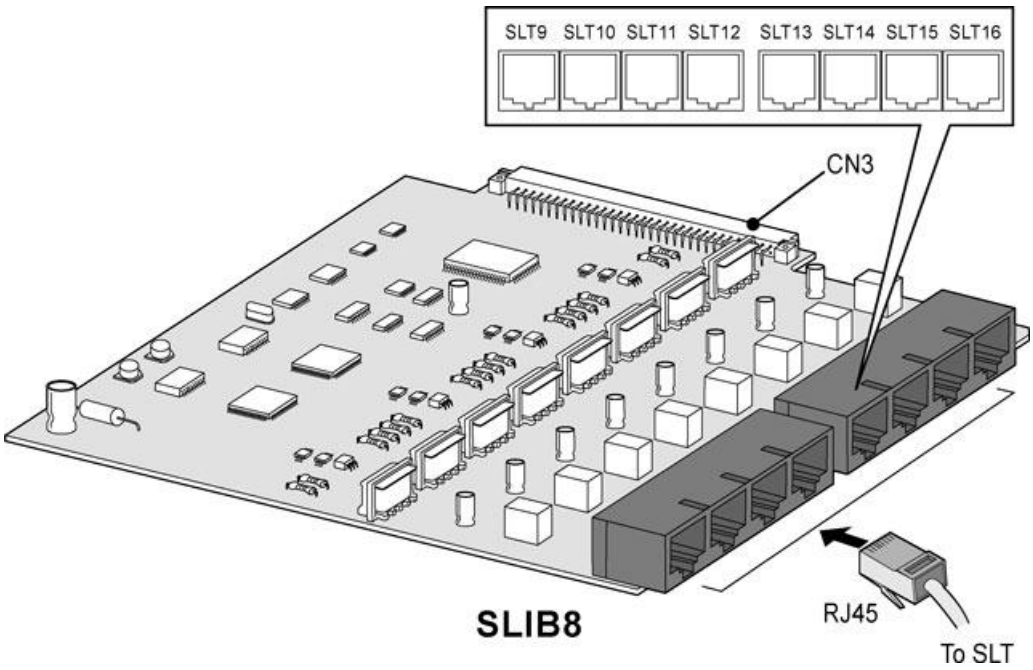
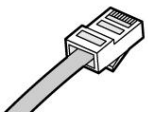
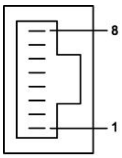


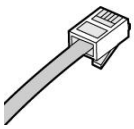
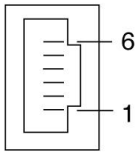
Figure 3.4.4 SLIB8

3.4.4.1 Pin assignment

SLIB8

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ45 		1,2,3	Reserved
		4	SLT_RING
		5	SLT-TIP
		6,7,8	Reserved

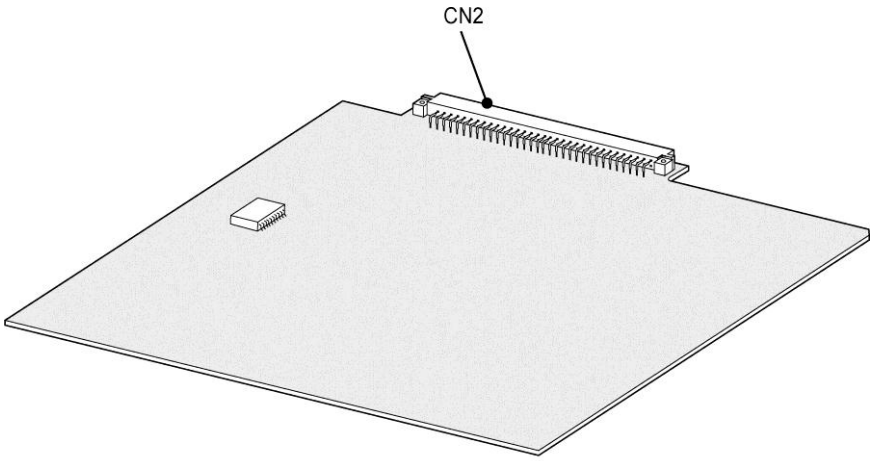
SLT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

3.4.5 EXTB (Dummy Extension Board for VOIM)

Description

EXTB is a dummy board that should be installed on the SLIB/DTIB connector to install VOIM(Voice Over internet protocol Interface Module) without any extension boards such as DTIB and SLIB.
It has a clock buffering circuit and just bypasses all signals from MBUE to expansion module.



EXTB

Figure 3.4.5 EXTB

※NOTE

- When EXTB is installed, DTIM and SLIM can not be used.
- Only EXTB + VOIM configuration is allowed.

3.5 Other Board Installation

3.5.1 VMIB(Voice Mail Interface Board)

Description

The VMIB can be installed on the VMIB/AAFB connector, and provides system announcement, ACD/UCD announcement, and User Greeting.

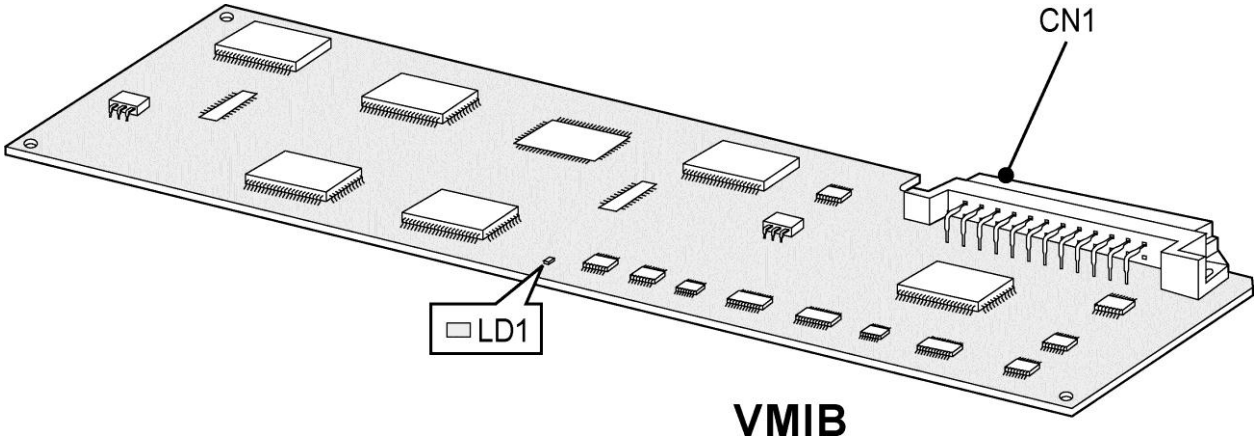


Figure 3.5.1 VMIB

ITEM	RECORD/PLAY	MOH
Channel	2 channels	1 channel
Max record time: System/time stamp User record time	100 Min 28 Min 72 Min	60 Sec.
Max. Number of User voice message	400 EA	

※ NOTE

- User Greeting is not lost by system power OFF or reset because the message is stored in FLASH memory.
- MBUE SW3-4 controls the protection of recorded messages.
- LD1 gets turned on when any RECORD/PLAY channel is activated.

3.5.2 AAFB(Auto Attendant Function Board)

Description

The AAFB can be installed on the VMIB/AAFB connector, and provides system announcement and ACD/UCD announcement.

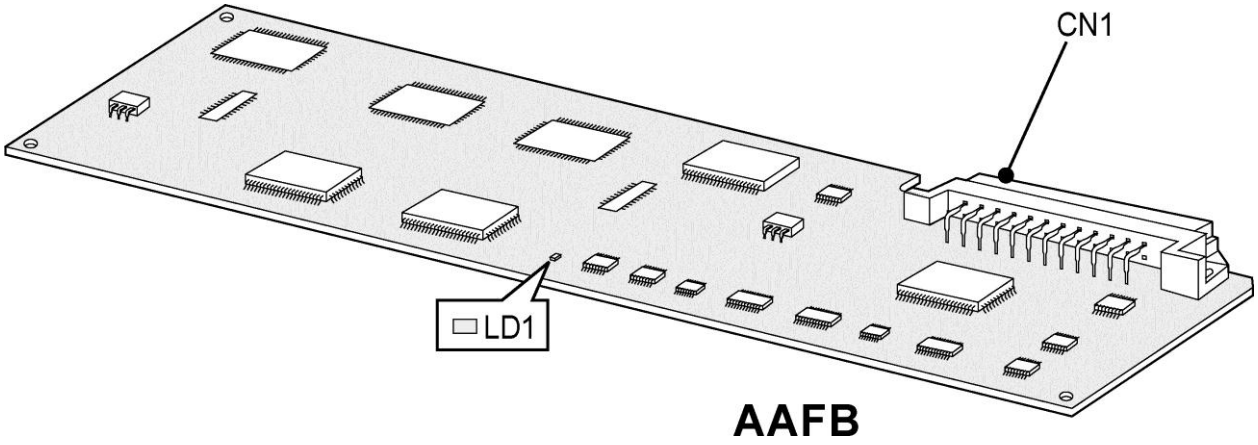


Figure 3.5.2 AAFB

ITEM	RECORD/PLAY	MOH
Channel	2 channels	-
Max record time: System/time stamp User record time	28 Min 28 Min Not Possible	-

※ NOTE

- LD1 gets turned on when any RECORD/PLAY channel is activated.

3.5.3 VMIBE (Voice Mail Interface Board Enhanced)

Description

The VMIBE can be installed on the VMIB/AAFB connector, and provides system announcement, ACD/UCD announcement, and User Greeting.

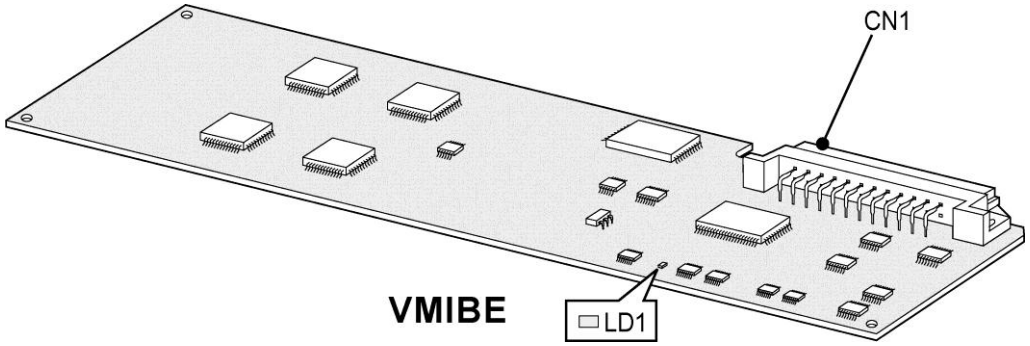


Figure 3.5.3 VMIBE

ITEM	RECORD/PLAY	MOH
Channel	3 channels	1 channel
Max record time: System/time stamp User record time	200 Min 28 Min 172 Min	60 Sec.
Max. Number of User voice message	800 EA	

※ NOTE

- VMIBE is supported from software **Version 2.1xx**.
- User Greeting is not lost by system power OFF or reset because the message is stored in FLASH memory.
- MBUE SW3-4 controls the protection of recorded messages.
- LD1 gets turned on when any RECORD/PLAY channel is activated.

3.5.4 AAFBE(Auto Attendant Function Board Enhanced)

Description

The AAFBE can be installed on the VMIB/AAFB connector, and provides system announcement and ACD/UCD announcement.

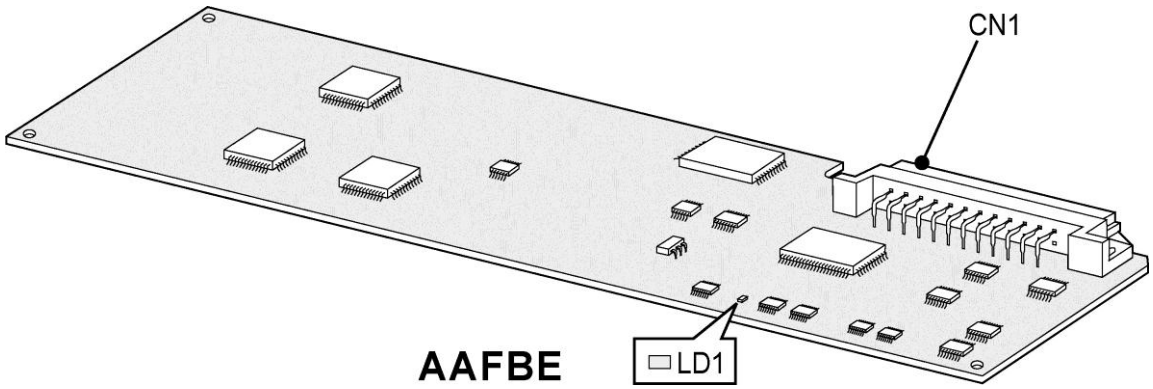


Figure 3.5.4 AAFBE

ITEM	RECORD/PLAY	MOH
Channel	3 channels	-
Max record time: System/time stamp User record time	28 Min 28 Min Not Possible	-

※ NOTE

- AAFBE is supported from software **Version 2.1xx**.
- LD1 gets turned on when any RECORD/PLAY channel is activated.

3.5.5 LANU (LAN interface Unit)

Description

LANU should be installed on the LANU connector, and provides 1 LAN port of 10Base-T networking. RJ45 Modular Jack, MJ1, is used to interface with the Local Area Network (LAN) or PC, and has 2 LEDs that indicate the operational state of the LAN port.

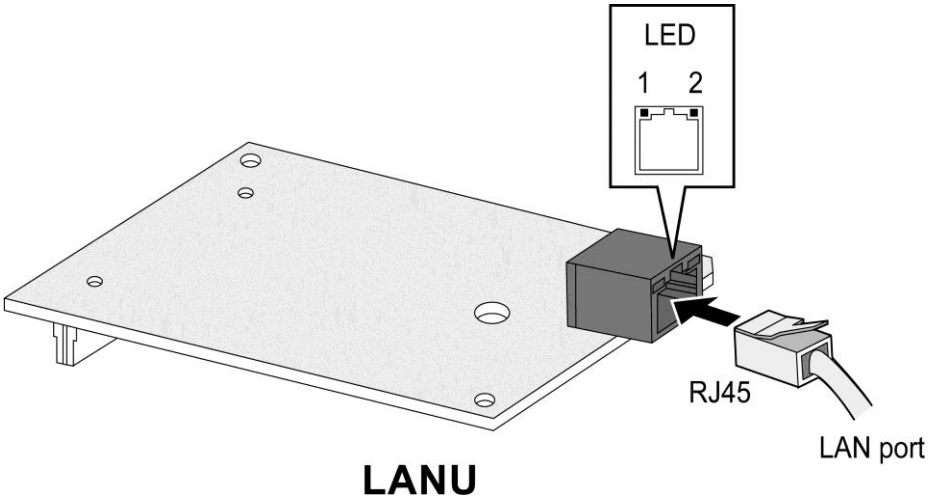
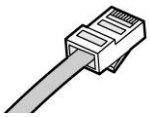
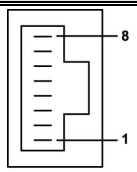


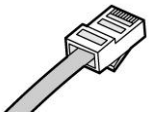
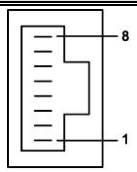
Figure 3.5.5 LANU

3.5.5.1 Pin Assignment

LANU

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	RESERVED	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

PC

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	RESERVED	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

THE LED INDICATION OF MJ1

LED	MEANING	
LED1 (Green)	OFF: No Link	ON: Link, Toggle: Data Transfer
LED2 (Orange)	OFF: Link and activity at 10MBps	ON: Link and activity at 100MBps

3.5.6 MODU (MODEM function Unit)

Description

MODU should be installed on the MODU connectors, and provides an analog modem connection. It supports Bell, ITU-T, V.34, V.32BIS, V.90 Protocol at 300bps, up to 33Kbps speed rate, and automatic rate negotiation.

