MBX IP™

Hardware & Installation Guide

vertical™

REVISION HISTORY

Release	Date	Documentation Changes	Page No.
1.7	04-12	Connecting an SBX Phone to an MBX system.	5-8
		Database areas not reset when initialized (TRANS/PGM499).	7-1
1.0	07-10	Initial Release	--

Contents

This feature is not available at this time ...

THIS PAGE INTENTIONALLY LEFT BLANK.

Chapter 1

Introduction

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; 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 table, stand, or card table; the product may fall, causing serious damage to the product or serious injury to those nearby.

- 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, 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 location, 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 florescent lamps, motors and televisions. These noise sources can interfere with the performance of the *MBX IP* 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 equipment should be repaired by an authorized LG-Nortel service center.

- Do not use benzene, paint thinner, or an abrasive powder to clean the KSU. Wipe it with a soft cloth only.

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 not correctly 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

When the displayed symbol (crossed-out wheeled bin) is adhered to a product, it designates the product is covered by the European Directive 2002/96/EC.

- All electric and electronic products should be only be disposed of in special collection facilities appointed by government or local/municipal authorities.
- The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.
- For more detailed information about disposal of your old appliances, please contact your city office, waste disposal service or the place of product purchase.

Manual Usage

This document provides general information covering the hardware description and installation of the *MBX IP* System. While every effort has been taken to ensure the accuracy of this information Vertical makes no warranty of accuracy or interpretations thereof.

Chapter 2 - System Overview

Provides general information on the *MBX IP* System, including system specifications and capacity.

Chapter 3 - KSU Installation

Describes detailed instructions for planning the installation site and procedures to install the *MBX IP* System.

Chapter 4 - Board Installation

Describes detailed instructions for installing components of the *MBX IP* Board.

Chapter 5 - Terminal Connection and Wiring Method

Describes the kinds of terminals, maximum distance, and other device connections for the terminal.

Chapter 6 - DECT Installation

Describes procedures to install the DECT.

Chapter 7 - Starting the *MBX IP* System

Describes procedures to program *MBX IP* System.

Chapter 8 - Troubleshooting

Provides information on the *MBX IP* System and explains common troubleshooting issues.

Chapter 2

System Overview

MPX IP System Highlights

Features of the *MBX IP* System include:

- Flexible System Capacity and architecture
- Minimum daughter board
- Powerful PC application, Remote maintenance via LAN/Modem/RS-232C, Web Admin
- Stable & Enhanced voice features
- Simple installation & efficient system management
- Value-Added features
    - Distinctive and Enhanced Voice Mail Function and Multi Language
    - Basic CID Function for CO & SLT
    - Basic 4 AA Function(default) or 4 VoIP channel and 6 DKT + 6 SLT ports on MPB
    - Built in PLL Circuit for ISDN Clock Synchronization, No need cabling
    - 8 Poly internal MOH (13 Music resources)
    - PSTN/SLT Line Monitoring function for maintenance
    - Green Product (DKT/SLT Power save mode by program, Low EMI, PB-Free product)

System Connection Diagram

The following Figure shows the components that make up the *MBX IP* System:
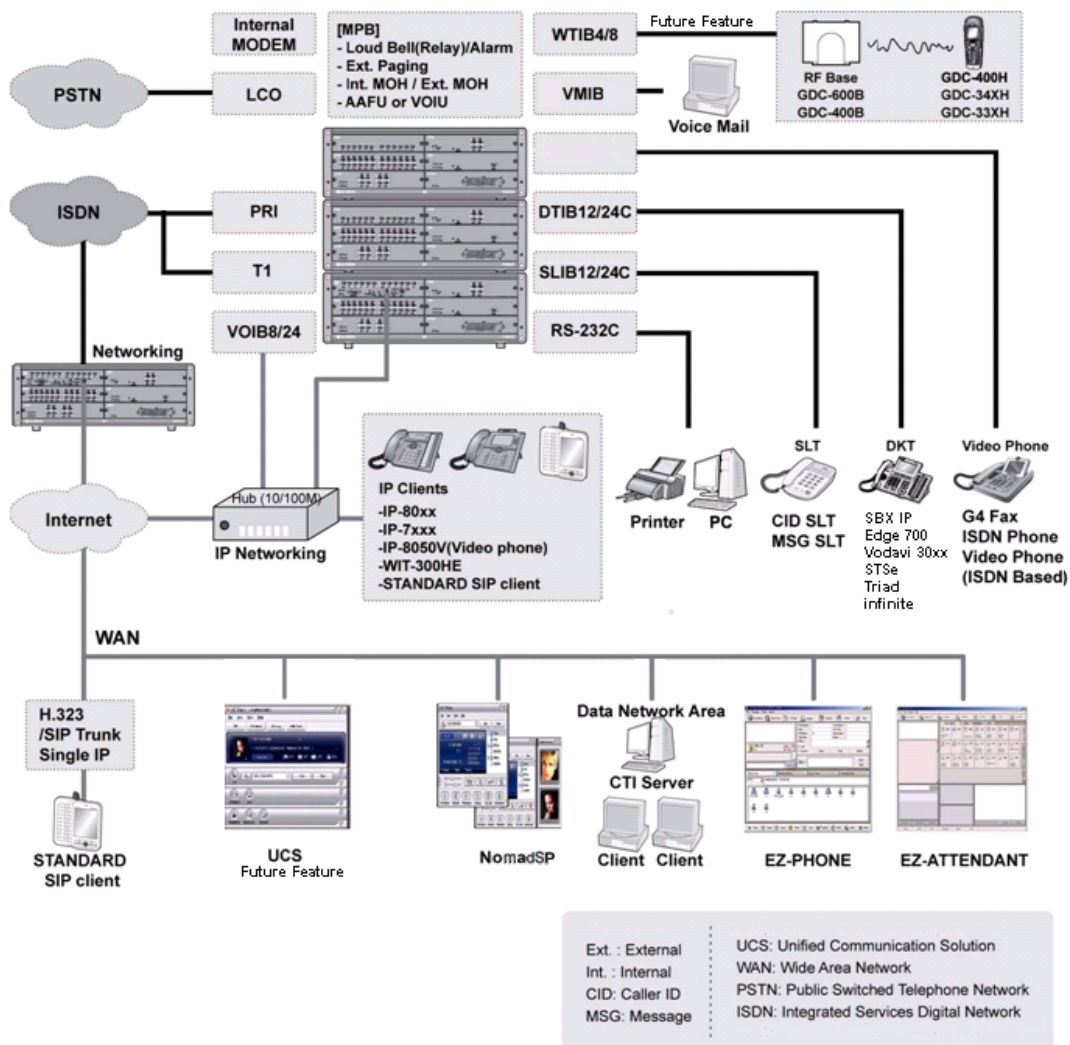
System Components

ITEM	OPTION BOARD		DESCRIPTION
BKSU		-	Basic KSU
EKSU		-	Expansion KSU
PSU		-	Power Supply Unit (350W)
Main Board	MPB100	-	Main Processor Board 100
		DSIU	Digital and Single Line Interface Unit (Default; 6 DKT, 6 SLT)
		MODU	Modem Unit (Optional; 33Kbps)
	MPB300	-	Main Processor Board 300
		DSIU	Digital and Single Line Interface Unit (Default; 6 DKT, 6 SLT)
		MODU	Modem Unit (Optional; 33Kbps)
Trunk Boards	LCOB4	-	4 LCO Interface Board
	LCOB8	-	8 LCO Interface Board
	LCOB12	-	12 LCO Interface Board
	PRIB	-	DCO Interface Board (1 PRI, 30chs)
Extension Boards	SLIB12C	-	12 SLT Interface Board (RJ21)
	SLIB24C	-	24 SLT Interface Board (RJ21)
	DTIB12C	-	12 DKT Interface Board (RJ21)
	DTIB24C	-	24 DKT Interface Board (RJ21)
Function Boards	WTIB4	-	4 Base Wireless Terminal Interface Board
	WTIB8	-	8 Base Wireless Terminal Interface Board
	VMIB	-	Voice Mail Interface Board (8 channels, 100hrs)
	VOIB8	-	8 VoIP Interface Board
	VOIB24	-	24 VoIP Interface Board
ETC	WMK	-	Wall Mount Bracket

Specifications

General Parameters

DIMENSION AND WEIGHT

ITEM	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	WEIGHT(lbs)
BKSU	6.7006	17.3224	12.8107	13.6686
EKSU	6.7006	17.3224	12.8107	13.7788
Digital Keyset	.41537	7.9919	4.8817	1.9841
Digital DSS/DLS Console	6.0628	6.8895	4.3699	.8815
Digital ICM/Door Box	1.2598	5.1967	3.8975	1.1023

ENVIRONMENT

ITEM	DEGREES (°C)	DEGREES (°F)
Operation Temperature	0-40	32-104
Optimum Operation Temperature	20-26	68-78
Storage Temperature	10-70	32-158
Relative Humidity	0-80% non-condensing	

SYSTEM ELECTRICAL

ITEM	SPECIFICATION (PSU)
1. Power Supply	-
- AC Voltage Input	100 - 240 Volt AC @47-63Hz
- AC Power	350W
- AC Input Fuse	6.3A @ 250Volt AC
- DC Output Voltage	+ 5, + 30Volt DC
- Efficiency	Above 80%
2. Battery Backup	-
- PSU Input Voltage	24Volt DC
- PSU Battery Fuse	15.0A @250Volt AC
- Charging Current	Max. 1A

PSU FAN

ITEM	SPECIFICATION
Maker / part number	POWERLOGIC / PLA07015B05H
Dimensions	70 X 70 X 15 (mm)
Rated voltage	+5V

DECT BASE STATION

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	600m (twisted 2-pair cable)

STATION DISTANCE FROM THE SYSTEM

ITEM	AWG 22 (ft)	AWG 24 (ft)
Digital Keyset	1641	1082
Single Line Telephone DSIU SLIB12C/SLIB24C	--	--

CO LOOP

ITEM	SPECIFICATION
Ring Detect Sensitivity	30Vrms @20-50Hz

DTMF Dialing
    Frequency Deviation
    Signal Rise Time
    Tone Duration, on time
    Inter-digit Time
	
	Less than +/- 1.8 %
	Max. 5ms
	Min. 50ms
	Min. 30ms

Pulse Dialing
    Pulse Rate
    Break/Make Ratio
	10 pps 60/40% or 66/33%

MPB VOIP

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 2
Voice Compression	G.711/G.729A/G.723.1
Voice/Fax Switching	T.38
Echo cancellation	G.168