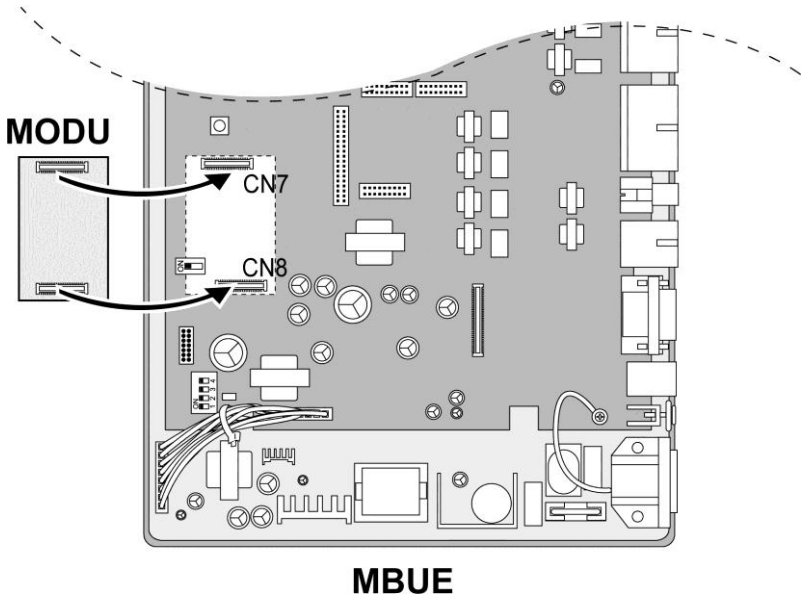


Figure 3.5.6 MODU

3.5.7 PLLU (Phase Locked Loop Unit)

Description

PLLU provides system clock, 32MHz, phase locked to BRI line to system clock generation circuits.
When STIB is installed on the MBUE, PLLU must be installed on CN3 & CN4 connectors for clock synchronization.

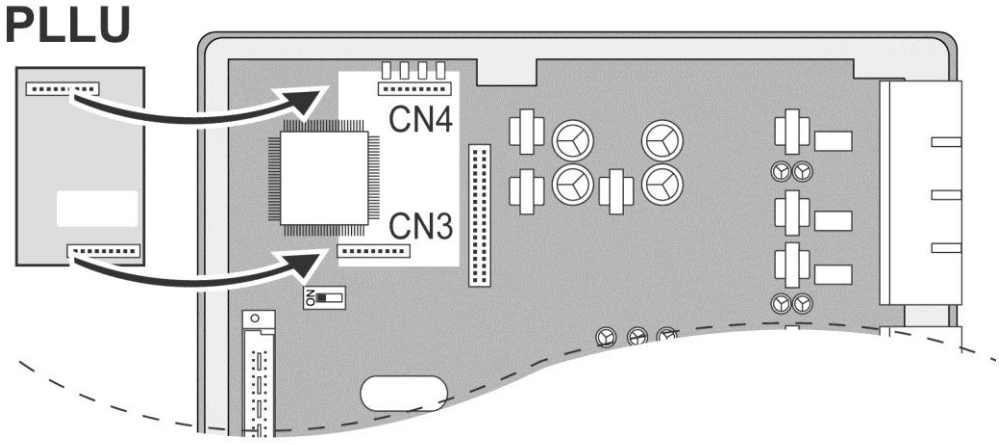


Figure 3.5.7 PLLU

※ NOTE

- LED1 on the PLLU gets turned on when PLL circuit is activated

SECTION 4. EXPANSION MODULE INSTALLATION

ipLDK-20 provides three kinds of expansion modules, VOIM, SLIM and DTIM.

MODULE	PORT	CONNECTOR TYPE	DESCRIPTION	CABLE	REMARK
VOIM	1 port	RJ45	Voice Over Internet Protocol interface	4 wire	
SLIM	4 ports	RJ45	Single Line Telephone interface: 8SLTs	2 wire	2SLTs/port
DTIM	4 ports	RJ45	Digital Terminal interface: 8DKTs	2 wire	2DKTs/port

4.1 Unpacking

Open the box and verify the items shown in Figure 4.1 are included:

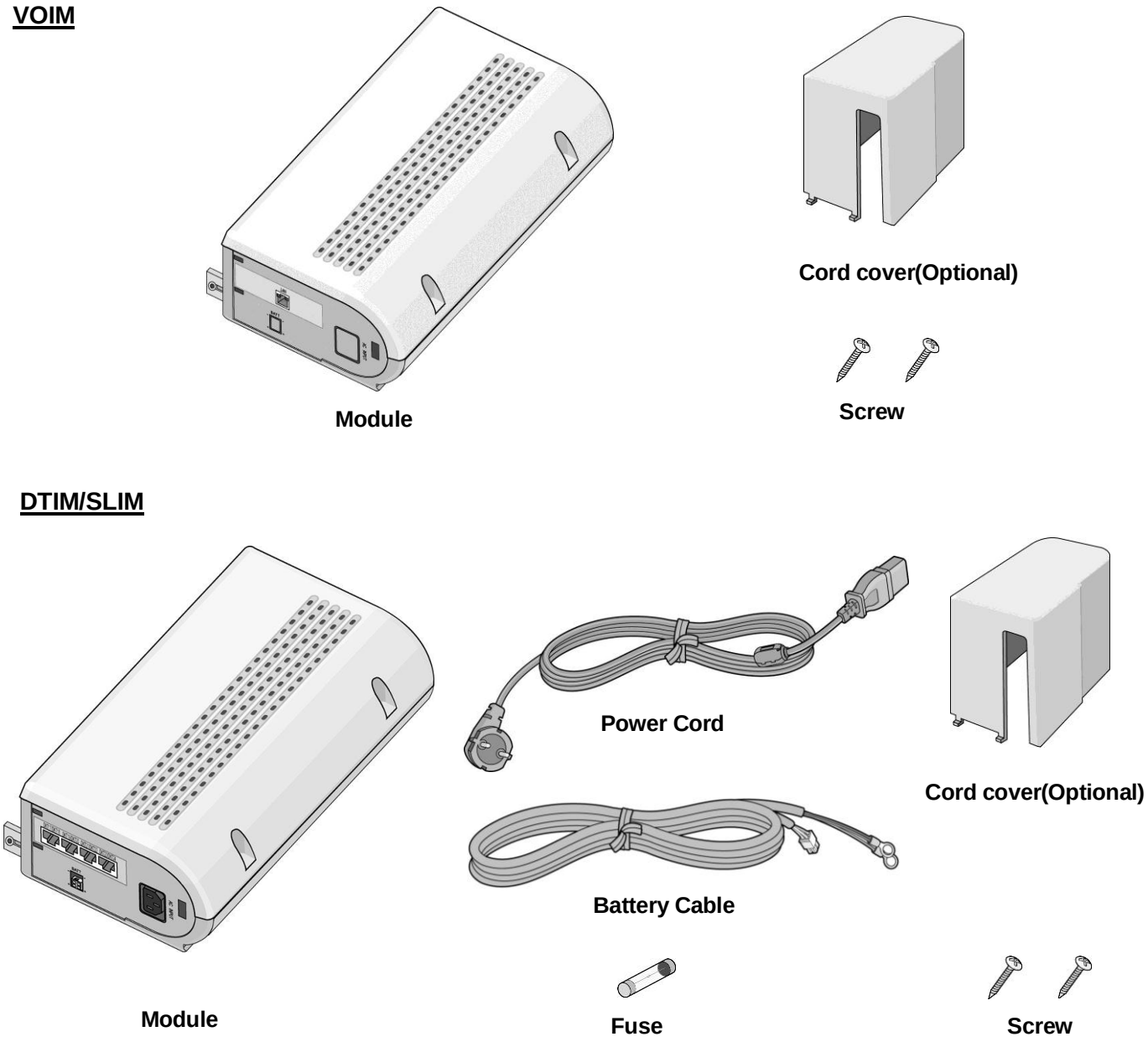


Figure 4.1 Carton contents

4.2 Opening and closing the front cover

4.2.1 Opening the front cover

1. Turn the screw counter-clockwise to loosen as shown in Figure 4.2.1.
2. Lift the front cover in the direction of the arrow as shown:

.

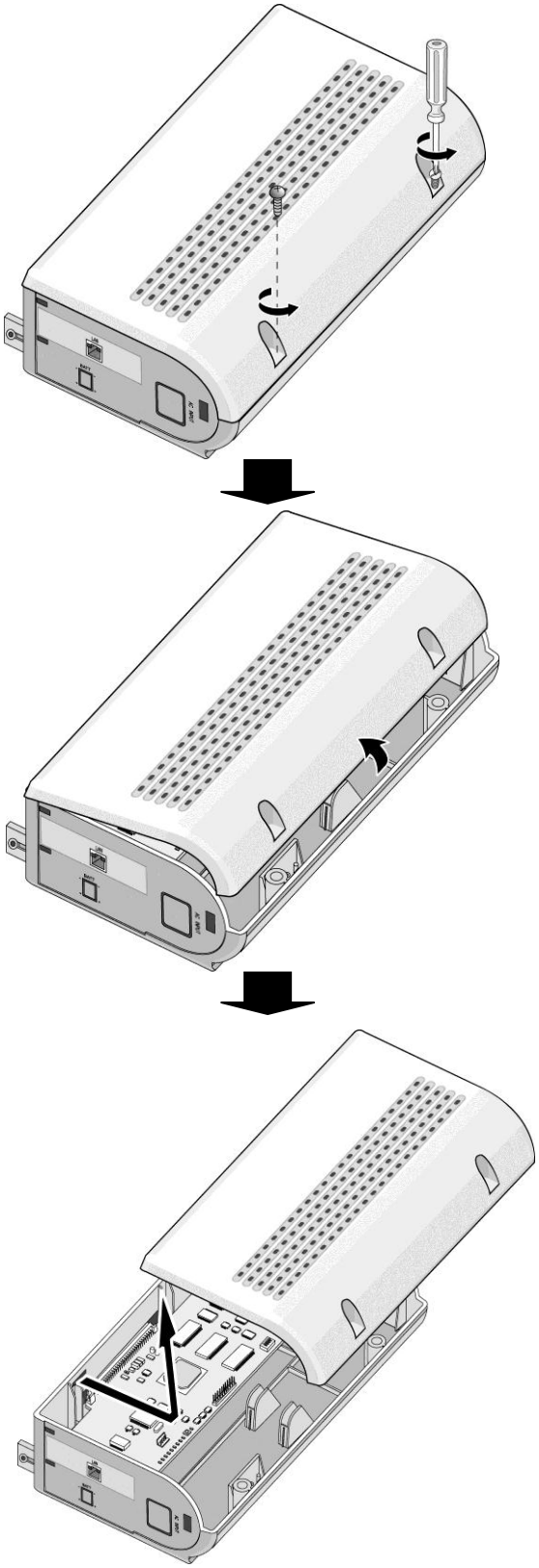


Figure 4.2.1 Opening the front cover

4.2.2 Closing the front cover

1. Insert the front cover into the slot on a module as show in Figure 4.2.2.
2. Then put the front cover down on a module in the direction of the arrow, as shown.
3. Turn the screws clockwise to tighten, as in the Figure.

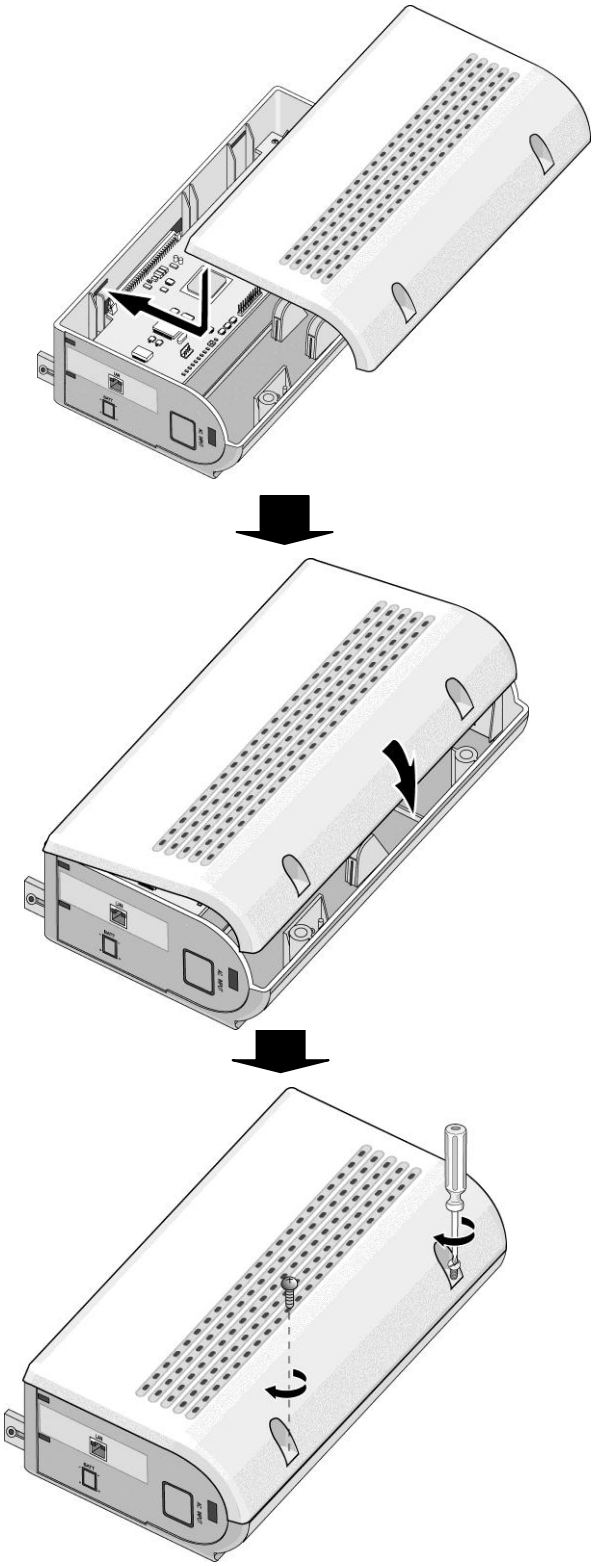


Figure 4.2.2 Closing the front cover

※ NOTE

For safety reasons, close the front cover and tighten the screws prior to operating the ipLDK-20 System.

4.3 Mounting Expansion Module

4.3.1 Connecting Expansion Module to KSU

1. Insert the expansion module into the slot of basic KSU as show in Figure 4.3.1.
2. Turn the screws clockwise to tighten, as in the Figure.

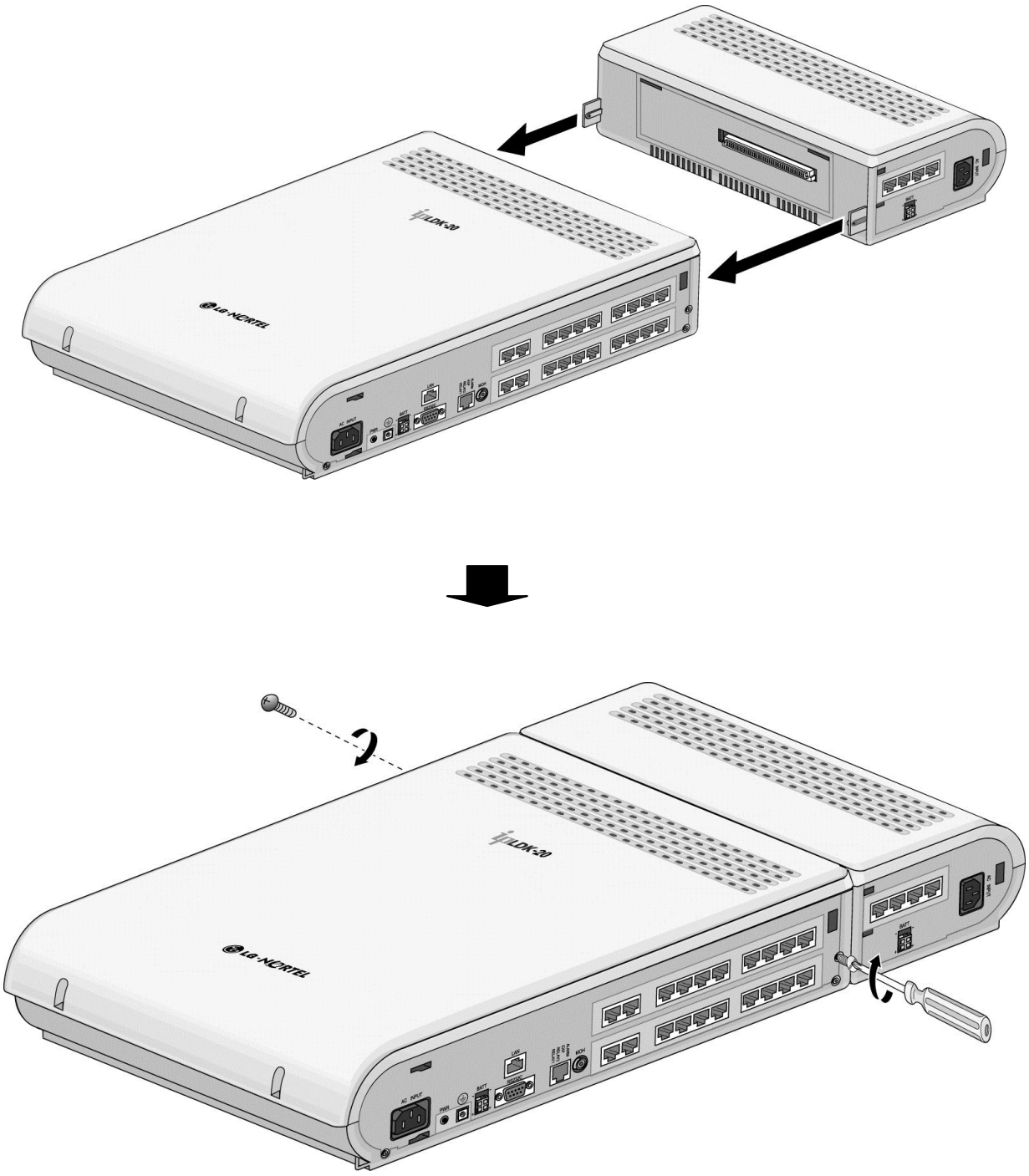


Figure 4.3.1 Connecting an expansion module

4.3.2 Wall mounting

The KSU with an expansion module is mounted on the wall in the same way with basic KSU and an expansion module itself is not mounted on the wall as shown in Figure 4.3.2.

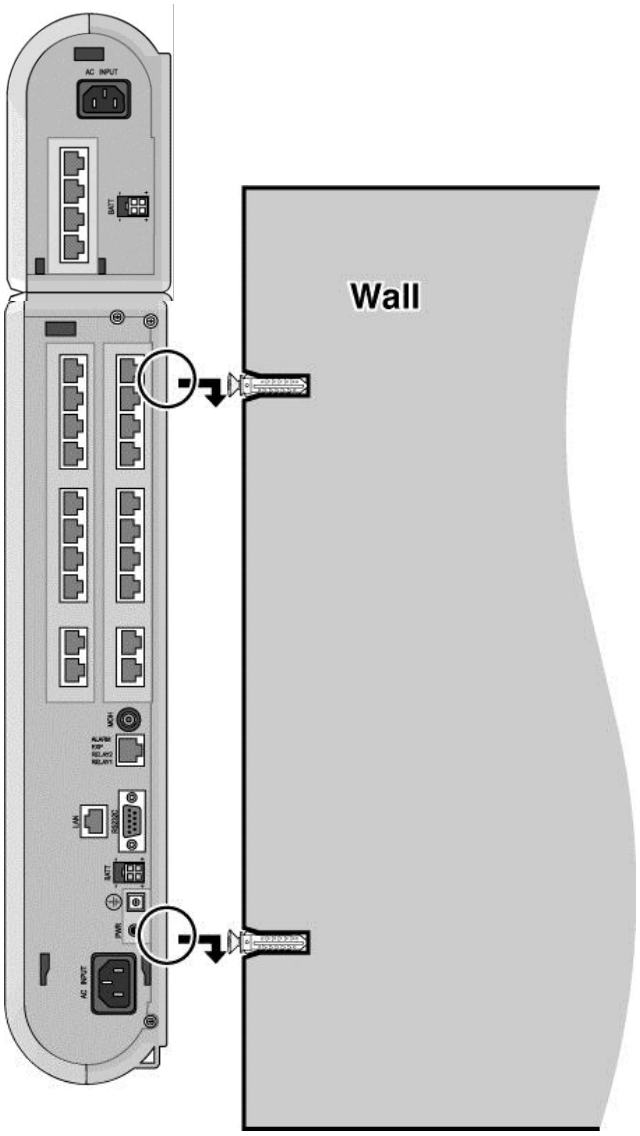


Figure 4.3.2 Wall mounting of KSU with an expansion module

※ Note : Be careful not to drop the KSU.

4.3.3 Rack Mounting

1. Attach the rack bracket to the bottom of an expansion module as shown in Figure 4.3.3.1.

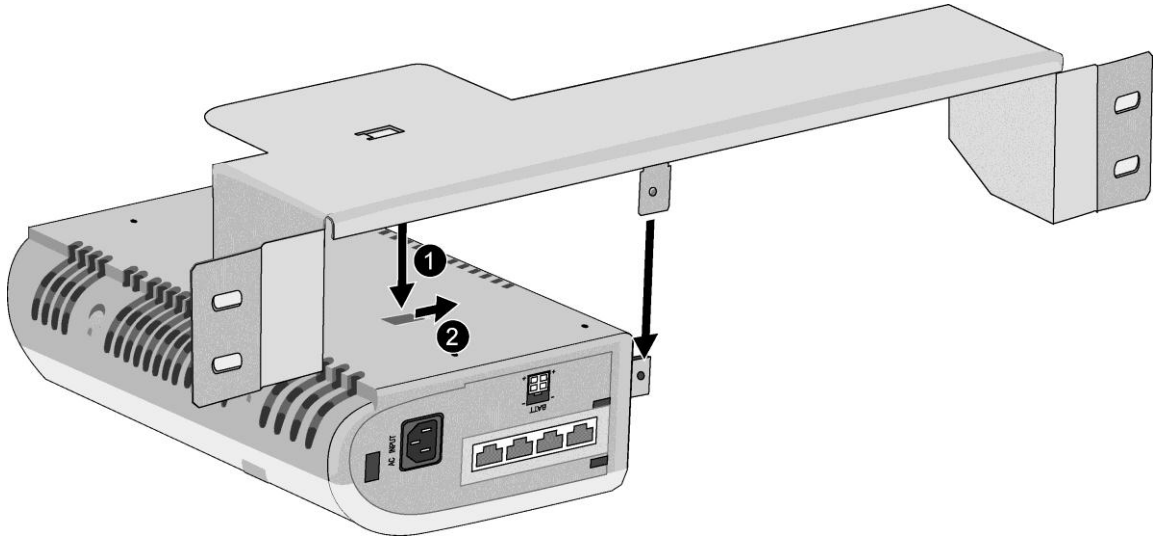


Figure 4.3.3.1 Rack bracket

2. Attach it to a module securely by tightening the screws clockwise, as shown in the Figure below.

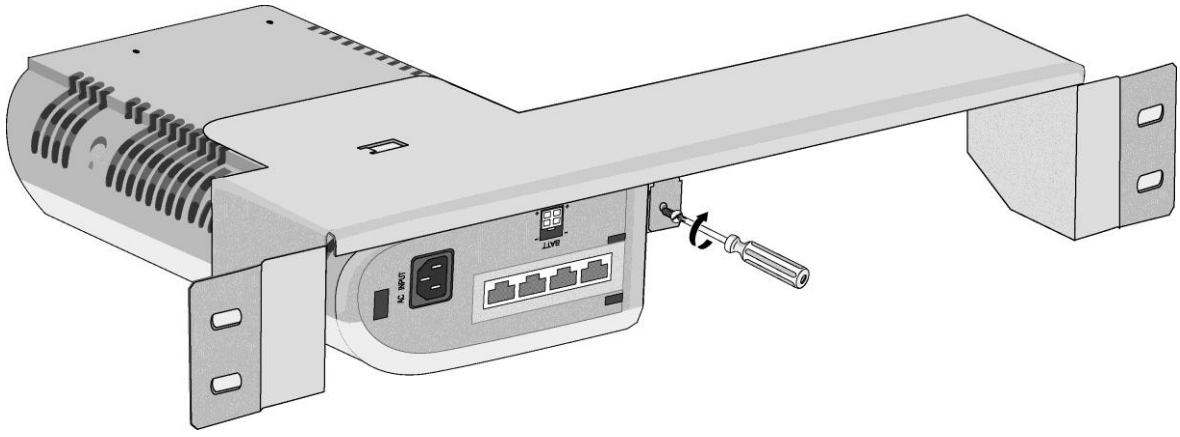


Figure 4.3.3.2 Tightening Rack bracket

3. To attach an expansion module to the rack, affix the bracket with the 4 screws provided (Figure 4.3.3.3)
4. Connect an expansion module to basic KSU with the flat cable packed in the bracket package, ipLDK-20 ERB(Expansion Rack mounting Bracket), as shown in the figure below.

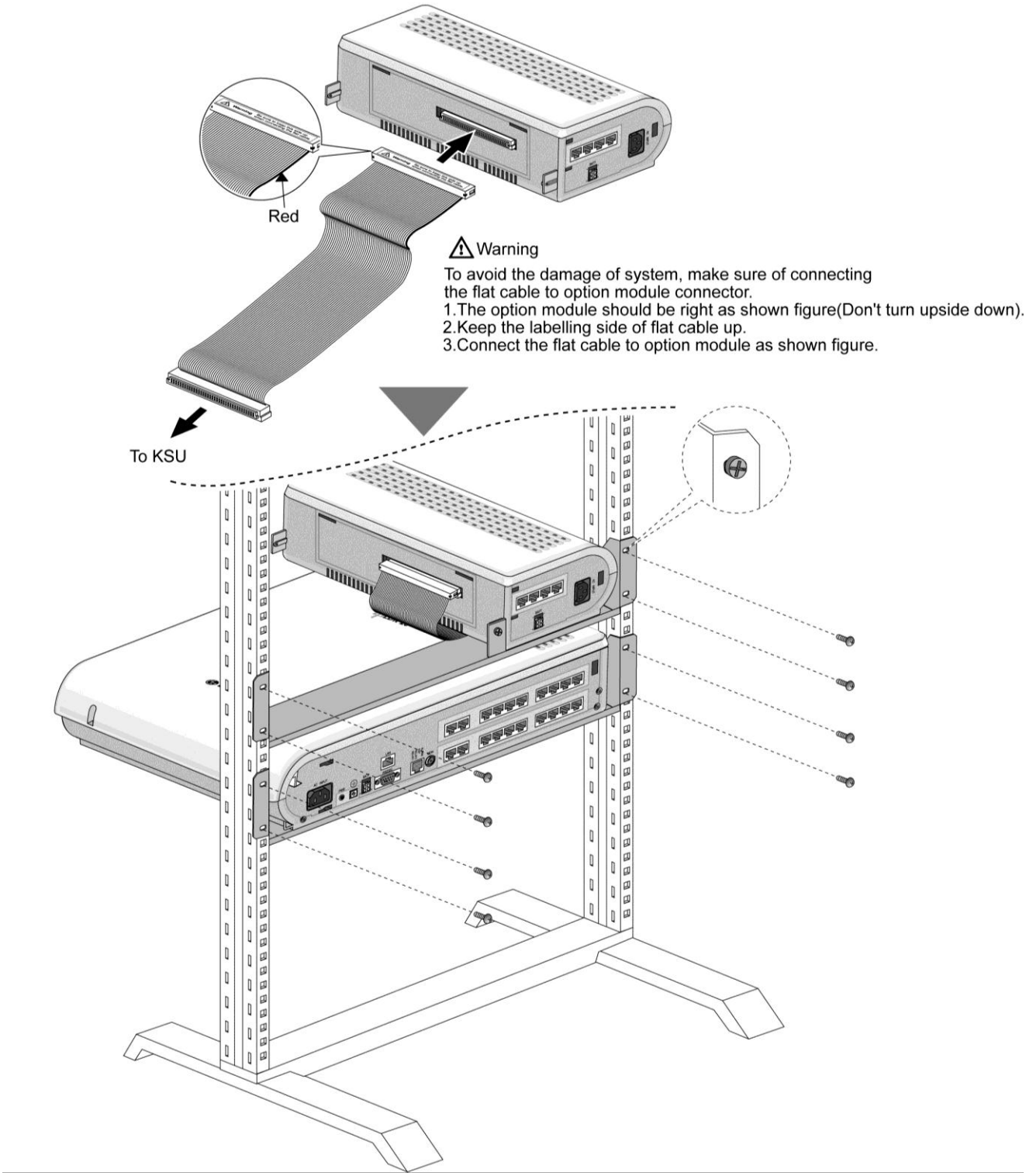


Figure 4.3.3.3 Module Rack Mounting

※ Note: The flat cable is supplied with LDK-20 ERB(Expansion Rack mounting Bracket) package.

4.4 External backup batteries connection

In case of power failure, the external backup batteries automatically maintain uninterrupted power for the ipLDK-20 system. The external batteries must provide 24 Volts DC. This is generally accomplished by connecting two 12 Volt batteries in a series arrangement.

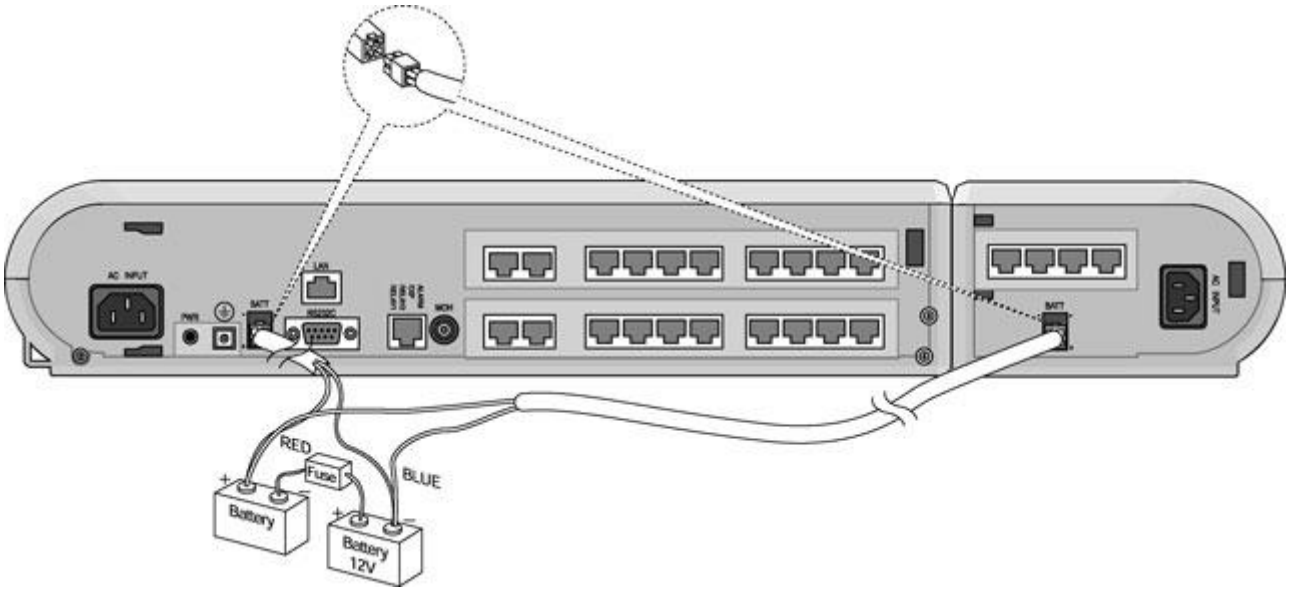


Figure 4.4 External Back Up Battery Installation

※ ***Note*** *: The cable for connecting the battery is supplied with an expansion module.*
Backup batteries for the basic KSU are used in parallel with an expansion module.