VOIB8/VOIB24

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 2
Voice Compression	G.711/G.729/G.723.1
Voice/Fax Switching	T.38
Echo Cancellation	G.165

OTHER SYSTEM SPECIFICATIONS

ITEM	DESCRIPTION	SPECIFICATION
CPU	-	M82805G, ARM9 Dual core (32bit, 375MHz)
Switching Device		ACT2, Custom Mixed-Signal ASIC Device
Memory Back-up Duration		7years
Ring Signal		70Vrms, 25Hz
External Relay Contact		1A @30Volt DC
External Music Port		0dBm @600ohm
External Paging Port		0dBm @600ohm
MODU	Analog Modem	Bell, ITU-T, V.34 V.32BIS, V.90
	Speed	300bps up to 33Kbps speed rate
	Connection	Automatic rate negotiation
USB	Version	USB 1.1 compliant
	Speed	Max. 12Mbps
	Mode	Host Mode (Memory stick) only

SYSTEM CAPACITY

DESCRIPTION	CAPACITY/BOARD	TOTAL
Time Slots	-	144 per KSU, Total Max 432
Max Ports	-	200 (MPB100), 414 (MPB300)
CO Line Ports	-	80 (MPB100) , 240 (MPB300)
Max Direct Station (DKT, SLT, DSS, So) Connections	-	120 (MPB100), 324 (MPB300)
LAN Port	1/MPB, 1/VOIB8,VOIB24 1/VMIB	1
MODEM Channel	1/MODU	1
Attendant Positions	5/Tenant	-
Tenant Group	5 (MPB100), 9 (MPB300)	-
Intercom Links	Non-Blocking	-

Paging
   - All Call
   - Internal
	-	1 zone
		15 zones (MPB100),
		30 zones (MPB300)

Station Speed Dial	50 (32 digits) / Station	-
System Speed Dial	-	1000 (32 digits) (MPB100) 2000 (32 digits) (MPB300)
Call Log (Outgoing/Incoming/Missed Call)	-	100 (32 digits) (Not Protected)
CO Line Group	-	24 (MPB100) 72 (MPB300)
Station Group	-	20 (50 members/group, MPB100) 50 (50 members/group, MPB300)
Conference	3-13 Party	All ports are available
Multi-Conference	3-13 Party	Max. 3 groups / 13 party
Internal MOH(13 Music Resources)	1/MPB	1
External MOH	1/MPB	1
External Paging port	1/MPB	1
External Relay Contact	1/MPB	1
Alarm Input	1/MPB	1

DESCRIPTION	CAPACITY/BOARD	TOTAL
RS-232C Port	1/MPB, 1/IPP Board	1
USB Port	1/MPB, 1/VMIB	1 Host mode(Memory stick) only
CPT/CID/ CO DTMF Detection channels	32 channels (MPB100), 64 channels (MPB300)	32 channels (MPB100), 64 channels (MPB300)
PFT Circuit	1/LCOB4, LCOB8, LCOB12	-

SYSTEM MAX. CALL CAPACITY

MPX IP MPB100	MAXIMUM PORT				
	EXTENSION		TRUNK		
	DKTU	SLT	PRI	CO	IP
1st KSU	102*	102	80	60	80
Total	108		80		
	138				
1st KSU + 2nd KSU	120	120	80	80	80
Total	120		80		
	200				

* DSIU DKT 6 + DTIB24, 4ea
- Max. IP Phone registration : 120
- Max. VMIB : 2ea

MPX IP MPB300	MAXIMUM PORT				
	EXTENSION		TRUNK		
	DKTU	SLT	PRI	CO	IP
1st KSU	102	102**	120	60	120
Total	108†		120		
1st KSU + 2nd KSU	198	198	180	132	180
Total	216		180		
1st + 2nd + 3rd KSU	294	294	240	204	240
Total	324		240		

** DSIU SLT 6 + SLIB24, 4ea
† DSIU DKT 6 + DSIU SLT 6 + SLIB24, 4ea (or DTIB24, 4ea)
- Max. IP Phone registration : 324
- Max. VMIB : 3ea
- WTIB4/WTIB8 should be installed on the same KSU when installing more than one WTIB4/8.
- Installed ports are over the capacity, there is an alarm indication at attendant keyset.

SIMPLIFIED MAX. NO OF PORT

Boards	Max. Extension		Max. Trunk	TOTAL
	Total	IP / TDM		
MPB100	120	120	80	200
MPB300	324	324	240	414

KSU Installation

Pre-Installation

Please read the following guidelines concerning installation and connection before installing the *MBX IP* System. Be sure to comply with applicable local regulations.

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 un-insulated 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.

Installation Precautions

The *MBX IP* System is designed for wall mounting or a free-standing rack. Avoid installing in the following places:

- In direct sunlight and extremely hot, cold, or humid places (optimal temperature range = 0 to 40oC).
- 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 welding machines.
- On or near computers, fax machines, or other office equipment, as well as microwave ovens or air conditioners.
- Do not obstruct the openings on the top of the *MBX IP* System.
- Do not stack up the Optional Service Boards.

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.

- Do not use the same power supply outlet for computers, fax machine, and other office equipment to avoid induction noise interruption when using the *MBX IP*.

- The power and battery switches must be OFF during wiring. After wiring is completed, the power switch may be turned ON.

- Incorrect wiring may cause the *MBX IP* 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 System power OFF and then ON again.

- Use twisted pair cable for connecting CO lines.

Basic Key Service Unit (BKSU) Unpacking

Open the box and verify the items shown in the Figure below are included:
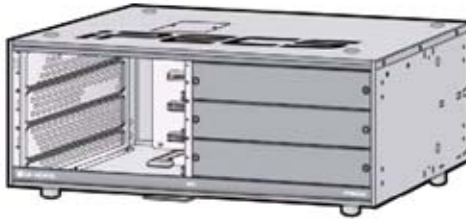
Key Service Unit

Rack Mounting Bracket   **Screw**   **Tie Cable**

CD manual   **Power Cord**   **Backup Battery Cable**

BKSU Carton Contents

Expansion Key Service Unit (EKSU) Unpacking

Open the box and verify the items shown in the Figure below are included.

Key Service Unit

Rack Mounting Bracket   **Screw**   **Tie Cable**

Expansion Cable   **Power Cord**   **Backup Battery Cable**
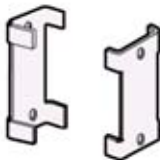
Fastener   **Screw**

EKSU Carton Contents

KSU Diagram, Exterior and Dimension

The Figure below shows the exterior and dimensions of the KSU.
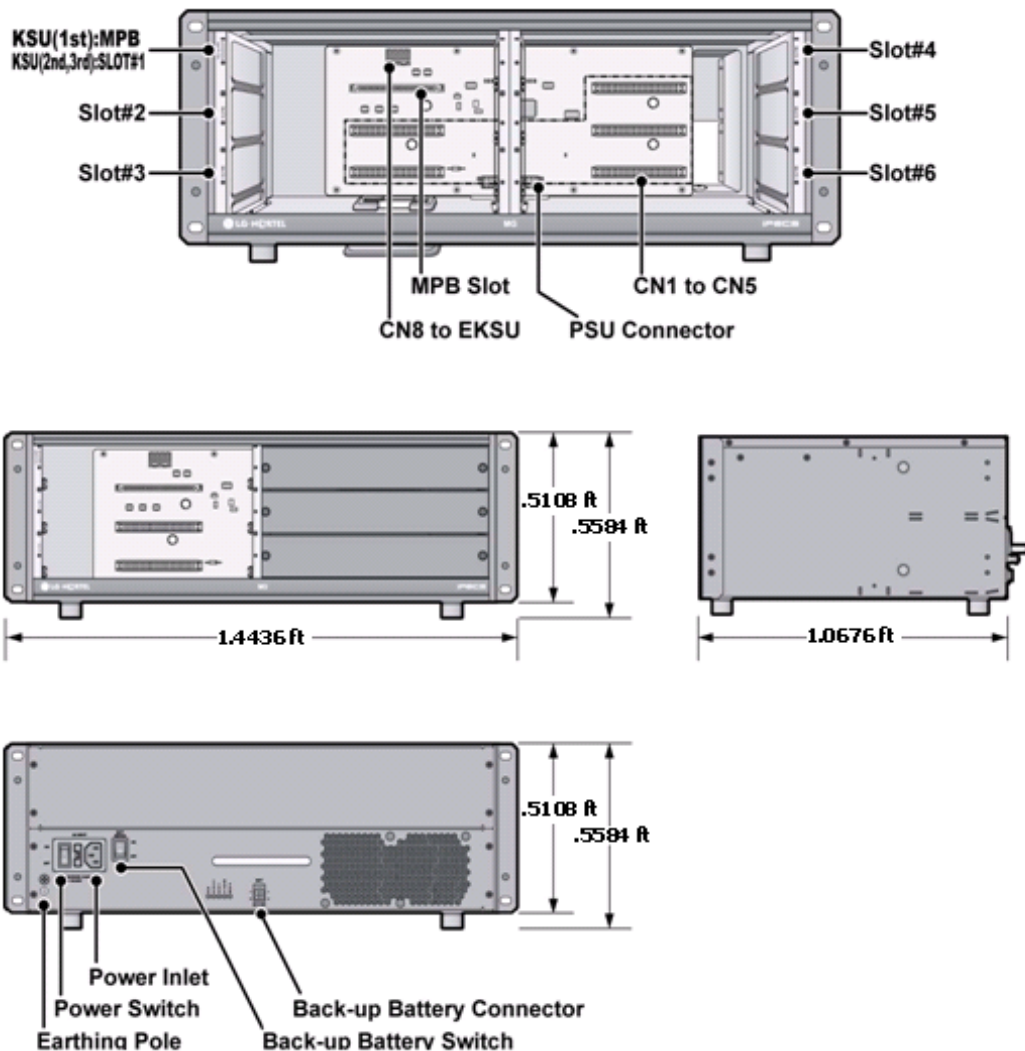
KSU Exterior and Dimension