The ipLDK-20 MBUE will provide charging current to the batteries during normal AC power operation at a maximum of about 100mA. During battery operation, the battery operation of MBUE and an Expansion Module will be stopped if the AC power re-applied or the battery voltage is too low to maintain full-system operation.
The external batteries can maintain system operation as needed depending on several elements such as, battery charge status, condition and capacity of the batteries, and system configuration (number of station ports).

CAUTION

- There is not the battery charging circuit in an expansion module.
- It is recommended to use an external backup battery fuse (6A @250V) between batteries in case of installing SLIM or DTIM.
- Recommended battery capacity is 24V/10AH MF battery; the ipLDK-20 system should operate more than 2 hours with batteries that are in good condition.
- Carefully check the battery polarity with cable colors (RED and BLUE) when connecting the battery to the system.
- Make sure that you do not short-out the external backup batteries or cables.
- There is a danger of explosion if external backup batteries are incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

4.5 VOIM (Voice over Internet Protocol Interface Module) Installation

Description

The VOIM can be installed on the basic KSU and provides the Ethernet interface for S/W applications and VoIP features with a basic VoIP board(VOIB) that provides 4 VoIP channels.
The VOIM has the capacity of maximum 8 channels with one optional daughter board(VOIU) that provides 4 VoIP channels.

Item	Specification
LAN Interface	10 / 100 Base-T Ethernet (IEEE 802.3)
Speed	10 Mbps or 100 Mbps (Auto-Negotiation)
Duplex	Half Duplex or Full Duplex (Auto-Negotiation)
VoIP Protocol	H.323 Revision 3
Voice Compression	G.711/G.726/G729/G.723.1
Voice/Fax Switching	T.38
Echo cancellation	G.165

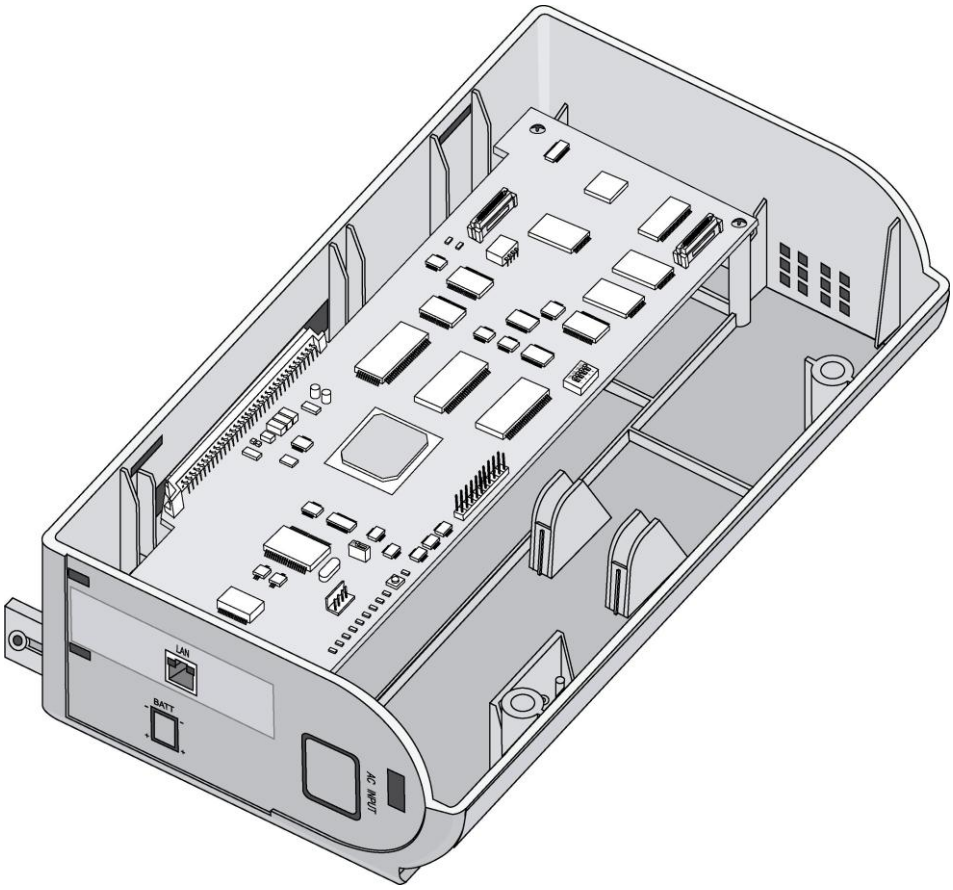


Figure 4.5.1 VOIM

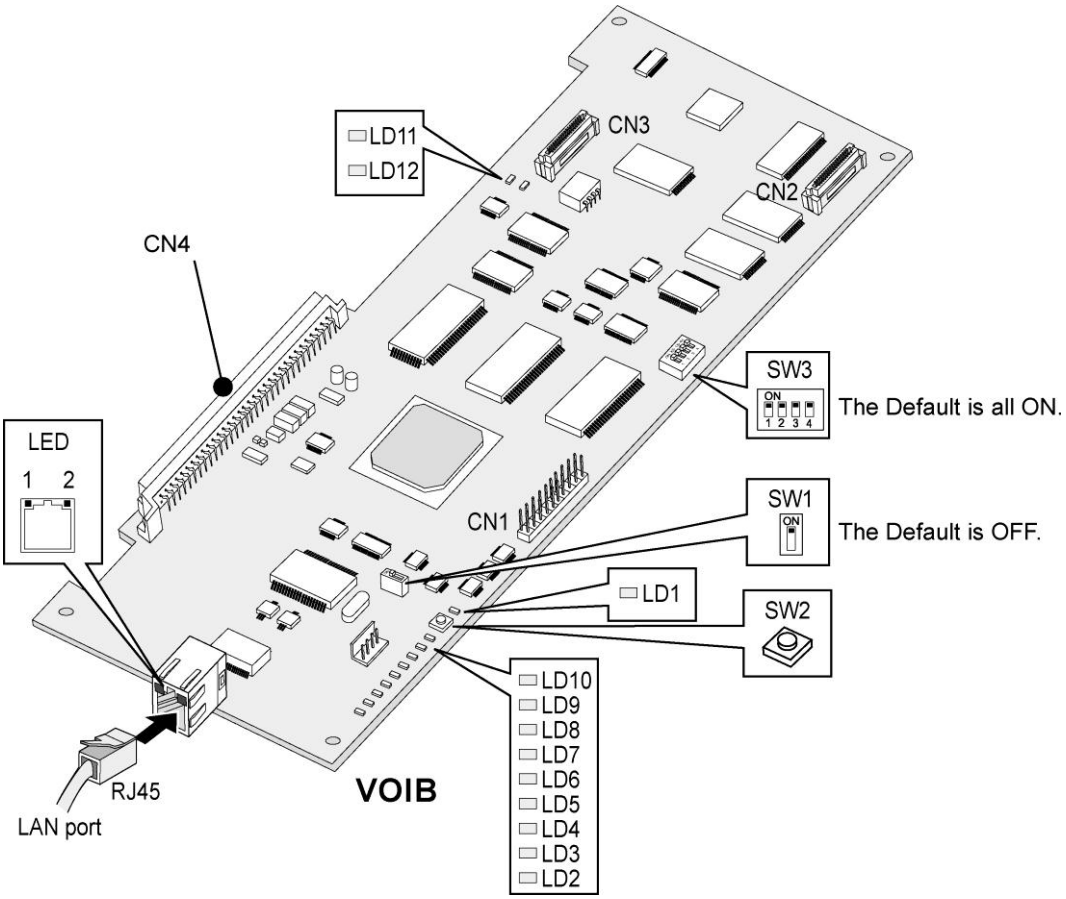


Figure 4.5.2 VOIB

The VOIB is installed in the VOIM and provides various kinds of connectors and RJ45 modular jack for the connection of peripheral boards and miscellaneous functions (refer to the following Table).

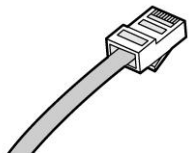
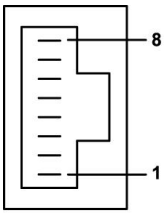
Various switches and connectors functions

Switch / Connector	Functions	Remark
SW1	Watch dog reset enable	Default: Off
SW2	VOIB Reset Switch for CPU (S32500C)	
SW3	Pole1: Trace function disable, others: reserved	Default: ON
CN1	JTAG(Joint Test Action Group) for debug	
CN2	VOIU Board Connection	
CN3	VOIU Board Connection	
CN4	Basic KSU Connection	
CN6	RS232C Trace Tool Connection	
MJ1	Network(RJ-45) Cable Connection	

LED indications

LED	Functions	Remark
LD1	DSP HINT interrupt LED (ON: Active, OFF: Idle)	
LD2	Periodic toggle – ON: 1 sec., OFF: 1 sec.	
LD3	Channel8 Seize indication LED (ON: Busy, OFF: Idle)	
LD4	Channel7 Seize indication LED (ON: Busy, OFF: Idle)	
LD5	Channel6 Seize indication LED (ON: Busy, OFF: Idle)	
LD6	Channel5 Seize indication LED (ON: Busy, OFF: Idle)	
LD7	Channel4 Seize indication LED (ON: Busy, OFF: Idle)	
LD8	Channel3 Seize indication LED (ON: Busy, OFF: Idle)	
LD9	Channel2 Seize indication LED (ON: Busy, OFF: Idle)	
LD10	Channel1 Seize indication LED (ON: Busy, OFF: Idle)	
LD11	VOIB DSP operation status LED (ON: Normal, OFF: Fail)	
LD12	VOIU DSP operation status LED (ON: Normal, OFF: Fail)	
MJ1-LD1	Link Status LED (ON: Link, Toggle: Data transfer, OFF: No Link)	
MJ1-LD2	Speed Status LED (ON: 100Mbps operation, OFF: 10Mbps)	

4.5.1 Pin assignment

Connector	Pin Number	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	Reserved	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

※ NOTE

- 10BASE-T runs on Category 3 UTP or higher.

- 100BASE-TX runs only on Category 5 UTP cable.

4.5.2 VOIU(Voice over Internet Protocol Interface Unit)

Description

The VOIU can be installed on the VOIB through CN2 and CN3 and provides the Ethernet interface for S/W applications and 4 VoIP channels.

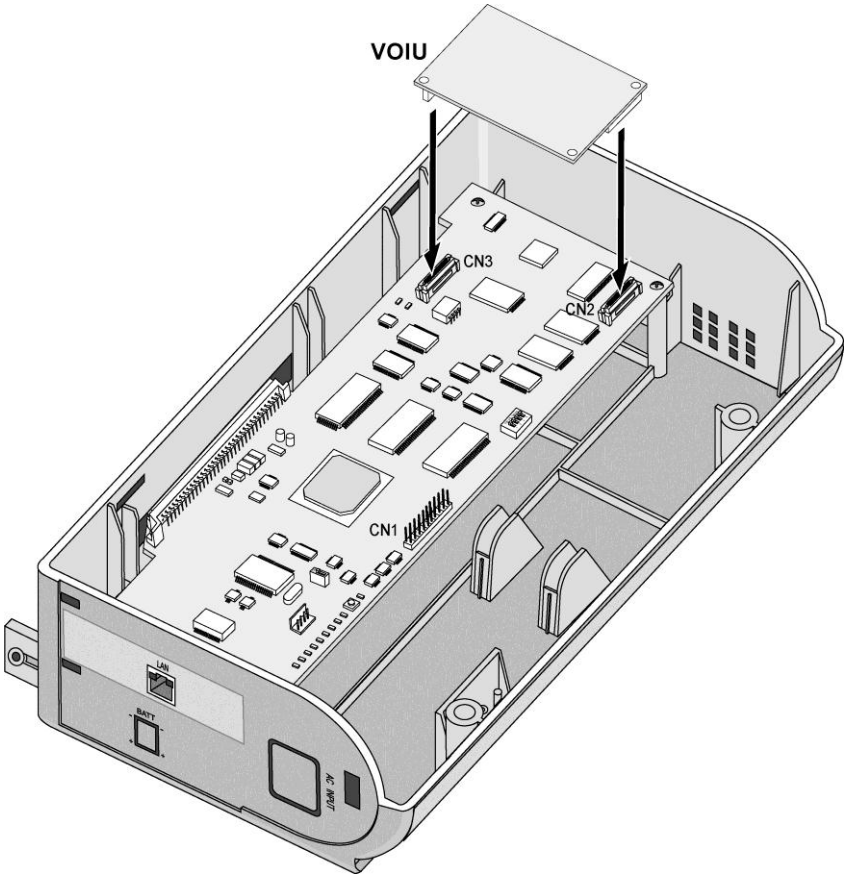


Figure 4.5.2.1 VOIU Installation

4.6 SLIM(SLT Interface Module) Installation

Description

The SLIM provides 8 ports of SLT interface circuits and 2 DTMF receivers. The connection between the SLIM and Single Line Telephone is performed through RJ45 Modular Jacks, MJ1.
SLIM can be installed on basic KSU.

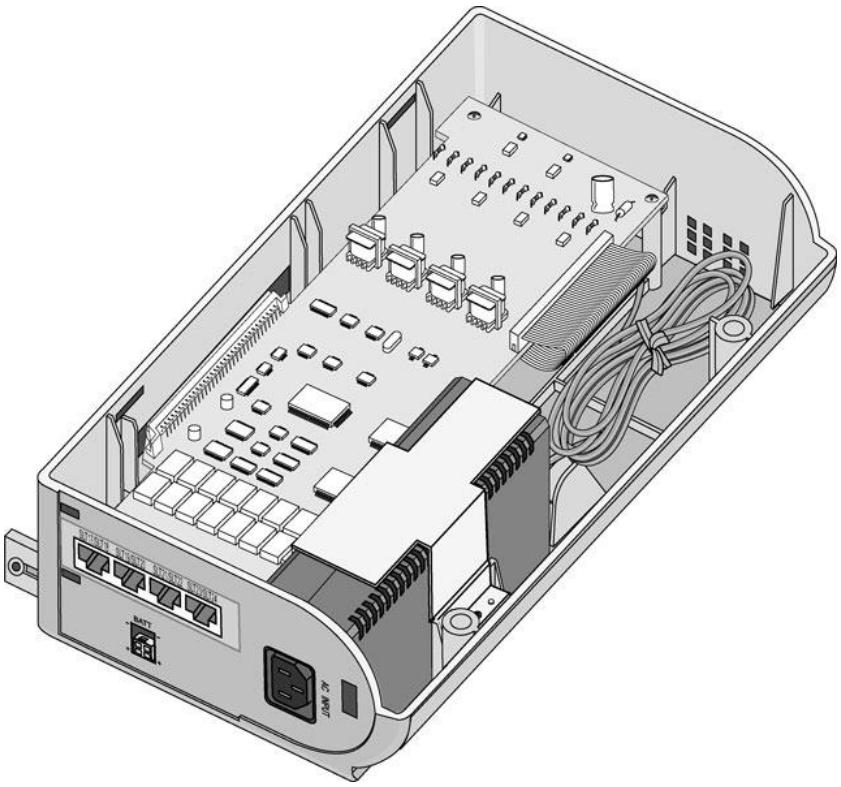
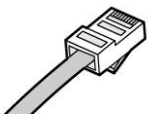
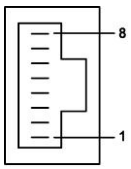


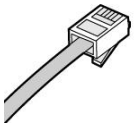
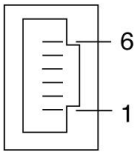
Figure 4.6.1 SLIM

4.6.1 Pin assignment

SLIM

Connector	Pin Number	NO	SIGNAL NAME
RJ45 		1,2	SLT1-R, SLT1-T
		3	Reserved
		4,5	SLT2-R, SLT2-T
		6,7,8	Reserved

SLT

Connector	Pin Number	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

4.7 DTIM(Digital Terminal Interface Module)

Description

The DTIM provides 8 ports of Digital terminal interface and provides 2-wire connection to Digital Keysets. It has module connector, MJ1, which is used to connect Digital Keyset lines to the DTIM.