Motherboard (MB) & Motherboard Expansion (MBE) Diagrams

CN7 MPB Slot

CN8 To EKSU   **PSU Connector**
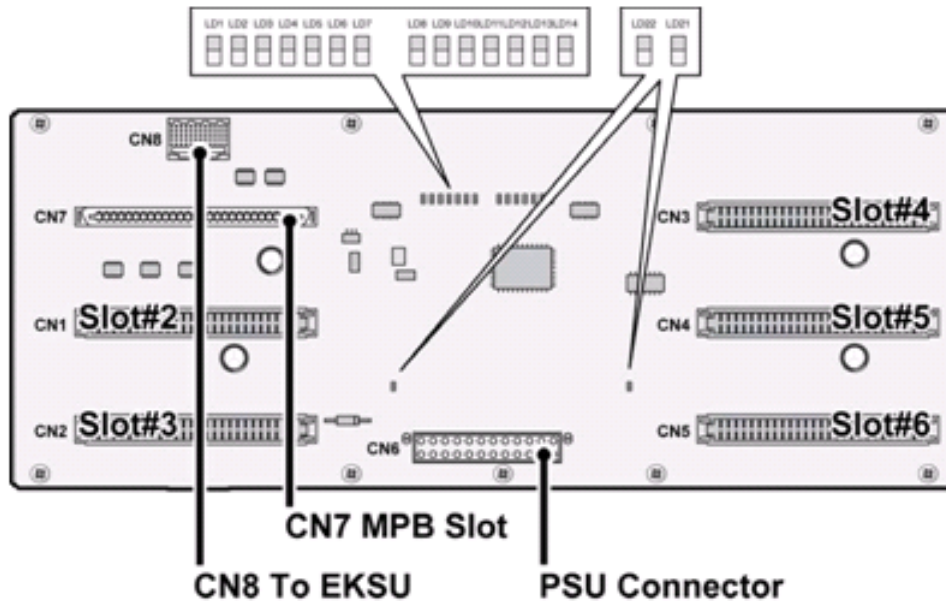
LED Indications

LED	DESCRIPTION
LD1 (Blue)	MPB Slot Link/Act - ON, Link/Act is established; OFF, Idle
LD2 - LD6 (Blue)	Slot #2 - 6 Link/Act - ON, Link/Act is established; OFF, Idle
LD7(Blue)	2nd KSU Link/Act - ON, Link/Act is established; OFF, Idle
LD21, LD22 (Blue)	AC Power Indication - ON, AC Powered ON: OFF, AC Powered OFF

MotherBoard (MB) & Motherboard Expansion (MBE) Diagrams (cont'd)
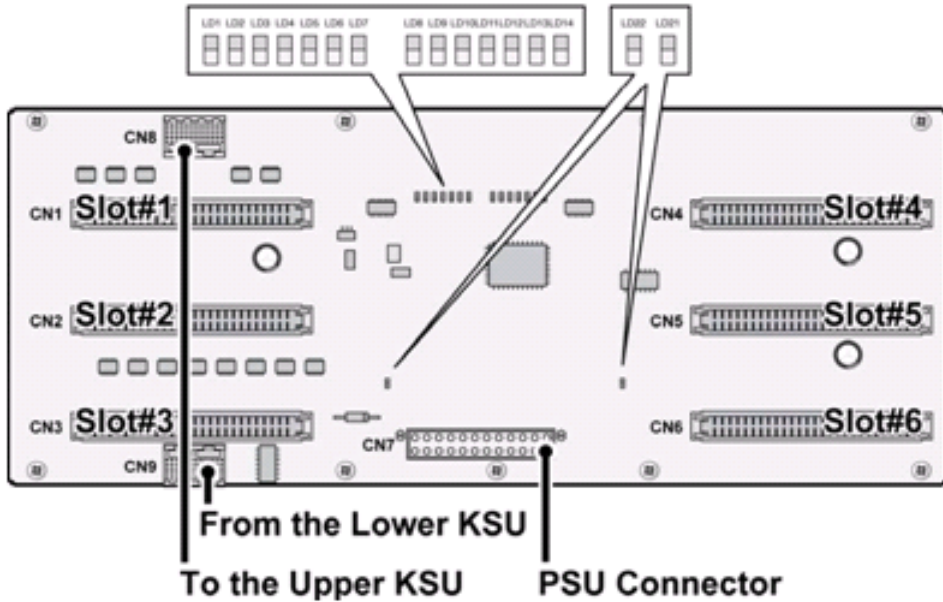
LED Indications

LED	DESCRIPTION
LD1 - LD6 (Blue)	Slot #1 - 6 Link/Act - ON, Link/Act is established; OFF, Idle
LD7 (Blue)	Upper KSU Link/Act - ON, Link/Act is established; OFF, Idle
LD21, LD22 (Blue)	AC Power Indication - ON, AC Powered ON: OFF, AC Powered OFF

Power Supply Unit Installation

The Power Supply Unit (PSU) can be installed in the BKSU and the EKSU by the installer. Make sure that the KSU is not plugged into an outlet. The PSU is located at the rear side of the KSU and is capable of providing three kinds of power sources to the MB and MBE through the 20-pin connector, CN6/CN7 (refer to the following Table).

AC Input Voltage and Fuse Rating

INPUT VOLTAGE	CONNECTION	FUSE RATINGS
100V AC – 240V AC	CN6/CN7 on the MB/MBE	6.3A @ 250V

PSU Capacity

PSU TYPE	+5V DC	+27V DC	+30V DC
PSU (SMPS)	10.0A	1A (Battery charge)	10A

1. Insert the PSU along the guide rails on the rear side of the *MBX IP* system.

2. Slide and press PSU to the CN6 (PSU Connector) on MB and the CN7 (PSU Connector) on MBE.

3. To affix securely, turn the 4 screws clockwise (as shown in illustration #2 below).
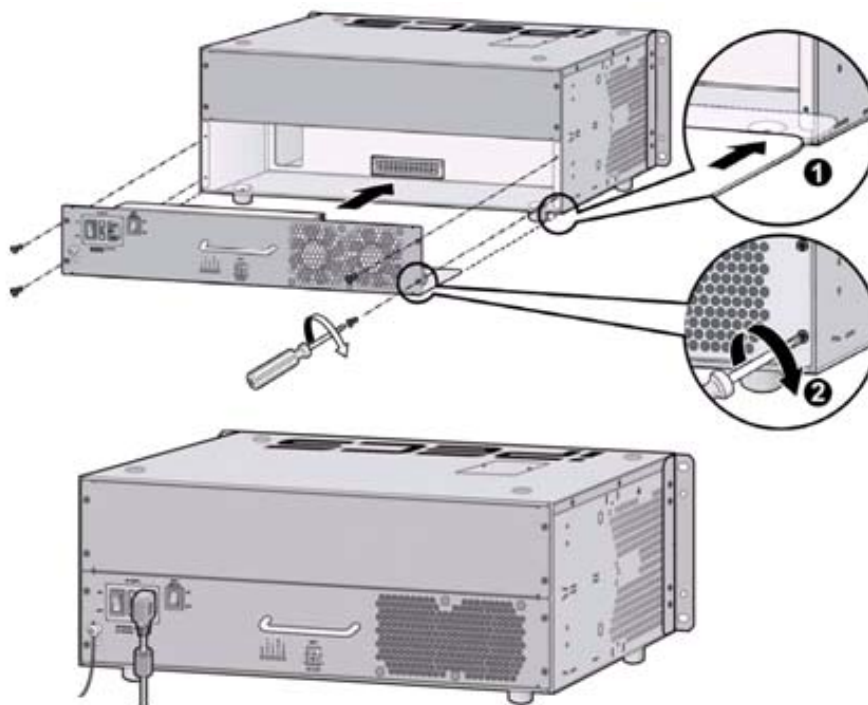
PSU Installation

NOTE:

1. When turning-Off the PSU of 1st KSU, the 2nd and 3rd PSUs first should be turned-Off, or the *MBX IP* will automatically shut them off.

2. The 1st and 2nd KSUs will work independent of the 3rd KSU (power shut-Off).

3. The 1st KSU will work independent of the 2nd KSU (powered-Off), however, the 3rd KSU cannot work without the 2nd KSU powered-On.

4. The MPB (100/300) will be recommended to reset if the 2nd and 3rd KSUs are turned-On/Off.

5. The PSU Fan may need to be replaced sometimes during lifecycle use of the *MBX IP* (refer to Fan Specification on page 2-5).

Frame Ground Connection

It is very important that the frame of the *MBX IP* System is grounded:

1. Turn the grounding screw counter clockwise to loosen, as shown in the figure below.

2. Insert the grounding wire and tighten the screw.

3. Then connect the grounding wire to an appropriate ground source (refer to Caution).

To earth
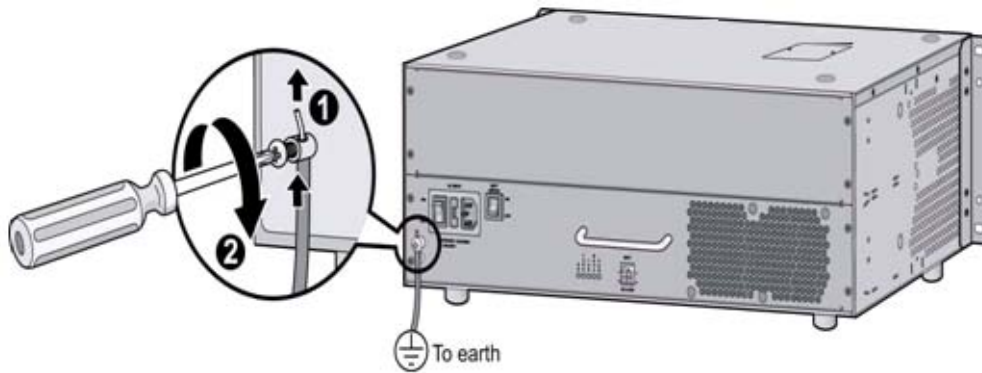
CAUTION:

- 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 is shorter than 1m (3.28ft).

- Proper grounding is very important to protect the *MBX IP* 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.

External Backup Battery Installation

In case of power failure, the external backup batteries automatically maintain uninterrupted power for the *MBX IP* System. The external batteries must provide 24V DC; this is generally accomplished by connecting two 12V batteries in a series arrangement as shown:

1. Connect the backup battery cable with 2 identical batteries (12V DC X 2).

2. Connect the external back up battery cable to the battery connector of the PSU.

3. After connecting the external backup battery cable, turn on the battery switch.
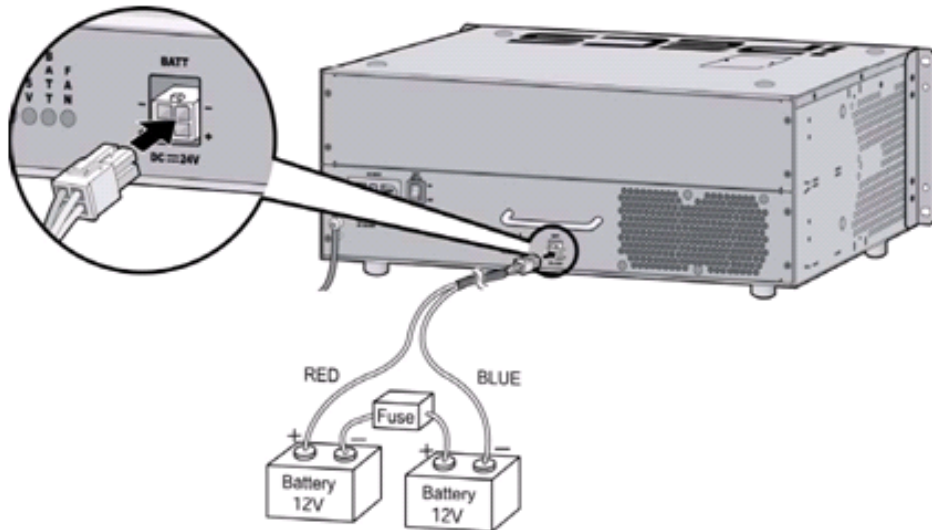
NOTE: The cable used to connect the battery is supplied with the KSU from the manufacturer.

Battery operation is controlled by the PSU. The PSU will provide charging current to the batteries during normal AC power operation at a maximum of about 1A (PSU). PSU battery operation will be halted if the AC power is reconnected or if 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).

The length of time that the system will operate on the batteries is dependent on several elements including, battery charging state, condition of the batteries, capacity of the batteries, and the size of the system (number of station ports). The chart below gives the approximate back-up time for several system sizes and different battery capacities in ampere-hours.
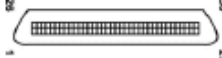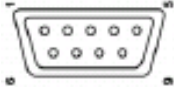
Battery Capacities
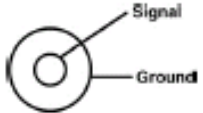
BATTERY CAPACITY	DKT 24 PORTS	DKT 72 PORTS	DKT 120 PORTS
20AH	6 hours	3 hours	1.5 Hours
40AH	12 hours	6 hours	3 hours

CAUTION:

- It is recommended to use an external backup battery fuse between the battery and the System.
- Recommended battery capacity is more than 24V/20AH MF
- 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 batteries and cables.
- There is a danger of explosion if external 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.

Types of Connectors

CONNECTOR TYPE	PIN NUMBER	BOARD	REMARK
RJ21 (Male)	(Female)	MPB, VOIB8, VOIB24, VMIB, PRIB, DSIU, LCOB4, LCOB8, LCOB12, DTIB12C, DTIB24C, SLIB12C, SLIB24C	DKT Ports SLT Ports
RS-232C		MPB	Serial Port
Serial to Audio Jack		VOIB8, VOIB24, VMIB, PRIB, WTIB4, WTIB8	Serial Port

CONNECTOR TYPE	PIN NUMBER	BOARD	REMARK
Audio Jack	Signal / Ground	MPB	EXT MOH Port EXT PAGE Port

KSU Mounting

Wall Mounting

1. Attach the mounting template for accurate placement to the wall and drill the hole.
2. Install 12 anchor plugs into the wall using the mounting template shown below.
3. Insert 12 included screws into the 12 anchor plugs.
4. Hook Wall Bracket onto installed screws.
5. Attach Wall Shelf to the bottom of KSU and affix 2 shelves to the KSU using the 8 screws provided.
6. Hook the Wall Shelf onto the Wall Bracket, make sure the System slides down seurely.
7. Affix the Wall Shelf to the Wall Bracket using the 8 screws provided.
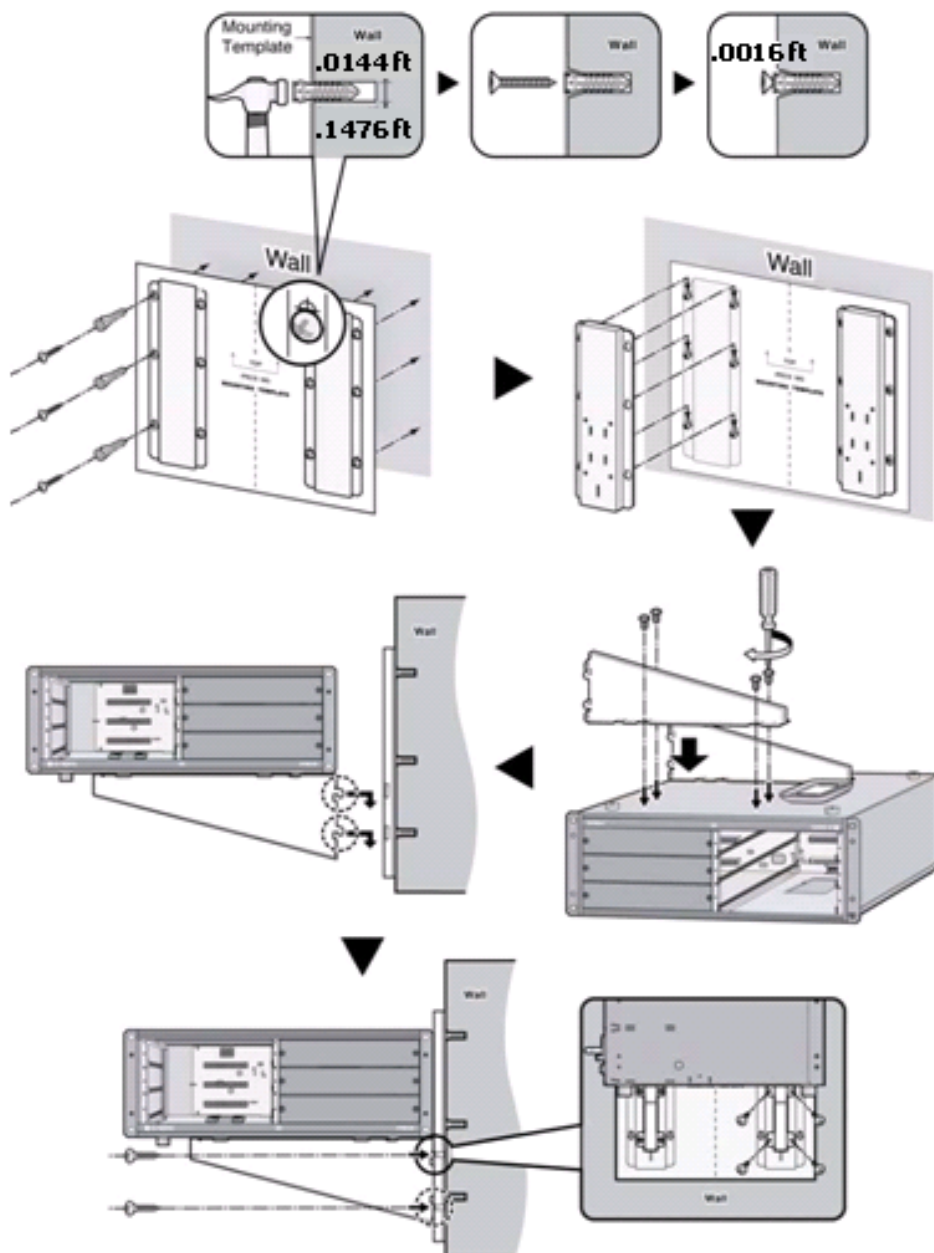
KSU Wall Mounting

Rack Mounting

Attach System to the rack securely by tightening the screws clockwise. These screws are supplied with the rack.
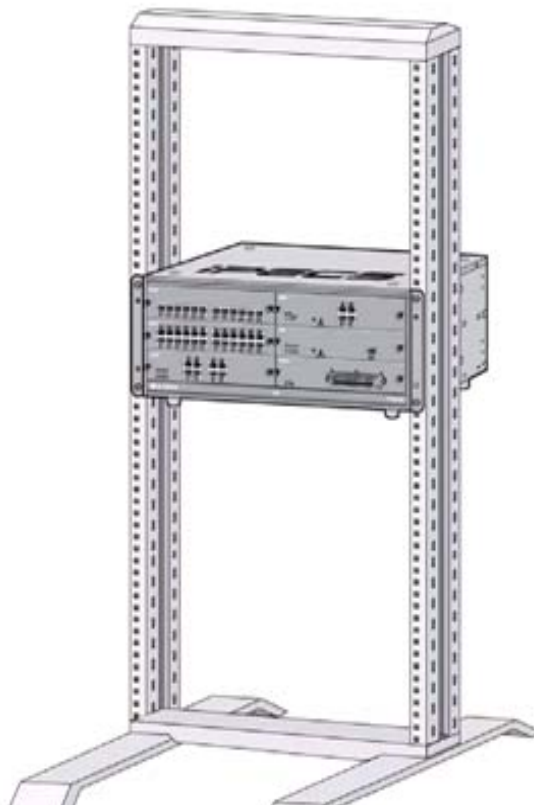
KSU Rack Mounting

Expansion KSU Installation

Using Expansion Cable

1. Turn the screw counter-clockwise to loosen and then remove the Dummy Cap. Also, the Dummy Cap of the 2nd KSU should be opened in the same manner at three KSU system.

2. To operate the System, each KSU should be connected using the Expansion cable as shown below. Make sure that the Expansion cable is connected correctly, and not facing the wrong direction.