DTIM can be installed on basic KSU.

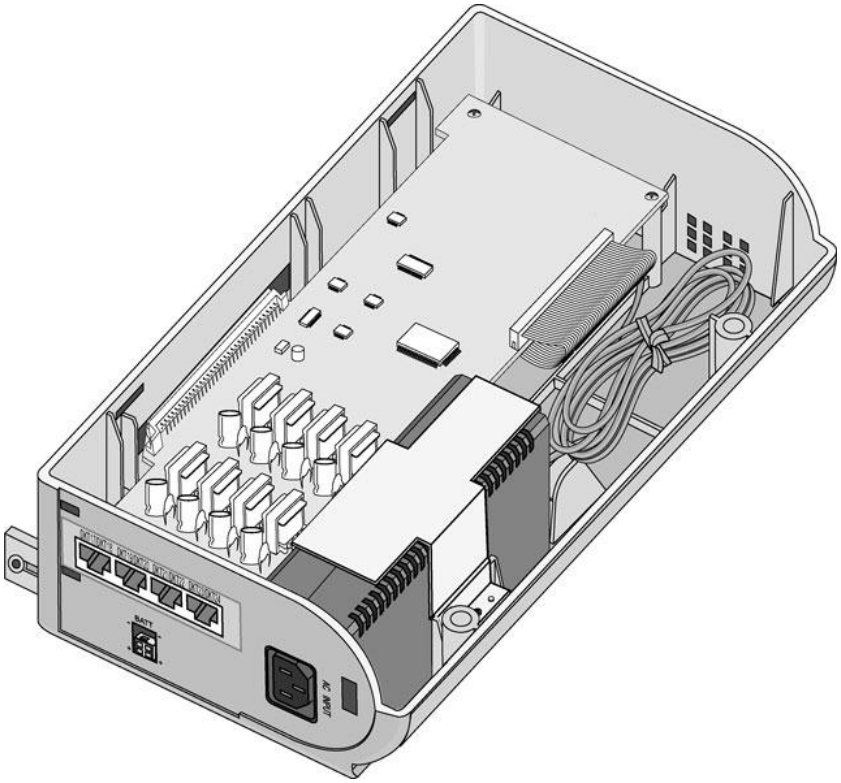
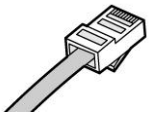
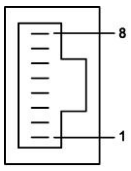


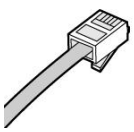
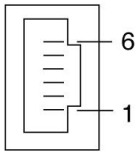
Figure 4.7.1 DTIM

4.7.1 Pin assignment

DTIM

Connector	Pin Number	NO	SIGNAL NAME
RJ45 		1,2	DKT1-R, DKT1-T
		3	Reserved
		4,5	DKT2-R, DKT2-T
		6,7,8	Reserved

DKT

Connector Type	Pin Number	NO	SIGNAL NAME
RJ11 		1-2	Reserved
		3	TIP
		4	RING
		5-6	Reserved

SECTION 5. TERMINAL CONNECTION

5.1 Terminal Models

Various types of digital terminals are used with ipLDK-20 MBUE/DTIB4/DTIB8/DTIM/VOIM as listed and shown below:

Model	Description	Model	Description
KD-36EXE	24 Flexible Button Display	KD/E-36EXE	24 Flexible Button Display
KD-36ENH	24 Flexible Button Normal	KD/E-36ENH	24 Flexible Button Normal
KD-24EXE	12 Flexible Button Display	KD/E-24EXE	12 Flexible Button Display
KD-24ENH	12 Flexible Button Normal	KD/E-24ENH	12 Flexible Button Normal
KD-33LD	8 Flexible Button Large Display	KD/E-8BTN	8 Flexible Button Normal
KD-DSS	48 Button DSS/DLS Console	KD/E-36LD	24 Flexible Button Large Display
LKD-30DS	30 Flexible Button Display	LDP-7004N	4 Flexible Button Normal
LKD-8DS	8 Flexible Button Display	LDP-7004D	4 Flexible Button Display
LKD-2NS	2 Flexible Button Normal	LDP-7008D	8 Flexible Button Display
LKD-30LD	30 Flexible Button Large Display	LDP-7016D	16 Flexible Button Display
LKD-48DSS	48 Button DSS/DLS Console	LDP-7024D	24 Flexible Button Display
KD-Digital Phone Box	Digital Intercom Box	LDP-7024LD	24 Flexible Button Large Display
		LDP-7048DSS	48 Button DSS/DLS Console
LIP-7008D	8 Flexible Button Display	LIP-7024D	24 Flexible Button Display
LIP-7016D	16 Flexible Button Display	LIP-7024LD	24 Flexible Button Large Display

LDP-7004N

LDP-7004D

LDP-7008D

LDP-7016D

LDP-7024D

LDP-7024LD

LIP-7008D

LIP-7016D

LIP-7024D

LIP-7024LD

5.2 Terminal Cabling Distance

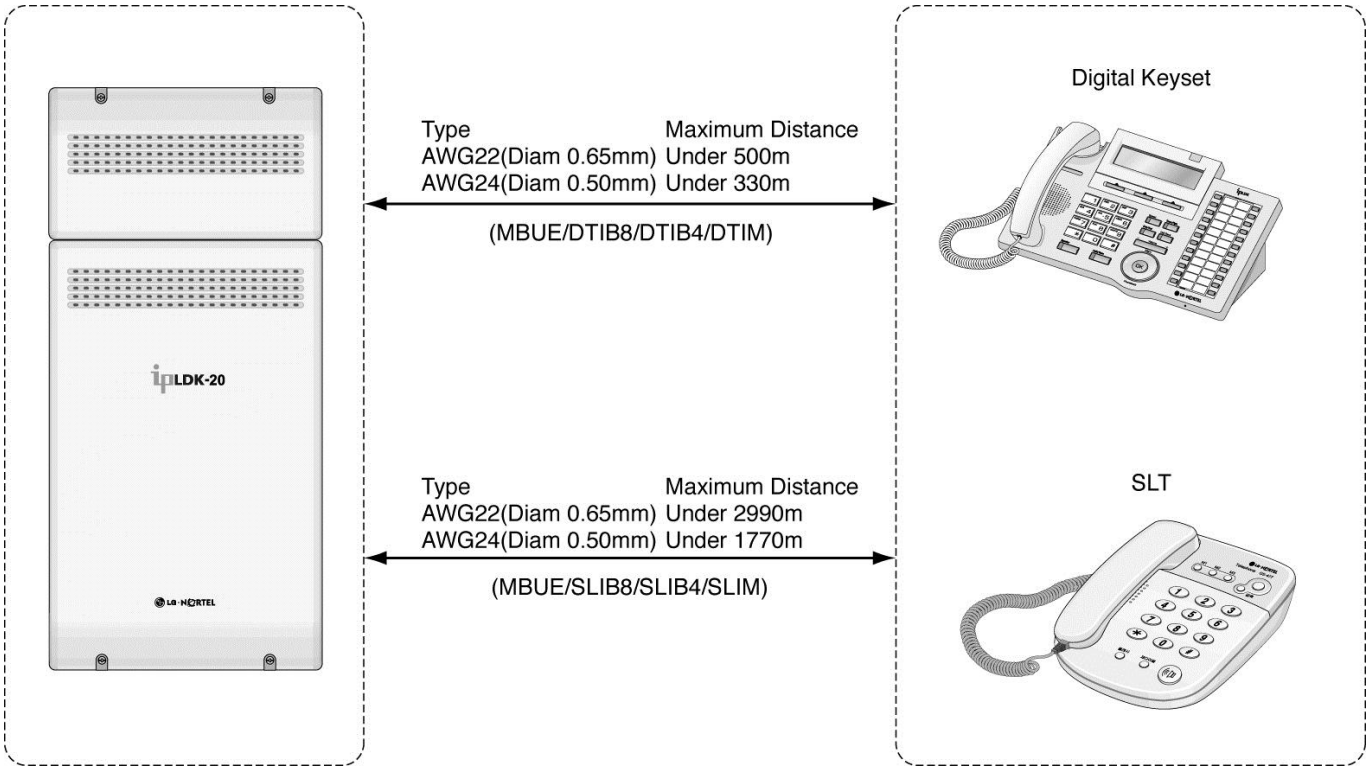


Figure 5.2 Terminal Cabling Distance

5.3 Keyset Connection

5.3.1 LIP-7000 Series Keyset

The following illustrates how to connect the LIP-7000 series Keyset to your system:

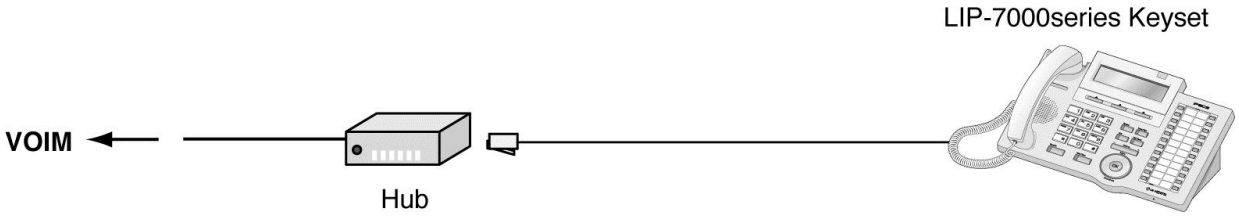
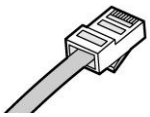
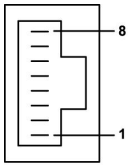


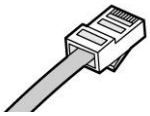
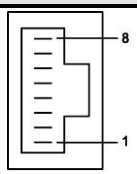
Figure 5.3.1 LIP-7000 series Keyset Connection

5.3.1.1 Pin Assignment

LAN AND VOIM PORT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	RESERVED	
		1	TX+	Transmit Data
		2	TX-	Transmit Data
		3	RX-	Receive Data
		6	RX+	Receive Data

PC PORT

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME	FUNCTION
RJ45 		4,5,7,8	RESERVED	
		1	RX+	Receive Data
		2	RX-	Receive Data
		3	TX-	Transmit Data
		6	TX+	Transmit Data

5.3.2 Digital Keyset

The following illustrates how to connect the Digital Keyset to your system:

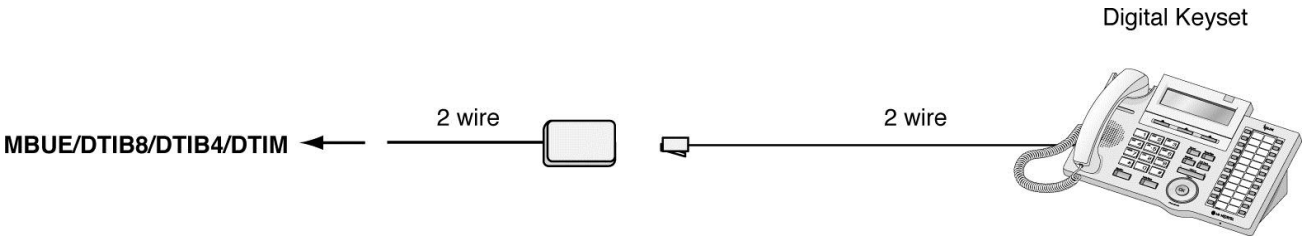
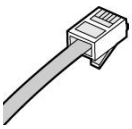
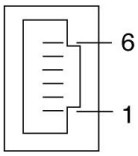


Figure 5.3.2 Digital Keyset Connection

5.3.2.1 Pin Assignment

CONNECTOR TYPE	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	RESERVED
		3	TIP
		4	RING
		5-6	RESERVED

5.3.3 SLT

The following illustrates how to connect the SLT to your system:

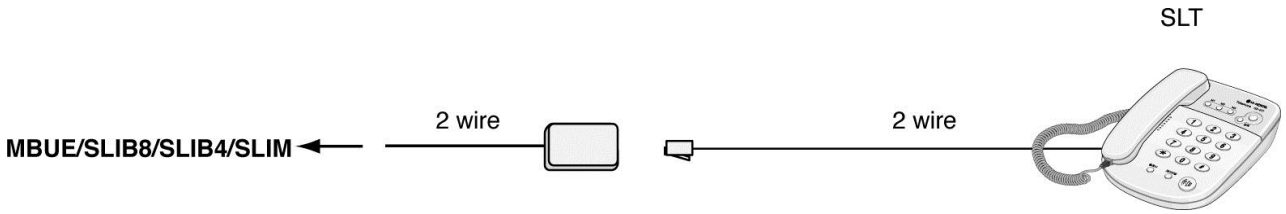
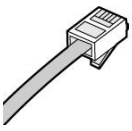
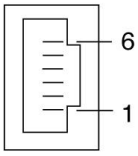


Figure 5.3.3 SLT Connection

5.3.3.1 Pin Assignment

CONNECTOR TYPE	PIN NUMBER	NO	SIGNAL NAME
RJ11 		1-2	RESERVED
		3	TIP
		4	RING
		5-6	RESERVED

5.4 Connecting Additional Terminals

MBUE provides connections for 1 external music source, 1 external page port, 2 relay contacts, and an alarm/door-bell input monitor through the PJ1 audio jack and a MJ4 RJ45 Modular Jack.

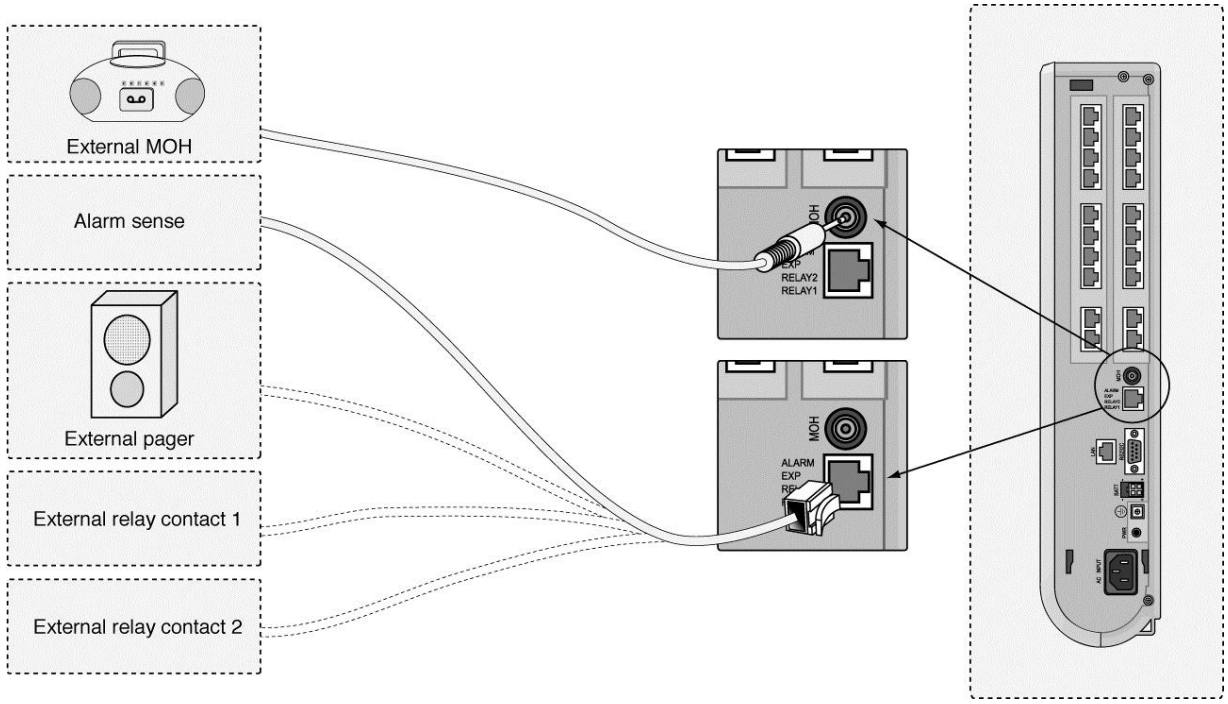


Figure 5.4.1 Additional Terminal Connection

5.4.1 External Music Source wiring

The MBUE accommodates 1 port of external music source through a PJ1 (RED) audio Jack.