3. Connect Fasteners with screws to affix the *MBX IP* system.
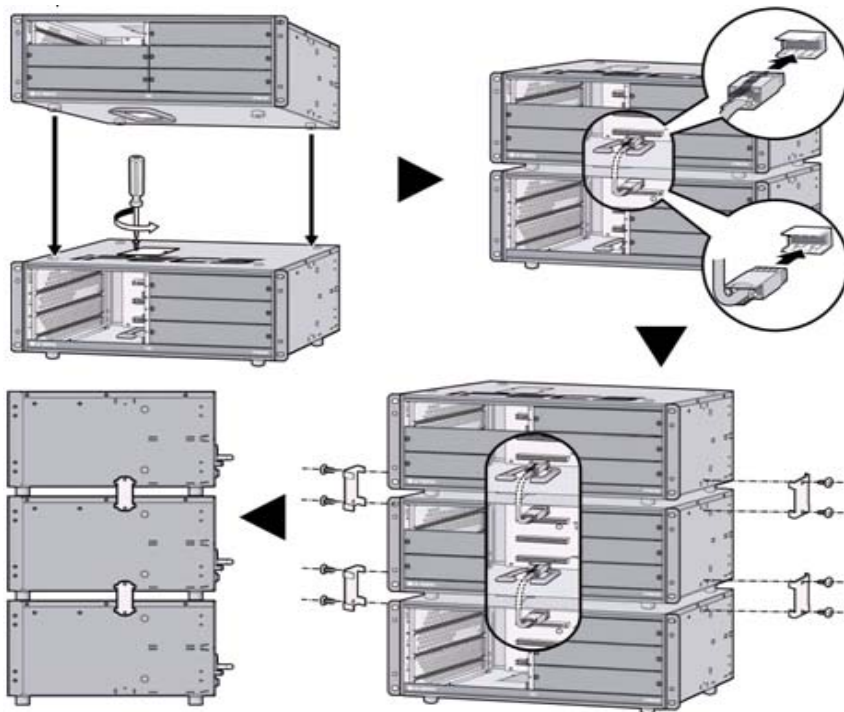
Expansion KSU Installation

NOTE: Be careful not to bend the pins of connectors.

- When the Expansion Cable is inserted in an uneven manner, the connector pins (male) on MB/MBE may be bent. So, be careful when making connections.
- Before connection of Expansion Cable, remove Dummy Caps and Dummy Plates.

Mounting

Wall Mounting

1. Attach the mounting template included for accurate placement to the wall and make the hole.

2. Install 12 anchor plugs into the wall and insert 12 included screws to the anchor plugs.

3. Hook Wall Bracket to the installed screws (as shown below).

4. Attach Wall Shelf to the bottom of the KSU and affix using the 8 screws provided.

5. Hook the Wall Shelf onto the Wall Bracket, making sure that the System slides down securely.

6. Affix the Wall Shelf to the Wall Bracket using the 8 screws provided.

7. Install the 2nd and 3rd KSU and then affix them by using the fasteners.
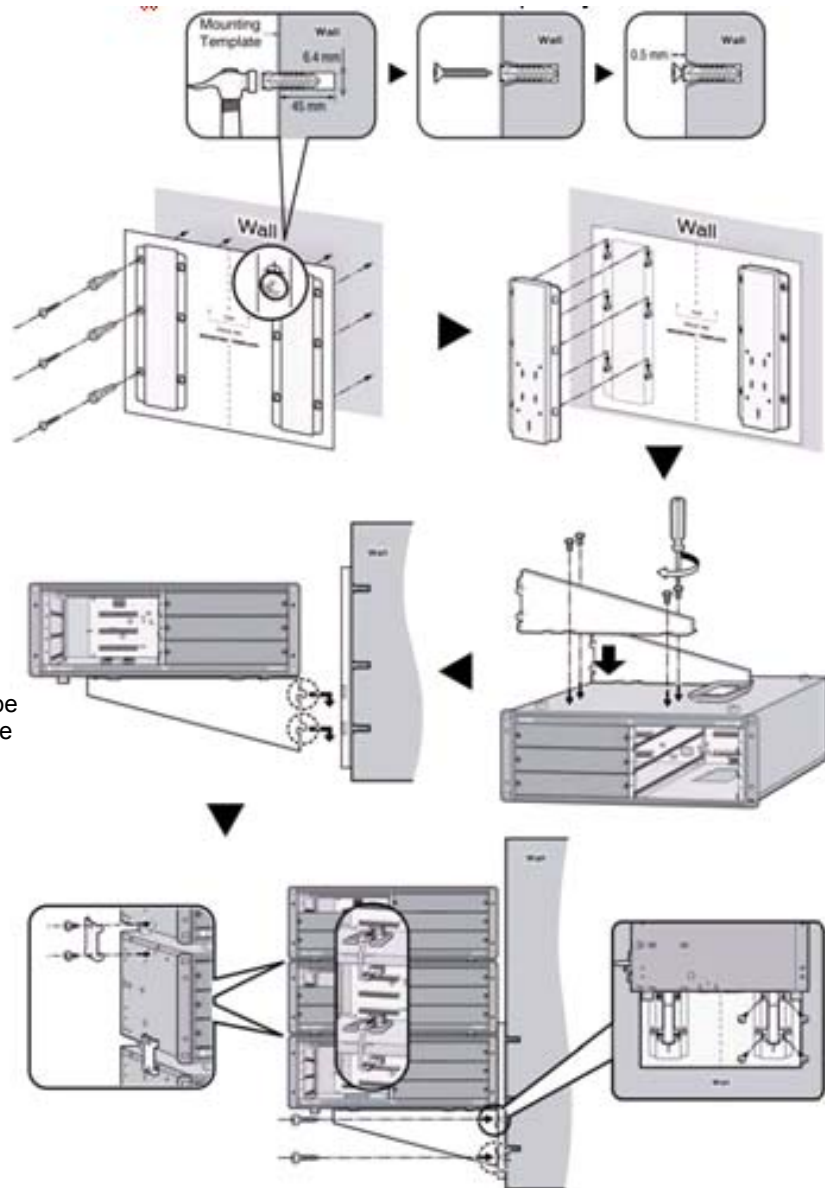
NOTE --

Before Board Installation,
the Dummy cap on top of the
KSU should be open, and the
Dummy plates in front should be
removed in order to connect the
Expansion Cable as shown on
page 3-17.

Expansion KSU Wall Mounting

Rack Mounting

Attach System to the rack securely by tightening the screws clockwise.

NOTE --

Before Board Installation,
the Dummy cap on top ofthe KSU
should be open, and the Dummy
plates in front should be removed
in order to connect the Expansion
Cable as shown on **page 3-17**.
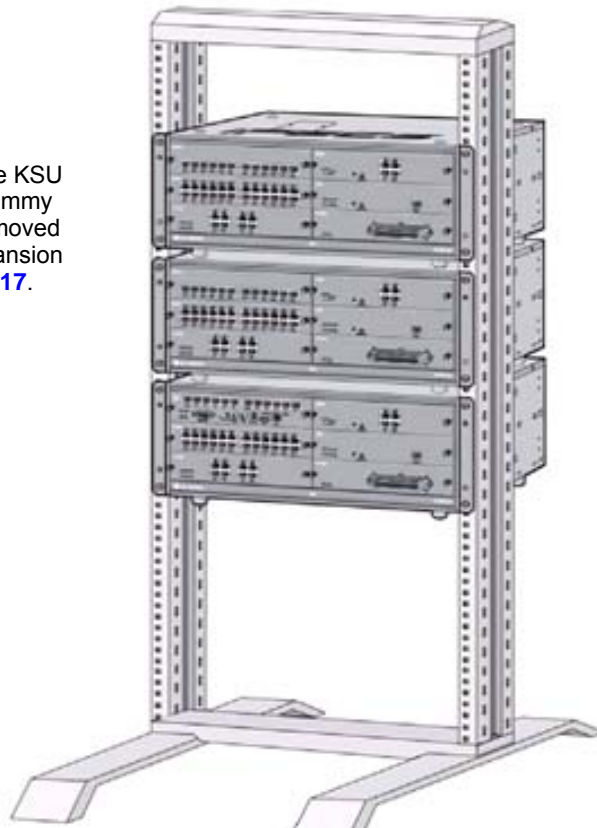
KSU Rack Mounting

THIS PAGE INTENTIONALLY LEFT BLANK.

Chapter 4

Board Installation

Installing the Boards

Prior to installing the Boards, the following should be considered:

CAUTION: - First, check that electrical Power is turned OFF before installation of board.
- To protect the System from static electricity, do not directly touch the boards; to discharge static, touch a grounded object, or wear a grounding strap.

To install the Board, perform the following steps:

1. Slide the board along the guide rails and hold the board as shown in the 2nd figure, carefully insert the Board in the direction of the arrow so that the Board securely inserts with the connector on the Mother Board.

2. Press the screw to turn it clockwise and affix it securely.
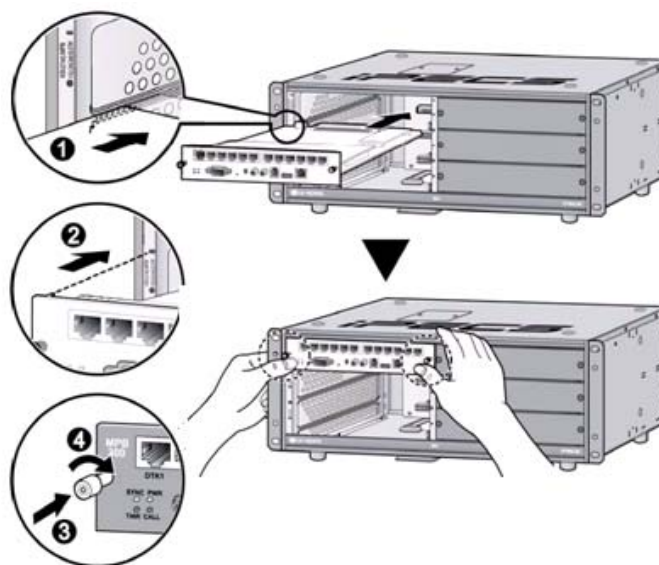
Board Installation

Main Processing Board

MPB 100/300

The Main Processor Board controls:

- communication between the peripheral Board,
- supervises all resources in the system,
- controls the gain adjustment of the PCM signal,
- generates the System tones, and
- manages System call processing.

The MPB100/MPB300 shown on the next two pages incorporates the main control of the System, and is composed of the microprocessor and memory, the PCM management and miscellaneous functional circuits.

>>> MPB100/MPB300 <u>must</u> be installed in the MPB slot of the Basic KSU (BKSU).
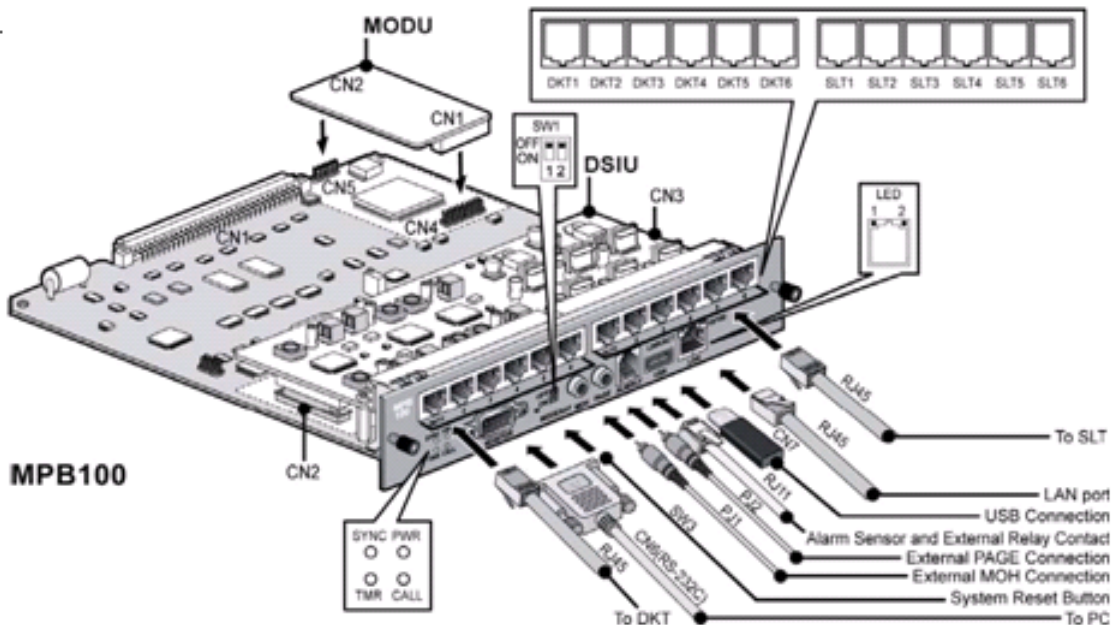
Main Processing Boards (cont'd)
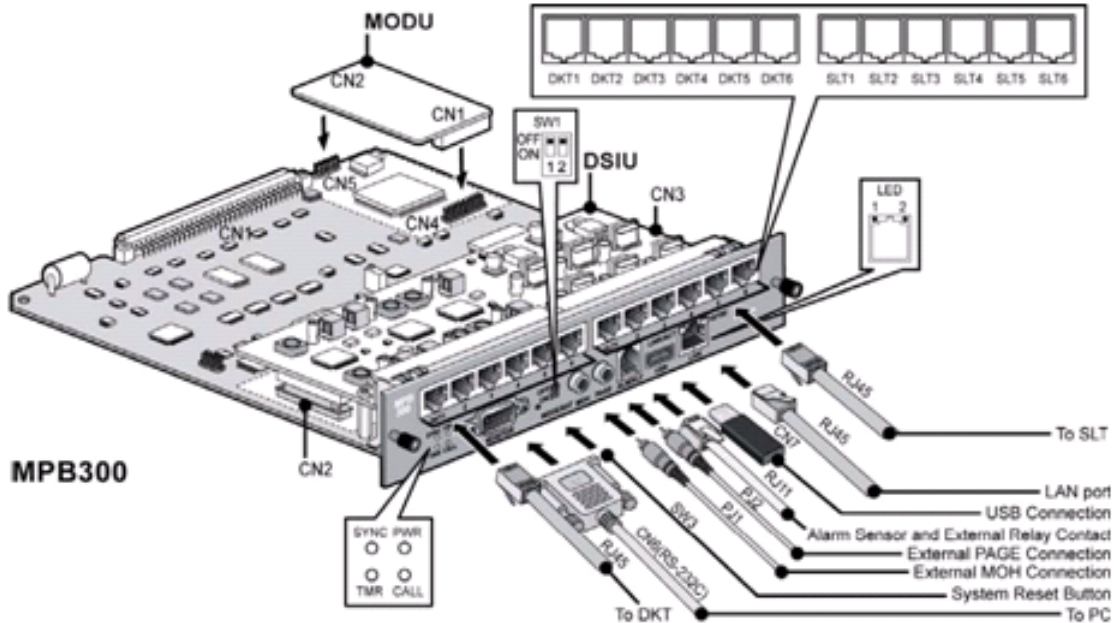
Main Processing Board

The following devices and functions are included on the MPB100/MPB300:

- Main Processor: MINDSPEED ARM9 Dual Core, M82805G, 375MHz
- PCM Voice Processing circuit (ACT2) -PCM voice switching, System Tone/Gain Control
- Tone (DTMF/CPT) Detection/CID Signal (FSK/DTMF/RCID) Detection/CID Generation
- Real Time Clock for System Time/Date
- System Memory [SDRAM / SRAM / Flash ROM / NAND Flash] for Operation
- PLL Circuit for External ISDN Line Clock Synchronization
- 1 Internal MOH - 13 Music resources
- 4 VoIP channel (default)
- MODU (Option) Interface
- Basic DSIU Included 6 DKTs and 6 SLTs
- 4 Status Indication LEDs

- 1 RS-232C monitoring port
- 1 Reset Button
- 1 Switch for Admin Database back up
- 1 External MOH port and 1 External Paging port
- 1 Alarm Detection port and 1 Relay Contact for general purpose
- 1 USB port for DB upload and Download, SW upgrade with Memory stick
- 1 Ethernet port - System maintenance, MP/PP SW upgrade / Basic 4 channel VoIP

Differences between MPB100 and MPB300
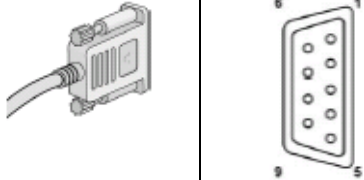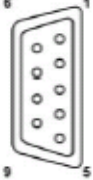
ITEM	MPB100	MPB300	REMARK
SRAM	2 ea (4MB)	4 ea (8 MB)	User Database back up
ACT2	1 ea (32 DSP chs)	2 ea (64 DSP chs)	DTMF,CPT,CID Detection channels at the same time
MAX Ports	200	414	Available MAX.(Trunk + Extension) Ports

Pin Assignment
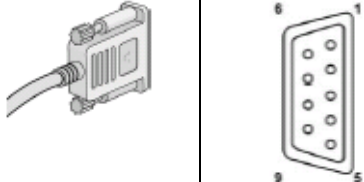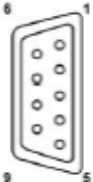
MJ4,USB

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
USB Type A	4 3 2 1	1	GND
		2	D+
		3	D-
		4	VBUS (+5V)

CN6, MPB

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	

CN6, 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	

Connector, Switch and LED Functions

The MPB is installed in the MPB Slot, providing various kinds of connectors and RJ21 jacks (refer to the following table).

Connector, Modular Jack and Switch Functions

SWITCH/CONNECTOR, MJ	FUNCTIONS	REMARK
CN1	MPB100 or MPB300 Installation to the MB	120Pins
CN2, CN3	DSIU installation	20Pins
CN4, CN5	MODU Installation	20Pins, 6Pins
CN6	RS-232C Port Connection	9Pins
CN7	USB Connection (USB Memory Stick only)	Host Mode Only
CN10	Emulator Debug port	For R&D Test
CN11, CN12	CPLD Download for U11(for CN11), U37(for CN12)	For R&D/Factory set
SW1	Admin Database Protection	-
SW2	Watch-dog (OFF ; Enable, ON : Disable)	Not Assembled at MP
SW3	System Reset Button	-
RV1	Internal 32.768MHz "0" PPM Control	For Factory set
PJ1 (Red)	External MOH Connection	-
PJ2 (Blue)	External PAGE Connection	-
MJ1	LAN Port	-
MJ3	Alarm Sensor and External Relay Contact	-

SW1 Functions

SWITCH	FUNCTION	OFF (DEFAULT)	ON
1-1	Database Default at Power ON	Enable	Disable
1-2	Lithium Battery Back up ON/OFF for Memory and RTC	Back up OFF	Back up ON

NOTE: Default is all OFF while delivering the board.

After all the boards are installed, and before programming the System, switch 1-1 should be OFF and then power cycle OFF and ON to initialize the default System database. Once the database has been initialized, switch 1-1 should be placed in the ON position to protect the User database and to protect the features being programmed in Admin programming after the System power up and initialization. Switch 1-2 should be placed in the ON position to feed physically the Lithium Battery Voltage to SRAM/RTC to protect the User Database and System Time/Date information, etc.

NOTE: As needed, replace the batteries with the same or equivalent type recommended by the manufacturer; the System will not function normally if the battery is replaced incorrectly. Be sure to dispose of used batteries according to manufacturer instructions and/or local gov't regulations.

LED Indications

LED	DESCRIPTION
LD1 (Blue), TMR	Timer, Periodic Toggle — ON, 100msec; OFF, 100msec.
LD2 (Blue), CALL	Call Task Status — ON, Call task activated; OFF, Call Task idle
LD3 (Blue), SYNC	External ISDN Board Clock synchronization ON: PLL circuit activation by External Clock from ISDN Board; *MBX IP* will be operated on the basis of external ISDN clock (refer to "NOTE"). OFF: PLL activation by Internal Clock; *MBX IP* will be operated on the basis of internal clock.
LD4 (Blue), PWR	System DC Power ON Indication – ON, Power ON; OFF, Power OFF

NOTE: When several ISDN boards are installed, Default automatic clock priority of Slots and KSUs will be as follows unless modified by the Admin. (PGM301):

- Boards - PRIB>Internal Clock
- KSUs - 1st KSU>2nd KSU>3rd KSU
- Slot - Slot 1>Slot 2>…>Slot 18

LED Indication (MJ1)

LED	DESCRIPTION
1 (Green)	Link Status LED – ON: Link OK, OFF: No Link
2 (Orange)	Speed Status LED – ON: 100Mbps, OFF: 10Mbps
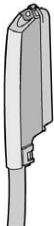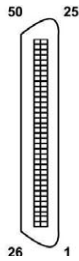
DSIU (Digital and Single Line Interface Unit)
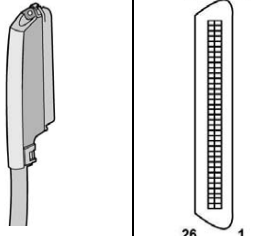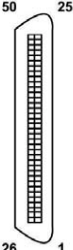
The DSIU is included by default on the MPB100/300, and provides 6 Digital Terminal (DKT) ports and 6 Single Line analog (SLT) ports with FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID function. The 6 SLT ports support the Message Wait Indication, DTMF or Pulse Dial receive, Polarity reversal, sinusoidal ringing generator, -48V DC feeding voltage, 20mA Current Limitation and GR-909 Line Testing. The connection between the DSIU and terminal is connected through RJ21 Modular Jacks.