5.4.2 Relay Contacts

The MBUE provides 2 relay contacts that are used for loud bell or external paging through pin No. 1-2 & 3-4 of MJ4.

5.4.3 External Paging wiring

The MBUE supports 1 external paging port through Pin No.5-6 (paging port) of MJ4.

5.4.4 Alarm Detection wiring

The MBUE provides an external alarm detection input, which can be used to transmit notification to extensions when the external switch is closed or opened (programmable through Admin Programming). This alarm detection input is provided through pin No.7-8 of MJ4.

SECTION 6. DECT Installation

6.1 Introduction

The ipLDK-20 can be equipped with a WTIB(Wireless Telephone Interface Board) or a WDIB (Wireless Telephone and DKT Interface Board) which will support DECT installations with single or multiple (max. 4/WTIB or 4/WDIB) Base Station configurations. DECT installation is a 5 step process:

1. Install the WTIB(WDIB) in the ipLDK-20
2. Identify the Base Station locations
3. Install the Base Stations
4. Subscriber DECT Terminals
5. Register DECT users and terminal.

Installation of the WTIB(WDIB) is covered in section 6.2. Location and installation of Base Stations is accomplished in accordance with the GDC-345TB CRS manual. DECT Terminals are subscribed and registered in accordance with the GDC-345H/400H Wireless Terminal User Guide.

The WTIB(WDIB) provides the standard interface between the ipLDK-20 and DECT network. The WTIB(WDIB) provides three or four wireless terminal interface circuits for connection to Base Stations that can support up to 16 wireless terminals.

The following equipment is required to connect the wireless system:

- **Base Station**

  The base station should be installed indoors and protected from surge because it is designed for indoor station.

- **GDC-400B**

  Each base station provides similar coverage for a particular area call as a cell, and supports 4 simultaneous calls (4 traffic channels).

- **Wireless Terminal (GDC-345H, 400H)**

Base station Specifications (GDC-400B)

Item	Specification
Power feeding	**+30V DC**
Transmission Max Power	**250mW**
Access Method/Duplex	**TDMA/TDD**
Frequency Band	**1,880 ~ 1,900MHz**
Channel Spacing	**1.728MHz**
Modulation	**GFSK**
Data rate	**1.152Mbps**
Max. Base Station distance from the WTIB(WDIB)	**600m (twisted 2-pair cable)**

Wireless Terminal Specifications

Item	Specification
Max. Transmission Power	**250mW**
Modulation Method	**GFSK**
Frequency Band	**1,880MHz ~ 1,900MHz**

The following table shows the capacity of WTIB(WDIB).

WTIB(WDIB) Capacity

Items	WTIB(WDIB)
Maximum Cell Number (Number of Base Stations)	**4**
Voice channels / Cell	**4**
Maximum registered terminals	**16**
Max. Simultaneous Wireless calls	**16***

*** The number of maximum channel is limited by the number of maximum registered terminals.**

6.2 WTIB and WDIB Installation

6.2.1 WTIB Installation

The WTIB connects to Base Stations using two pair of an RJ45 connector as shown in Figure 6.1 and wiring charts below.

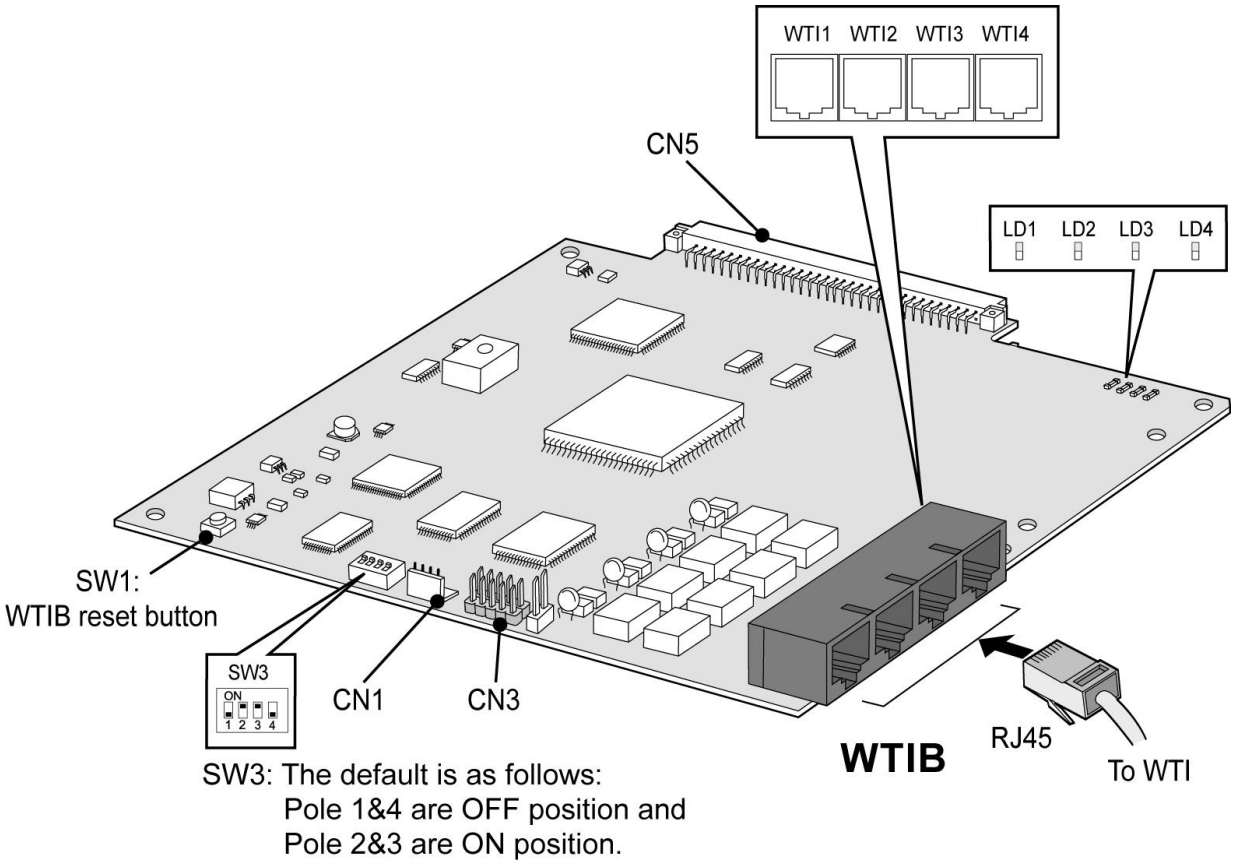


Figure 6.1 WTIB (Wireless Terminal Interface Board)

NOTE—

1. ***The WTIB should only be installed when power to the system is Off; installation with power On will cause damage to the system and/or WTIB.***
2. ***The modular connectors, WTI1 to WTI4, are connected to Base Stations using 2-pair unshielded twisted pair cable.***

WTIB LEDs

LED No.	LED On
LED 1	HDLC Interrupt
LED 2	10ms task interrupt operation
LED 3	Voice channel active
LED 4	Echo canceller enable

WTIB Connectors

Modular Connector Number		Cell Number
WTIB	WTI1	Cell 1
	WTI2	Cell 2
	WTI3	Cell 3
	WTI4	Cell 4

WTIB Switches

SW3	On	Off	Default
Switch 3-1 Operation	TBR6 mode	Normal service mode	OFF
Switch 3-2 Echo canceller Control	Echo canceller on	Echo canceller off	ON
Switch 3-3	Reserved	Reserved	ON
Switch 3-4 Base reset mode	All base reset	One base reset	OFF

6.2.2 WDIB Installation

The WDIB connects to Base Stations using 2 pair of an RJ45 connector ass shown in Figure 6.2 and wiring charts below.

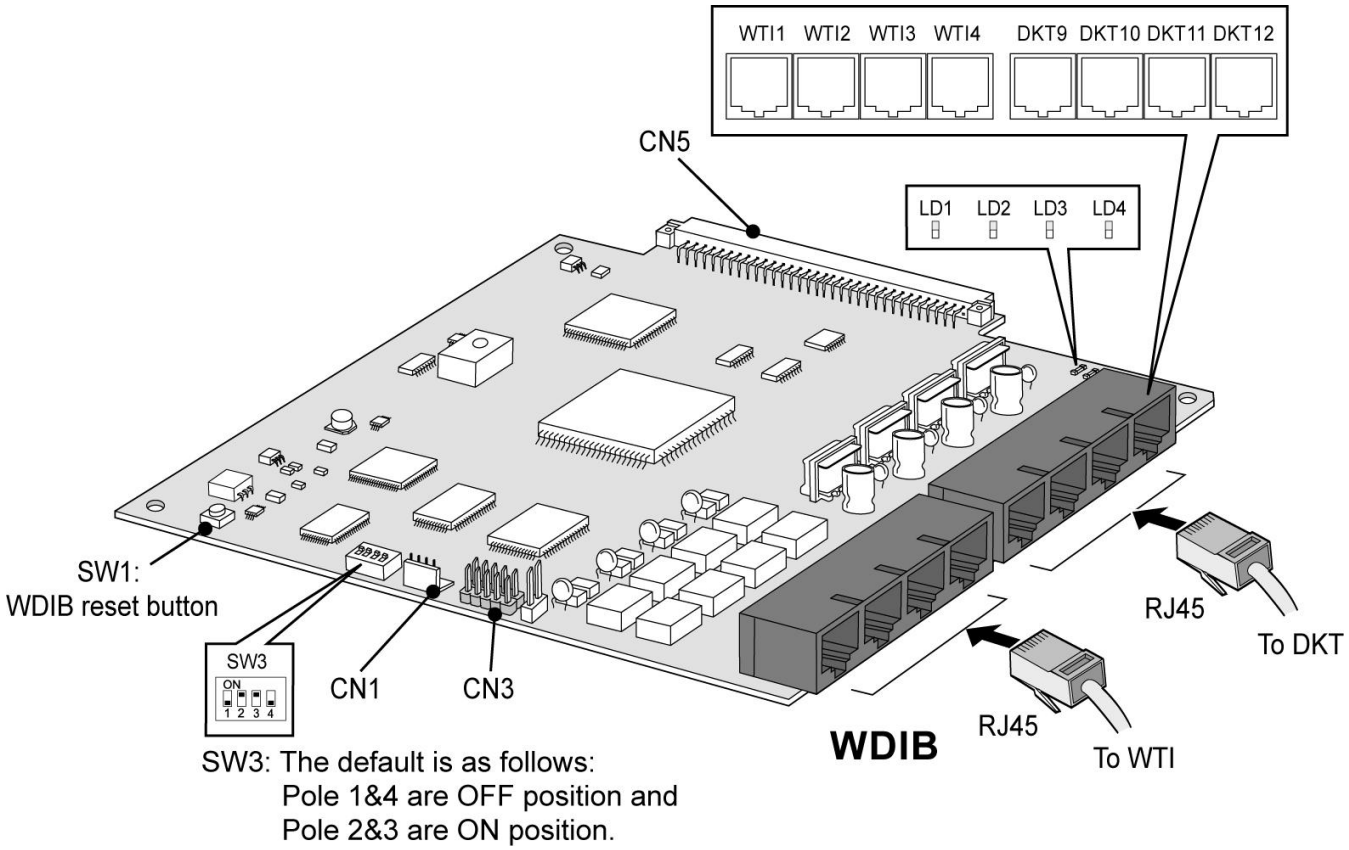


Figure 6.2 WDIB (Wireless Terminal Interface Board)

NOTE—

1. ***The WDIB should only be installed when power to the system is Off; installation with power On will cause damage to the system and/or WDIB.***
2. ***The modular connectors, WTI1 to WTI4, are connected to Base Stations using 2-pair unshielded twisted pair cable.***

WDIB LEDs

LED No.	LED On
LED 1	HDLC Interrupt
LED 2	10ms task interrupt operation
LED 3	Voice channel active
LED 4	Echo canceller enable

WDIB Connector 1

Modular Connector Number		Cell Number
WTI	WTI1	Cell 1
	WTI2	Cell 2
	WTI3	Cell 3
	WTI4	Cell 4

WDIB Connector 2

Modular Connector Number		DKT Number
DKT	DKT9	Digital Key Telephone 1
	DKT10	Digital Key Telephone 2
	DKT11	Digital Key Telephone 3
	DKT12	Digital Key Telephone 4

WDIB Switches

SW3	On	Off	Default
Switch 3-1 Operation	TBR6 mode	Normal service mode	OFF
Switch 3-2 Echo canceller Control	Echo canceller on	Echo canceller off	ON
Switch 3-3	Reserved	Reserved	ON
Switch 3-4 Base reset mode	All base reset	One base reset	OFF

WTIB(WDIB)-400B Automatic Line Test Function

1. Install WTIB(WDIB) in the system and connect the base(s) to each port of WTIB(WDIB).To check line status, all bases should already be connected to WTIB(WDIB).

2. Set all dip switch in WTIB(WDIB) to ON state.

3. Power on the system. (Automatic Line Test Start)

4. During Test (5 minutes),

All LED(1-4) blink (1sec LED On, 1sec LED Off).

5. After Test, LED show test result.

TESTING...	LED ON(1s) / OFF(1s)
OK	LED OFF
NOT OK	LED ON
BASE EJECT	LED ON(100ms) / OFF(100ms)

6. Also you can see the test state in realtime through WTIB(WDIB) console.

```
==========================================================
*  Welcome to LG-Nortel WTIB(WDIB) Liu Test Program Ver 0.a   *
==========================================================
E1 Line Test Start !! 01minutes
During Test... 00:59
E1 Line Test End !!
Base eject [01]
Base eject [02]
Base eject [03]
Base eject [04]
Base eject [05]
```

LIU Error cnt1 : Link0=0000, Link1=6700, Link2=7229, Link3=8131
: Link4=8170, Link5=7475, Link6=0000, Link7=0000
LIU Error cnt2 : Link0=0000, Link1=9475, Link2=9646, Link3=4363
: Link4=2793, Link5=5563, Link6=0000, Link7=000

- **Note**
  1. **Don't write any other things at WTIB(WDIB) console during test.**
  2. **It's meaningless to change dip switch during test (after changing dip switch, you should be reset WTIB(WDIB))**
  3. **If even 1 error happened, also display "NOT OK".**

6.3 Base Station Installation

There are two ways in installing the base station:

Mounting Base Station - 1

The weight of a base station is light as approx. 460g, so it can be mounted on a masonry or dry-wall surface, wooden wall, or partition wall. The distance between mounting holes is 121mm as shown below. The base station is mounted with 1 1/2 inch or longer screws. Drill pilot holes in the two locations, insert the screws and tighten leaving about 3mm gap between the wall and screw head. Mount the base station on the screws and tighten the screws securely.