NOTE:

- Caller ID signal can be either DTMF or FSK based on the country code entered in the system database.
- Dialing Type (DTMF or DP) and Message Wait Indication (MWI) function is determined by the selected admin value.
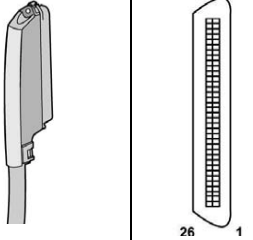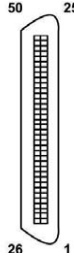
Pin Assignment, MJ1 (DKT Only)
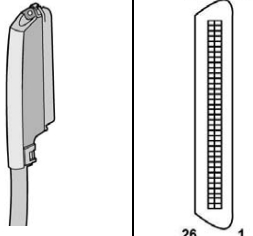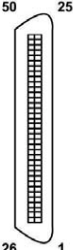
CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		
		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		
		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	
		44		44	VR-19		
		20	20	20	VT-20	20	
		45		45	VR-20		
		21	21	21	VT-21	21	
		46		46	VR-21		
		22	22	22	VT-22	22	
		47		47	VR-22		
		23	23	23	VT-23	23	
		48		48	VR-23		
		24	24	24	VT-24	24	
		49		49	VR-24		
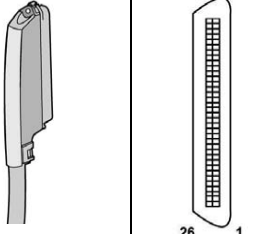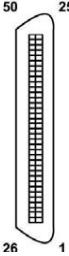
Pin Assignment, MJ2 (SLT Only)
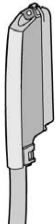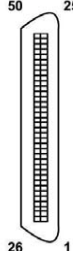
Pin Assignment, Terminal DKT

CONNECTOR	PIN NUMBER	RJ21 PIN	DKT CONNECTOR		DKT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		
		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		

CONNECTOR	PIN NUMBER	RJ21 PIN	DKT CONNECTOR		DKT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21	50 25 26 1	18 43	18	18 43	VT-18 VR-18	18	-
		19 44	19	19 44	VT-19 VR-19	19	
		20 45	20	20 45	VT-20 VR-20	20	
		21 46	21	21 46	VT-21 VR-21	21	
		22 47	22	22 47	VT-22 VR-22	22	
		23 48	23	23 48	VT-23 VR-23	23	
		24 49	24	24 49	VT-24 VR-24	24	

Pin Assignment, Terminal SLT

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1 26	1	1 26	VT-1 VR-1	1	BL:BLUE BK:BLACK
		2 27	2	2 27	VT-2 VR-2	2	BN:BROWN OR:ORANGE
		3 28	3	3 28	VT-3 VR-3	3	WH:WHITE GN:GREEN
		4 29	4	4 29	VT-4 VR-4	4	SL: SILVER VI:VIOLET
		5 30	5	5 30	VT-5 VR-5	5	RD:RED YL:YELLOW
		6 31	6	6 31	VT-6 VR-6	6	
		7 32	7	7 32	VT-7 VR-7	7	
		8 33	8	8 33	VT-8 VR-8	8	
		9 34	9	9 34	VT-9 VR-9	9	
		10 35	10	10 35	VT-10 VR-10	10	
		11 36	11	11 36	VT-11 VR-11	11	
		12 37	12	12 37	VT-12 VR-12	12	
		13 38	13	13 38	VT-13 VR-13	13	
		14 39	14	14 39	VT-14 VR-14	14	
		15 40	15	15 40	VT-15 VR-15	15	
		16 41	16	16 41	VT-16 VR-16	16	
		17 42	17	17 42	VT-17 VR-17	17	

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	
		44		44	VR-19		
		20	20	20	VT-20	20	
		45		45	VR-20		
		21	21	21	VT-21	21	
		46		46	VR-21		
		22	22	22	VT-22	22	
		47		47	VR-22		
		23	23	23	VT-23	23	
		48		48	VR-23		
		24	24	24	VT-24	24	
		49		49	VR-24		

MODU (Modem Interface Unit)

The optional MODU should be installed on the MODU connectors (CN4, CN5) of the MPB100/MPB300, and provides an analog modem connection. It supports Bell, ITU-T, V.34, V.32BIS, V.90 Protocol at a speed rate of 300bps up to 33Kbps, and automatic rate negotiation.
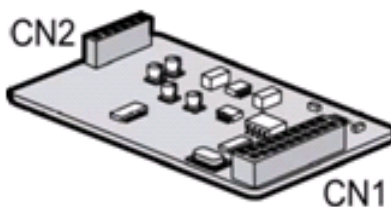
CO Line Boards

LCOB4/8/12 (Loop Start CO Line Interface Board)

The *MBX IP* LCOB (Loop Start CO Interface Board) is a board for PSTN interface on the *MBX IP* system. There are three kinds of LCOB:

- LCOB4 is for 4 ports PSTN Interface,
- LCOB8 is for 8 ports PSTN Interface,
- LCOB12 is for 12 ports PSTN Interface.

The LCOB basically supports Caller Identification (CID) detection, Polarity Reversal (PR) detection, Call Progress Tone (CPT) detection. And the LCOB has one Power Failure Transfer (PFT) circuit for 1st port.

>>> The LCOB4/LCOB8/LCOB12 board can be installed on any universal slot.

LCOB4

LCOB4/8/12/ (cont'd)

LCOB8

LCOB4/LCOB8/LCOB12 (cont'd)
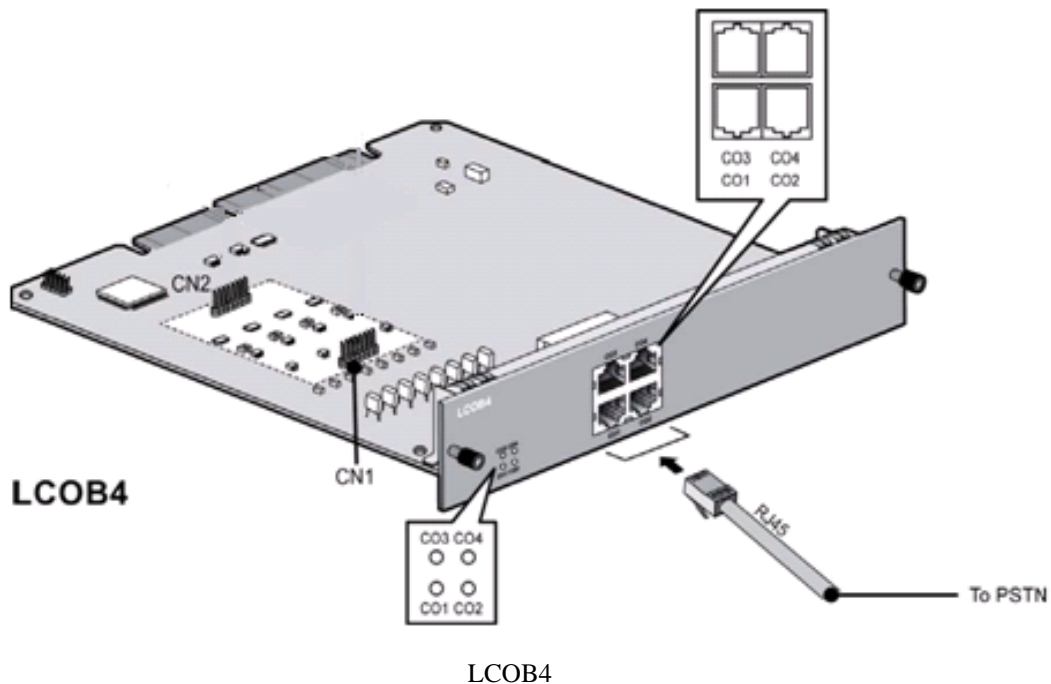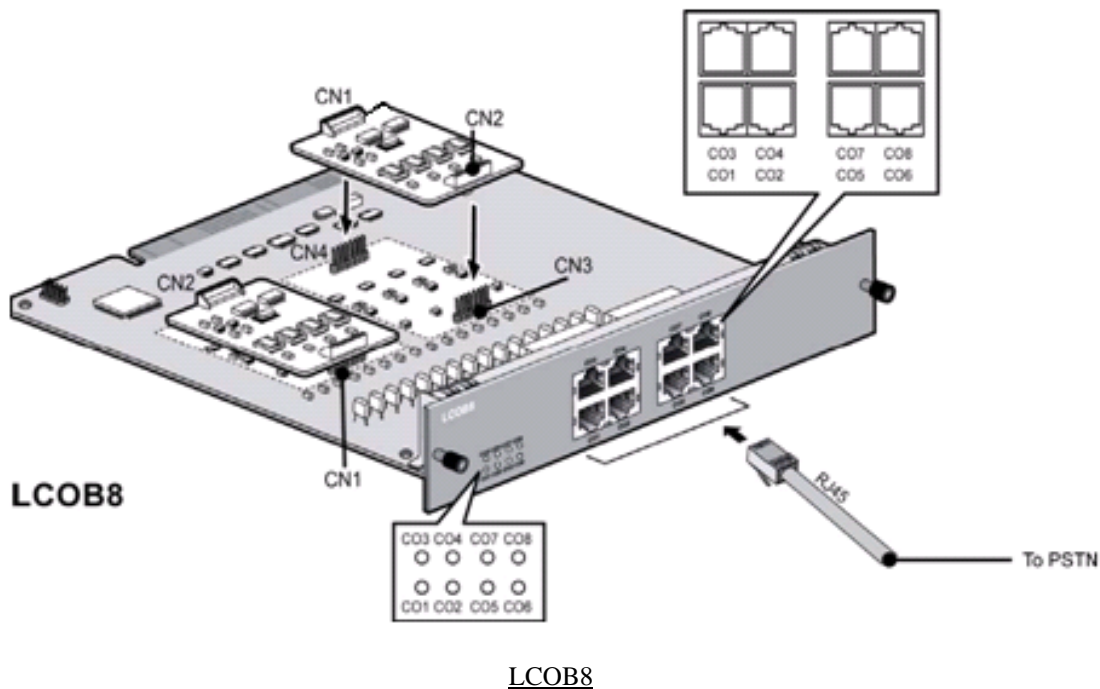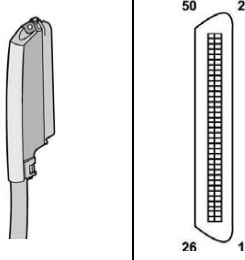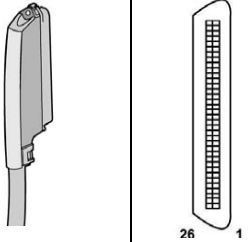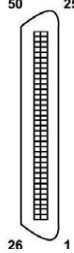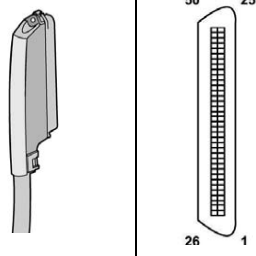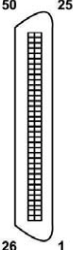
LCOB12