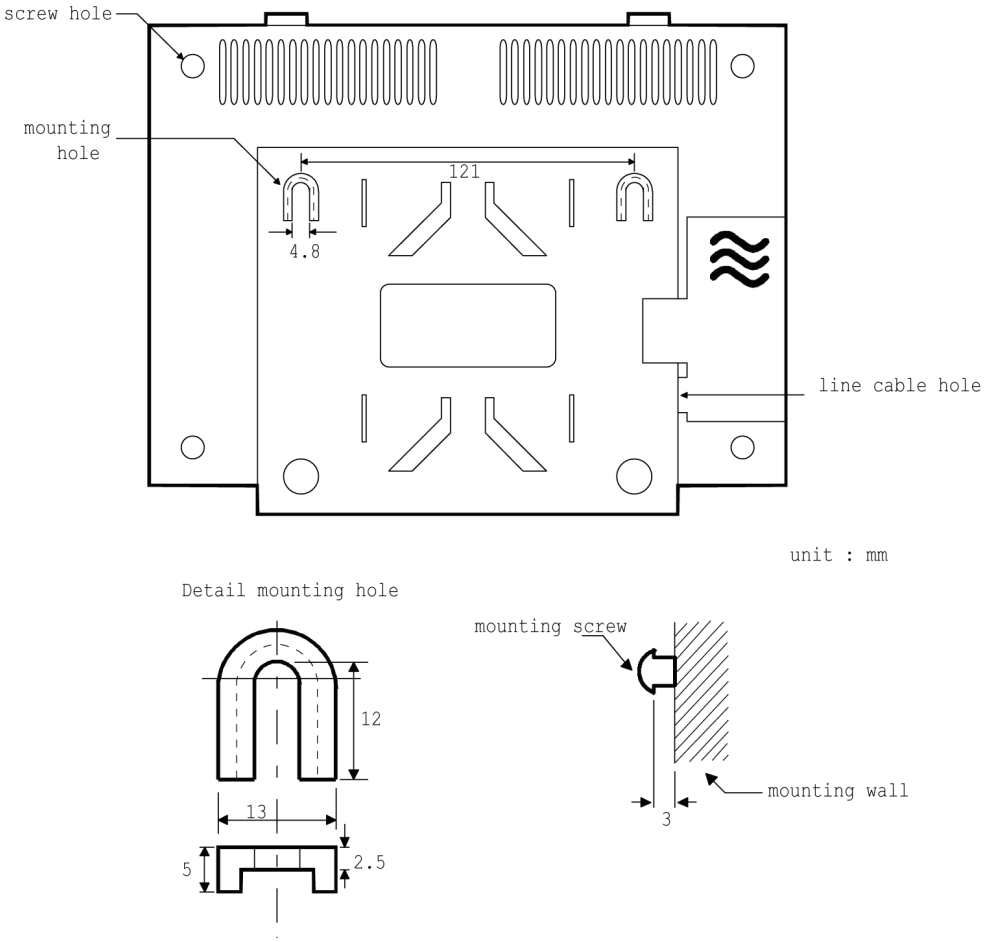


Figure 6.3-1 The back side of the GDC-400B

Before mounting base station permanently, you should determine locations that provide the best coverage. The wall mounting procedure of a base station is as follows:

1. Drill two 3.5mm holes in a fixed wall. To properly position the holes, you can use mounting template that is the last sheet of this manual and copy it if necessary.
2. Insert anchors into the drilled holes. Then insert screws in the anchors, leaving a 3mm gap between the wall and screw head.
3. Mount the base station eyelets on the screws.

Mounting Base Station - 2 (Using Wedge)

Installing the Base Station using the wedge,

1. Determine at first the location on wall where the wedge prepared for mounting the base station is to be fixed.
2. The wedge should be settled by using two screws on the wall with mounting template.
3. And insert the base station pulling down into the wedge.

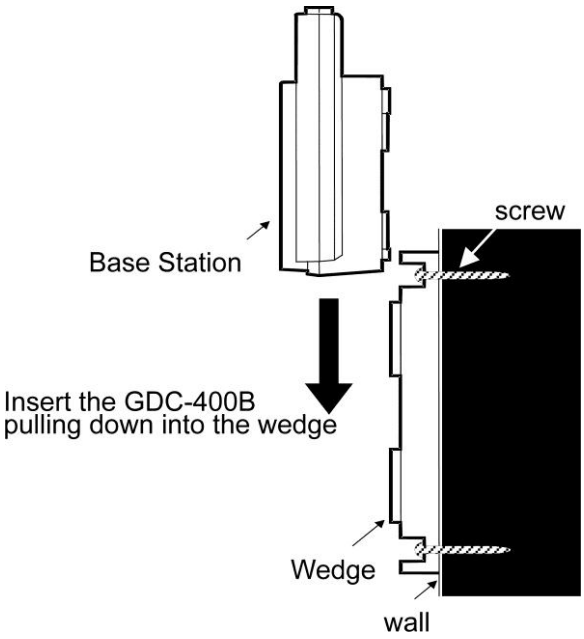


Figure 6.3-2 The side of the GDC-400B

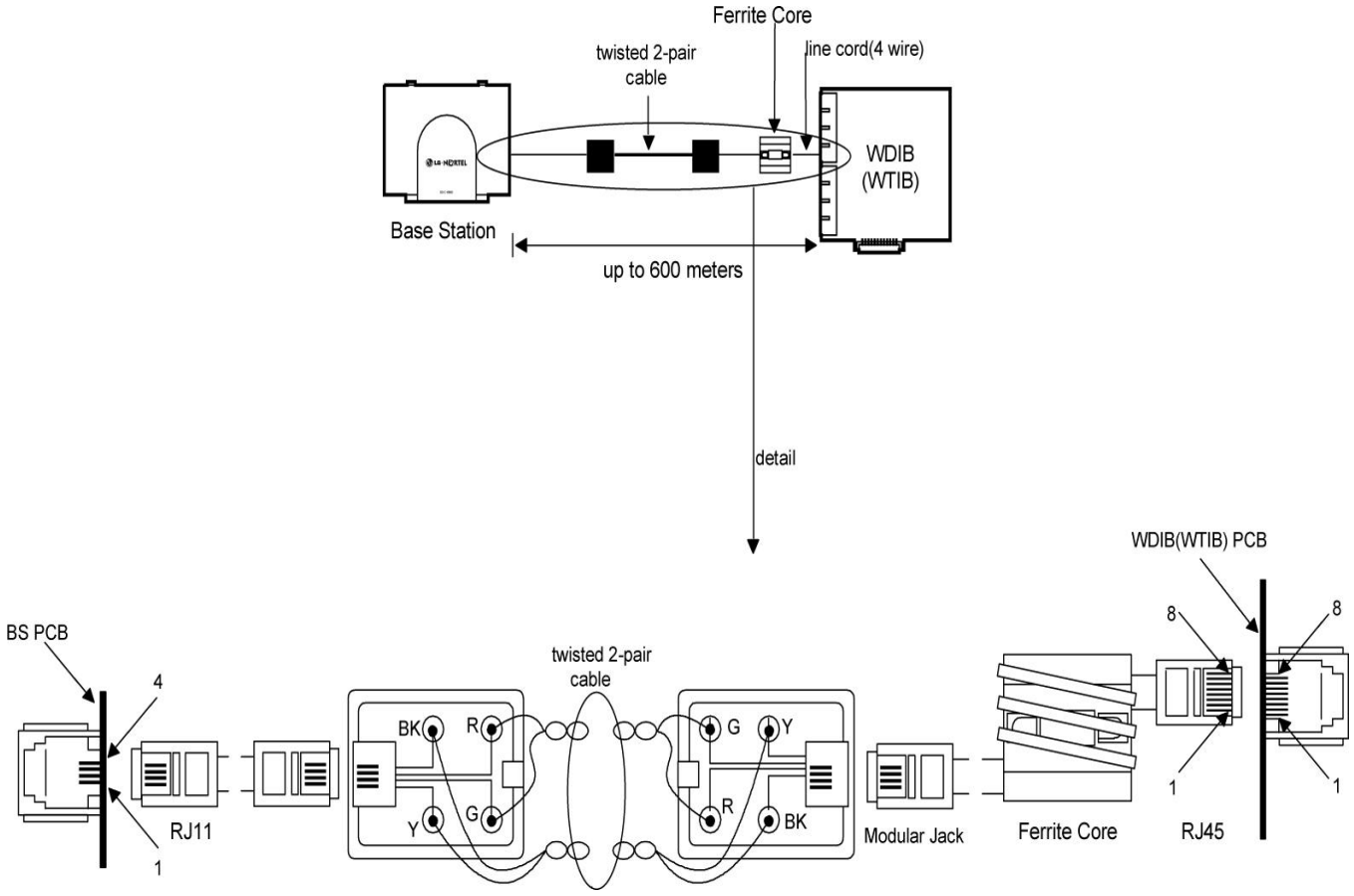
Before mounting base station permanently, you should determine a suitable location providing the best coverage. Use the last sheet of this manual for mounting template to drill pilot holes in the wall.

GDC-400B Base stations may be mounted on wall or desktop up to 600m away from the WTIB(WDIB) using a twisted 2-pair unshielded cable (0.5ϕ, AWG 24). They are remotely powered (DC 30 volts) by the WTIB(WDIB).

The number of base stations used in a system depends on the area to be covered and the traffic density. The typical in-house coverage is a 40m radius. In practice the cell size may vary between 10 meters indoor in worst cases situation and up to 200m outdoor in free space.

6.4 Installation of the Ferrite core and wiring

Ferrite core is provided in the package of Base station for EMI. Ferrite core should be installed when WTIB(WDIB) is installed in the key telephone system. One Ferrite core in the package of base station is for line cord between base station and each port of WTIB(WDIB).



SECTION 7. STARTING THE ipLDK-20 SYSTEM

7.1 Before Starting the ipLDK-20 System

The DIP switch (SW1) of Memory Backup Battery should be turned ON before installing the MBUE, to protect system data in the case of a power failure. To prepare for preprogramming, perform the following Steps:

1. Set the DIP switch (SW3) on the MBUE to ON.
2. To initialize all the data in Admin Programming, the 4th pole of SW3 should be set to ON.
3. Plug the AC power cord into the ipLDK-20 System and AC outlet.
4. Program the Country Code as applicable.
5. Reset the ipLDK-20 System.
6. Set the 4th pole of SW3 on the MBUE to OFF when the system operates normally. The 4th pole of SW3 is set to OFF, to protect the various features addressed by Admin Programming after system power-up and initialization.

7.2 Basic Preprogramming

The ipLDK-20 System can be programmed to meet an individual customer's need. There are two ways to perform ADMIN Programming:

- PC ADMIN : Refer to the PC ADMIN Programming Manual.
- DKTU : In this manual we explain DKTU (Station 10) in ADMIN Programming.

7.2.1 DKTU (Station 10) programming

All programming is done at Station 10 (Station port # 00) using the LDP-7024D digital key telephone.

Additional programming stations may be assigned (PGM 113 – FLEX 1), but only 1 DKTU can be active in the programming mode at any one time.

When in programming mode, Station 10 does not operate as a normal telephone, but instead works as a programming instrument with all of the buttons redefined. The keys of the dial pad are used to enter the various data fields and to enter numerical information:

- **Flexible Buttons**
  The 24 buttons located at the top of the phone are used to indicate a specific data field and to enter information.
- **SPEED Button and * Key**
  Are sometimes used to delete data or to indicate the end of data input.
- **REDIAL Button**
  Could be used to delete one digit or character from the end of entered digits or characters.

7.2.1.1 Button explanation

There are many kinds of DKTUs capable of connecting to the ipLDK-20 system. Figure 7.2.1 shows a model of the LDP-7024D and illustrates each button. Detailed DKTU information for this and other keysets is described in the DKTU User Guide and Installation Manual.

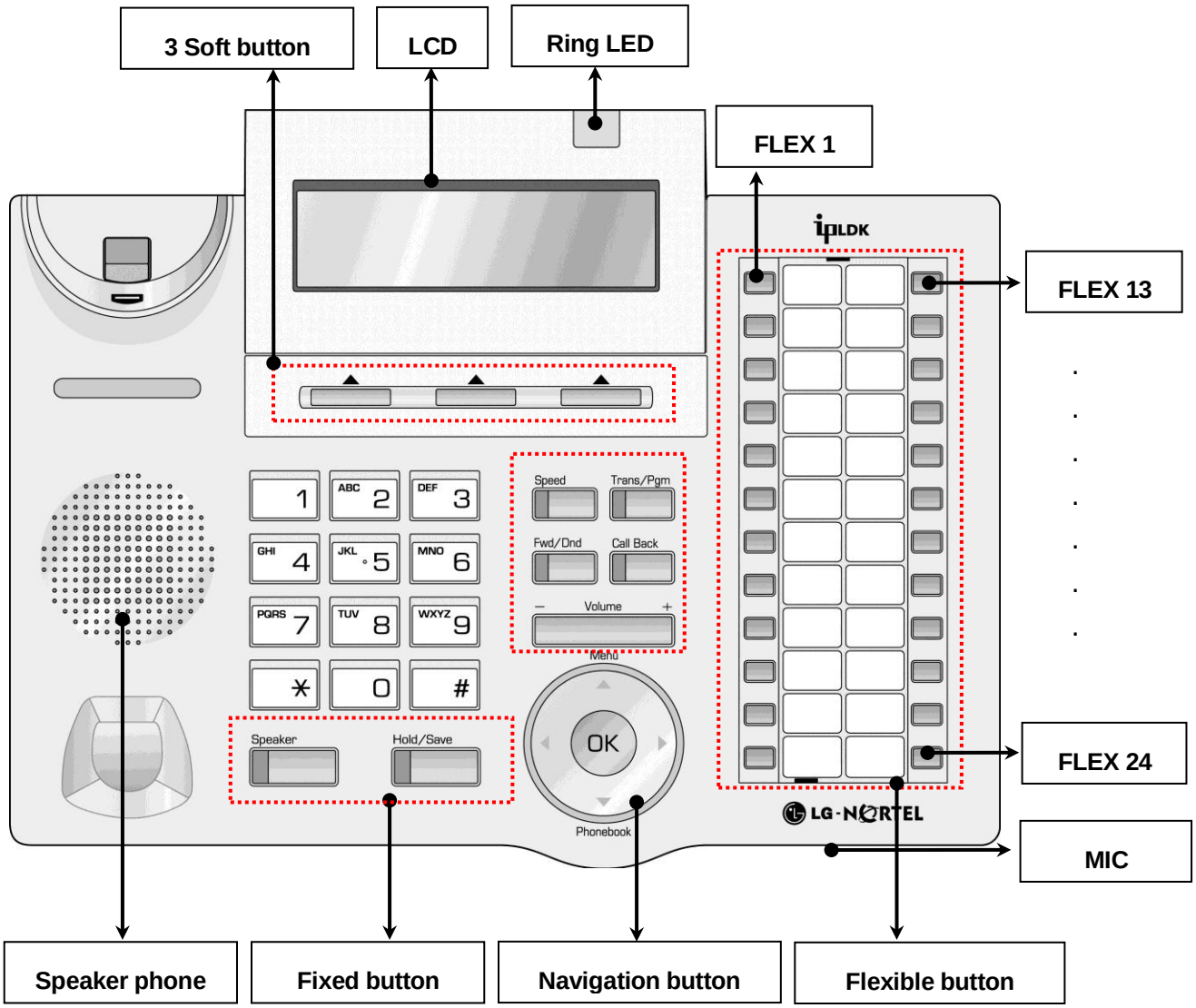


Figure 7.2.1 Description of LDP-7024D Buttons

7.2.2 Entering programming mode

To enter Programming Mode, perform the following Steps:

Lift the handset

OR

Press the **[MON]** button on the ADMIN station, and hear ICM dial tone.

1. Press the **[TRANS/PGM]** button and dial ＊# .
2. Confirmation tone should be heard.
3. Enter the ADMIN password if the password has been set.
4. A confirmation tone should be heard indicating that the station is in ADMIN Programming mode.
5. Each program is accessed by pressing the **[TRANS/PGM]** button, the following should display:

ENTER PGM NUMBER

6. Dial the desired three-digit program number. If an error is made while entering data, the [**TRANS/PGM**] button will return to the previous status.

※ NOTE

To return to the parent state while ADMIN programming, press the [**CONF**] button. Pressing the [**CONF**] button clears temporary data fields.

7.2.2.1 Permanent Update Procedure

To accept changes while programming, perform the following Steps:

1. Press the **[HOLD/SAVE]** button when all changes have been entered to store the data permanently.
2. A confirmation tone should be heard when pressing the [**HOLD/SAVE**] button if all data was entered correctly. If there were any errors in the entry, then an error tone is presented and data is not stored in the permanent memory.

7.2.2.2 Resetting the System

To reset the system, perform the following Steps:

1. Enter **[PGM]** + **450** then **[FLEX]** + **15** and press the **[HOLD/SAVE]** button.
   OR
2. Press **[PGM]** + **100** then **[FLEX]** + **1** (Nation Code Assign) to automatically reset the system.

7.2.3 Pre-programming

Location PGM-Nation Code & Site Name (PGM100)

※ **NOTE :** The 4th pole of the DIP switch (SW 3) on the MBUE must be turned ON.

Procedure

Nation Code

To program the Nation code, perform the following Steps:

1. Press **[Trans/PGM]** + *PGM Number(100),* then **[Flex1]** + **7.**
2. Press **[HOLD/SAVE]** to accept change.

※ NOTE : Press the reset button after setting the nation code to restart the system

Site Name

1. Press **[Trans/PGM]** + *Enter Site Name* (use the following Keyset Map, Max. 24 digits allowed), then **[Flex2].**
2. Press **[HOLD/SAVE]** to accept change.

[Keyset Map]

Q – 11 **Z – 12** **. – 13** **1 – 10**	**A - 21** **B - 22** **C - 23** **2 - 20**	**D - 31** **E - 32** **F - 33** **3 - 30**
G – 41 **H - 42** **I - 43** **4 – 40**	**J - 51** **K - 52** **L - 53** **5 - 50**	**M - 61** **N - 62** **O - 63** **6 - 60**
P - 71 **R - 72** **S - 73** **Q - 7*** **7 – 70**	**T - 81** **U - 82** **V - 83** **8 - 80**	**W - 91** **X - 92** **Y - 93** **Z - 9#** **9 - 90**
***1 - Blank** ***2 - :** ***3 - ,**	**0-00**	**#**

International Calling Codes

NATION	CODE	NATION	CODE	NATION	CODE
America	1	Argentina	54	Australia	61
Bahrain	973	Bangladesh	880	Belgium	32
Bolivia	591	Brazil	55	Brunei	673
Burma	95	Cameroon	237	Chile	56
China (Taiwan)	886	CIS	7	Colombia	57
Costa Rica	506	Cyprus	357	Czech	42
Denmark	45	Ecuador	593	Egypt	20
El Salvador	503	Ethiopia	251	Fiji	679
Finland	358	France	33	Gabon	241
Germany	49	Ghana	233	Greece	30
Guam	671	Guatemala	502	Guyana	592
Haiti	509	Honduras	504	Hong Kong	852
India	91	Indonesia	62	Iran	98
Iraq	964	Ireland	353	Israel	972
Italy	39	Japan	81	Jordan	962
Kenya	254	Korea	82	Kuwait	965
Liberia	231	Libya	218	Luxembourg	352
Malaysia	60	Malta	356	Mexico	52
Monaco	377	Morocco	212	Netherlands	31
New Zealand	64	Nigeria	234	Norway	47
Oman	968	Pakistan	92	Panama	507
P.N.G	675	Paraguay	595	Peru	51
Philippines	63	Portugal	351	Qatar	974
Saudi Arabia	966	Senegal	221	Singapore	65
South Africa	27	Spain	34	Sri Lanka	94
Swaziland	268	Sweden	46	Switzerland	41
TELKOM	*27	Thailand	66	Tunisia	216
Turkey	90	U.A.E.	971	United Kingdom	44
Uruguay	598	Venezuela	58	Y.A.R.	967
TELSTRA	*61				

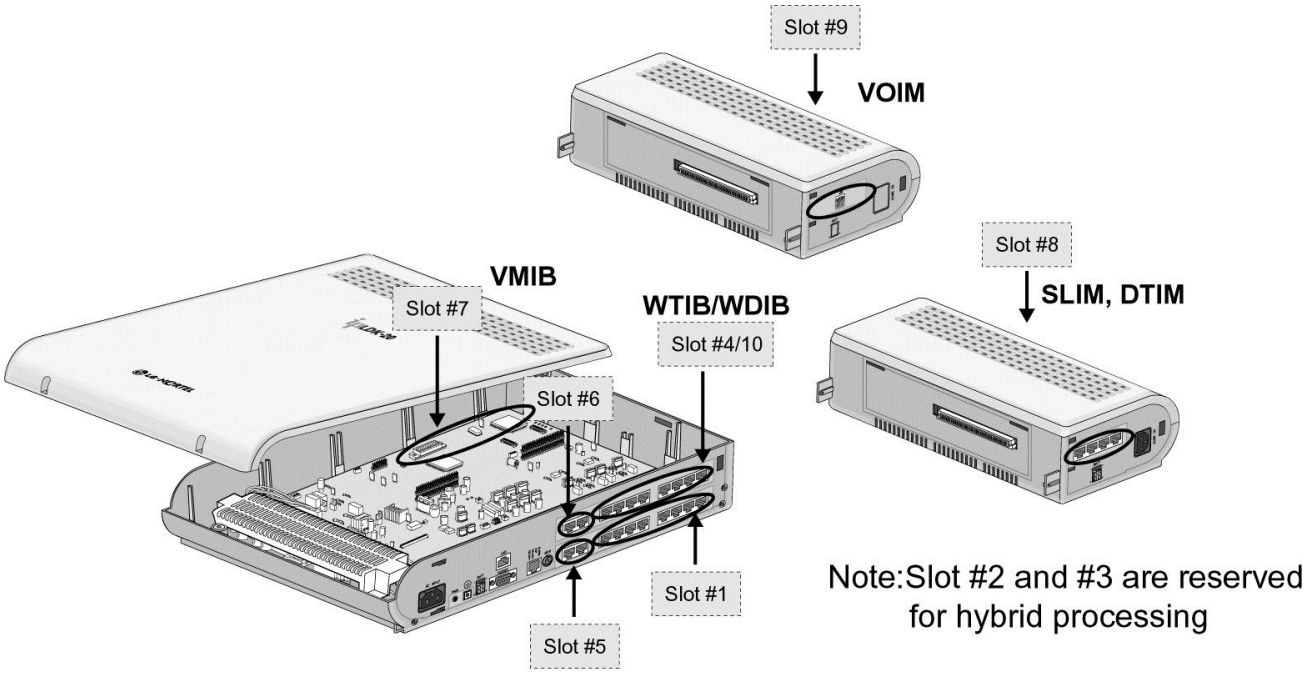
7.2.3.1 RACK SLOT ASSIGNMENT (PGM 101)

1. Press **[Trans/PGM]** + 101
2. Enter slot number(2 digits).
3. Press **[FLEX1].**
4. Enter Board Type code(2 digits).
5. Press **[HOLD/SAVE]** to accept change.

STA	CODE	COL	CODE	STA & COL	CODE	Etc	CODE
DTIB4 DTIB8 SLIB4 SLIB8 WTIB	11 12 13 14 15	LCOB2 LCOB CBIB VOIB	33 34 54 41	STIB STIB1	52 53	VMIB AAFB VMIBE AAFBE	61 62 64 65

Board type of basic MBUE(Slot 1, Slot5) and VMIB slot (slot 7) can not be changed.

- Slot 1: Hybrid on MBUE.
- Slot 2-3: not used.
- Slot 4: optional STA board.
- Slot 5: CO board on MBUE. Slot 6: optional CO slot.
- Slot 7: VMIB slot.
- Slot 8: SLIM/DTIM slot.
- Slot 9: VOIM slot.
- Slot 10: WTIB slot



Slot Numbering of ipLDK-20

7.2.3.2 LOGICAL SLOT ASSIGNMENT (PGM 103)

COL Board

1. Press **[Trans/PGM]** + **103.**
2. Press **[FLEX1]**.
3. Enter logical slot number(CO board slot).
4. (05: CO slot on MBUE, 06:Optional CO slot, 09: VOIM slot)
5. Press **[HOLD/SAVE]** to accept change.

STA Board

1. Press **[Trans/PGM]** + **103.**
2. Press **[FLEX2].**
3. Enter logical slot number(STA board slot).
4. (01: Hybrid slot on MBUE, 04:Optional STA slot, 08: SLIM or DTIM slot, 99: Virtual slot for RSG/IP phone)
5. Press **[HOLD/SAVE]** to accept change.

VMIB Board

1. Press **[Trans/PGM]** + **103.**
2. Press **[FLEX3].**
3. Enter logical slot number(VMIB slot : fixed 07 in LDK-20).
4. Press **[HOLD/SAVE]** to accept change.

7.2.3.3 Numbering Plan Type (PGM 104)

PROCEDURE

1. Press **[Trans/PGM]** + **104**, then enter the *Number Plan Type* (Refer to following Table, press 1 digit).
2. Press **[HOLD/SAVE]** to accept change.

Number Plan Type

NUMBER SET TYPE / PRESS #	INTERCOM RANGE	DEFAULT	REMARK
1	10 – 37	Yes	As the basic type, the 1st digit of station number should be 1 – 4.
2	10 – 37	No	The station number can be changed within 79.
3	10 – 37	No	
4	700 – 727	No	
5	200 – 227	No	
6	10 – 37	No	
7	100 – 137	No	
8	10 – 37	No	The station number can be changed within 99.

7.2.3.4 FLEXIBLE NUMBERING PLAN (PGM 105)

PROCEDURE

To set your flexible numbering plan, perform the following Steps:

1. Press **[Trans/PGM]** + **105**, then enter the *station range* (dial start and end station numbers).
2. Press **[HOLD/SAVE]** to accept change

Numbering Plan Detail

STATION NUMBERS	DESCRIPTION
000 001 002 003 100 101 102 103	**[TRANS/PGM]** + 105
000 001 002 003 100 101 102 103	Station Number Assign. You will see the 4 station numbers corresponding to the 4 port numbers. Station number length is in the range of 2 digits through 4 digits. There are two methods for changing station number. Dial two station numbers - Range start station number & range end station number, then LCD shows dialed range value. Press the [**HOLD/SAVE**] button, then station numbers changed from the first station number on current LCD to range end (All LEDs of BTNs are OFF.). Press one of FLEX 1-4 (Each FLEX 1-4 is assigned to station number 1- 4 on the current LCD), then LED of pressed Flexible button is steady on. Dial new station number and press the **[HOLD/SAVE]** button, or press other Flexible button to assign station number to other station without saving (The LED of pressed Flexible button is on.). If you want to delete all station numbers, press the **[SPEED]** button and press **[HOLD/SAVE]** button, then all station numbers are cleared. If you want to change next 4 station numbers then press [▼] button. If you want to change previous 4 station numbers, then press [▲] button.
000 001 002 003 100 400 102 103	Press the **[HOLD/SAVE]** button for saving database permanently. (Ex: Press FLEX 2, dial 400 and press **[HOLD/SAVE]** button.)

7.2.3.5 Flexible Numbering Plan (PGM 106-107)

PROCEDURE

Plan A (106)

1. Press **[Trans/PGM]** + **106**, then press the Flexible Button you wish to program (1-24).
2. Enter the code (refer to following Table).
3. Press **[HOLD/SAVE]** to accept change.

Flex Numbering Plan A(PGM 106)

FLEX	ITEM	DEFAULT VALUE (AT NUMBERING PLAN TYPE 1)
1	Station Group Pilot Number Range	620 – 629
2	Internal Page Zone Number Range	501 – 510
3	Internal All Call Page	543
4	Meet Me Page	544
5	External Page Zone	545
6	All Call Page (Internal/External)	549
7	SMDR Account Code	550
8	Flash Command to CO Line	551
9	Last Number Redial (LNR)	552
10	Do-Not-Disturb	553
11	Call Forward	554
12	Speed Dial Program	555
13	MSG Wait/Call-Back Enable	556
14	MSG Wait/Call-Back Answer	557
15	Speed Dial Access	558
16	Cancel DND/CFW/Pre-selected MSG Features	559
17	SLT Hold	560
18	Reserved	
19	Reserved	
20	SLT Program Mode Select	563
21	ACD Reroute	564

Plan B (107)

1. Press **[Trans/PGM]** + **107**, then press the Flexible Button you wish to program (1-24).
2. Enter the code (refer to following Table).
3. Press **[HOLD/SAVE]** to accept change.

Flex Numbering Plan B (PGM 107)

FLEX	ITEM	DEFAULT VALUE (AT NUMBERING PLAN TYPE 1)
1	Alarm Reset	565
2	Group Call Pick-Up	566
3	UCD Group DND	568
4	Night Answer	569
5	Call Park Location Range	601 – 608
6	Direct Call Pick-Up	7
7	Access CO Line Group	801 – 808 (8 + CO Group Number)
8	Access Individual CO Line	88 (88 + CO Line Number)
9	Tie Routing Access	8901
10	Access Held CO Line Group	8*
11	Access Held Individual CO Line	8# (8# + CO Line Number)
12	Access to CO line in the 1st available CO Line Group	0
13	Attendant Call	9
14	Door Open – 1	*1
15	Door Open – 2	*2
16	VM MSG Wait Enable	*8
17	VM MSG Wait Cancel	*9

7.2.3.6 IP setting for System (PGM 108)

PROCEDURE

IP Name (Use the # to skip)

1. Press **[Trans/PGM]** + **108**, then press **[FLEX1].**
2. Enter the code (max. 16 characters).
3. Press **[HOLD/SAVE]** to accept change.

Server IP Address

1. Press **[Trans/PGM]** + **108**, then press the [**FLEX2**] button.
2. Enter the Server IP Address (12 digits).
3. Press **[HOLD/SAVE]** to accept change.

CLI IP Address

1. Press **[Trans/PGM]** + **108**, then press the [**FLEX3**] button.
2. Enter the CLI IP Address (12 digits).
3. Press **[HOLD/SAVE]** to accept change.

Gateway Address (Use the # to skip)

1. Press **[Trans/PGM]** + **108**, then press the [**FLEX4**] button.
2. Enter the Gateway Address (12 digits).
3. Press **[HOLD/SAVE]** to accept change.

Subnet Mask Address (Use the # to skip)

1. Press **[Trans/PGM]** + **108**, then press the [**FLEX5**] button.
2. Enter the Subnet Mask (12 digits).
3. Press **[HOLD/SAVE]** to accept change.

SECTION 8. TROUBLESHOOTING

PROBLEM	CAUSE / SYMPTOM	SOLUTION
System power failure	Power short circuit in some board(s)	Exchange the malfunctioning board for one in good working condition. Dust each board. Check the PSU fuse. Replace the PSU with the appropriate type.
	LD6 LED light on the MBUE is OFF or blinking	
System does not operate	Power short circuit in some board(s)	Check the connection of each board with MBUE. Press the Reset button. Check the PSU. Check the short circuit on MBUE or other boards. Press the Reset button when the DIP switch (for database protection) is in the default position.
	Bad board connection	
	System database broken	
DKTU does not operate	Bad extension circuit	Exchange the malfunctioning board for one in good working condition.
	Bad connection between the MBUE/DTIB/DTIM and keyset	The connection between the system and the keyset must be repaired. Check the connection between the line of SLT and DKT on the MDF, and fix any mismatching.
	The limit of installation distance	Check the distance between the MBUE/DTIB/DTIM and keyset.
	Bad keyset	Plug the keyset into another extension port that has been verified as working. If the keyset does not work, replace the keyset.
SLT does not operate	Bad MBUE, SLIB or SLIM board	Exchange the board for one in good working condition.
	Bad connection between the MBUE/SLIB/SLIM and SLT	Check that the board connection between the lines of SLT and DKT on the MDF, and fix any mismatching.
CO line operation	ACNR Fail	Check the PRCPTU4, and CPCU4
	Bad connection	Check the connection.
ISDN board does not operate	The position of switch	Check the switch for term and So/To position
	Network problem	Check the Network.
Noise on External Paging port	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.
Distorted External MOH	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.

APPENDIX 1. DECLARATION OF CONFORMITY

Declaration of Conformity to R&TTE Directive 1999/5/EC for the European Community

- This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
- For the IP Key Telephone system, ipLDK-20A, the following standards were applied.

Safety : EN60950-1
EMC : EN 55022
EN 55024
EN 61000-3-2
EN 61000-3-3
Telecom : TBR21