Pin Assignment
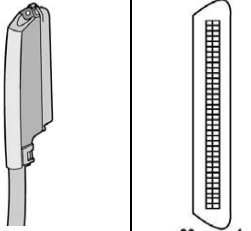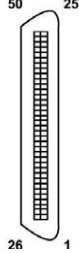
LCOB 1st Port (supports Power Failure Transfer function)

CONNECTOR	PIN NUMBER	RJ21 PIN	LCOB CONNECTOR		LCOB DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		
		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		

CONNECTOR	PIN NUMBER	RJ21 PIN	LCOB CONNECTOR		LCOB DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	-
		44		44	VR-19		
		20	20	20	VT-20	20	-
		45		45	VR-20		
		21	21	21	VT-21	21	-
		46		46	VR-21		
		22	22	22	VT-22	22	-
		47		47	VR-22		
		23	23	23	VT-23	23	-
		48		48	VR-23		
		24	24	24	VT-24	24	-
		49		49	VR-24		

LCOB Ports <u>except</u> 1st port

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21	50 25 / 26 1	1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		
		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	-
		44		44	VR-19		
		20	20	20	VT-20	20	-
		45		45	VR-20		
		21	21	21	VT-21	21	-
		46		46	VR-21		
		22	22	22	VT-22	22	-
		47		47	VR-22		
		23	23	23	VT-23	23	-
		48		48	VR-23		
		24	24	24	VT-24	24	-
		49		49	VR-24		

LED Indications

LED	DESCRIPTION
LD1 (BLUE)	The status of 1st port - ON, In use ; OFF, Idle
LD2 (BLUE)	The status of 2nd port - ON, In use ; OFF, Idle
LD3 (BLUE)	The status of 3rd port - ON, In use ; OFF, Idle
LD4 (BLUE)	The status of 4th port - ON, In use ; OFF, Idle
LD5 (BLUE)	The status of 5th port - ON, In use ; OFF, Idle
LD6 (BLUE)	The status of 6th port - ON, In use ; OFF, Idle
LD7 (BLUE)	The status of 7th port - ON, In use ; OFF, Idle
LD8 (BLUE)	The status of 8th port - ON, In use ; OFF, Idle
LD9 (BLUE)	The status of 9th port - ON, In use ; OFF, Idle
LD10 (BLUE)	The status of 10th port - ON, In use ; OFF, Idle
LD11 (BLUE)	The status of 11th port - ON, In use ; OFF, Idle
LD12 (BLUE)	The status of 12th port - ON, In use ; OFF, Idle

PRIB (Primary Rate Interface Board)

The Primary Rate Interface Board (PRIB) provides one (1) PRI interface; this interface supports 23 PCM bearer channels and 1 signaling channel.

- The PRIB supports pulse dialing, DTMF dialing, and MFC-R2 register signaling.

>>> PRIB can be installed on the universal slot No. 1-6 of any KSU <u>except</u> the slot No. 1 of 1st KSU.

Figure 4-5: 11-5515-01VE151.H
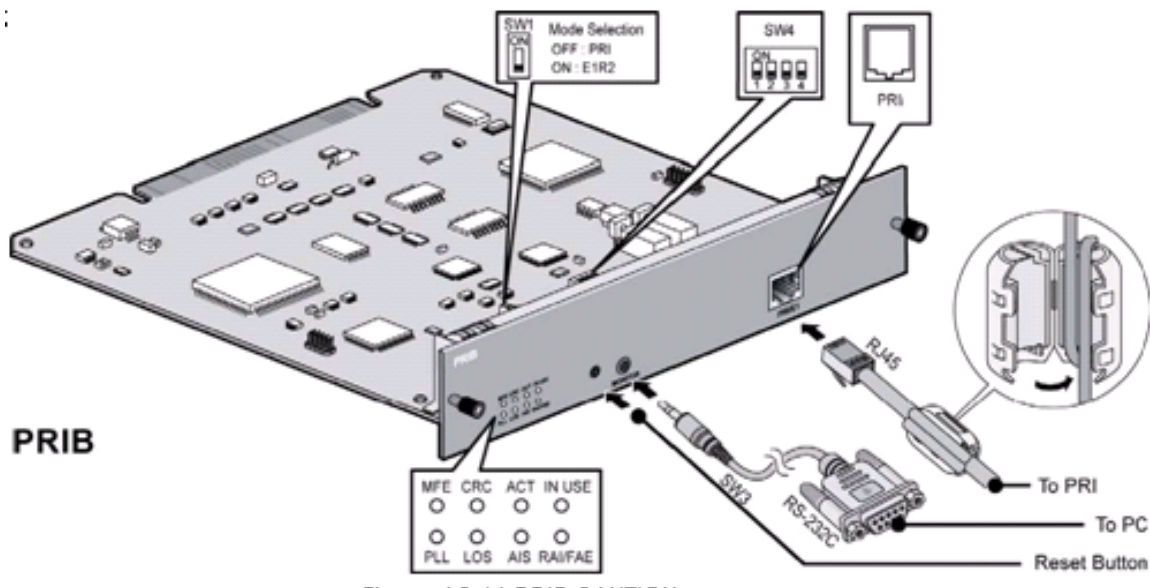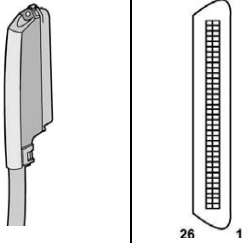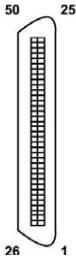
CAUTION: For QSIG (Voice Signalling Protocol) operation, check the mode setting method and the contact assignments of RJ21 type connector according to the mode of line, TE or NT.
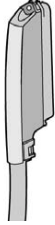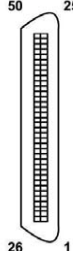
NOTE: *MBX IP* does not support daisy chained clock cable. The ISDN clock priority and synchronization is controlled by the MPB software (refer to PGM 301). The default clock priority for Slots and KSUs are as follows unless modified by the Admin.:

- Board - PRIB>Internal Clock
- KSU - 1st KSU> 2nd KSU> 3rd KSU
- Slot - Slot 1>Slot 2>…>Slot 18
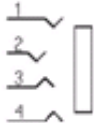
Pin Assignment

PRI Port

CONNECTOR	PIN NUMBER	RJ21 PIN	PRI CONNECTOR		PRI DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		

CONNECTOR	PIN NUMBER	RJ21 PIN	PRI CONNECTOR		PRI DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		
		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	
		44		44	VR-19		
		20	20	20	VT-20	20	
		45		45	VR-20		
		21	21	21	VT-21	21	
		46		46	VR-21		
		22	22	22	VT-22	22	
		47		47	VR-22		
		23	23	23	VT-23	23	
		48		48	VR-23		
		24	24	24	VT-24	24	
		49		49	VR-24		

Serial Port

CONNECTOR	PIN NUMBER	NO	SIGNAL HERE
Serial to Audio Jack		1	Signal Ground
		2	Receive Data
		3	Transmit Data
		4	Signal Ground

Connectors, Switch, and LED Functions

Connectors and Switch Functions

CONNECTOR/SWITCH	FUNCTION	REMARK
SW1	Initialization mode (OFF – PRI)	Default: PRI mode
SW2	Not used	-
SW3	Reset switch	-
SW4	Depends on S/W function	PRI mode: not used
CN1	JTGA port for CPU emulator	-
CN2	JTAG port for DSP emulator	-
CN3	JTAG port for CPLD	-

LED Indication

LED	PRI MODE	REMARK
LD1	PLL Synchronization	RED Color (ON: Error, OFF: Normal)
LD2	Loss of Signal from the Line	-
LD3	Alarm Indication Signal	-
LD4	Remote Alarm Indication	-
LD5	Multi Frame Error	-
LD6	CRC Error	-
LD7	Normal operation indication (Activity Indication)	Blue (Blink)
LD8	Indication of channel use	Blue Color (ON: Ch. Use, OFF: All ch. Idle)
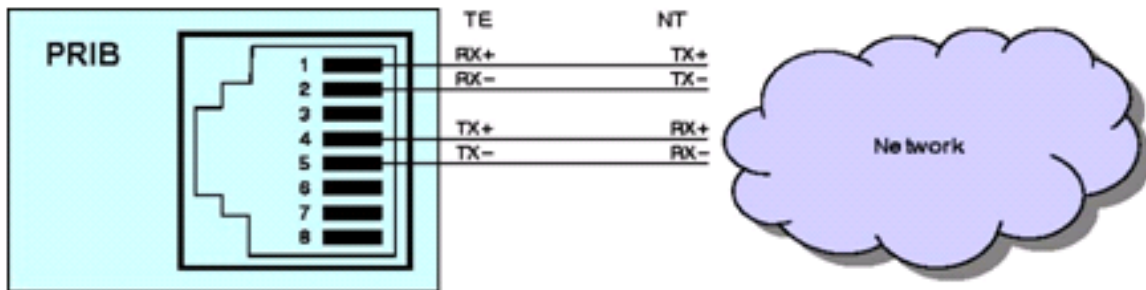
PRI Line Connector Configuration

Extension Boards

SLIB12/24C (with RJ21 connector)

The SLIB12/24C provides 12 (24) single line analog ports with FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID function. The SLIB supports the Message Wait Indication, DTMF or DP receive, Polarity reversal, sinusoidal ringing generator, -48V DC feeding voltage, 20mA Current Limitation and GR-909 Line Testing. The connection between the SLIB12/24C and Single Line Telephone is connected using RJ21 cable.

>>> SLIB12/24C can be installed in the universal slot in any KSU <u>except</u> MPB slot of 1st KSU.
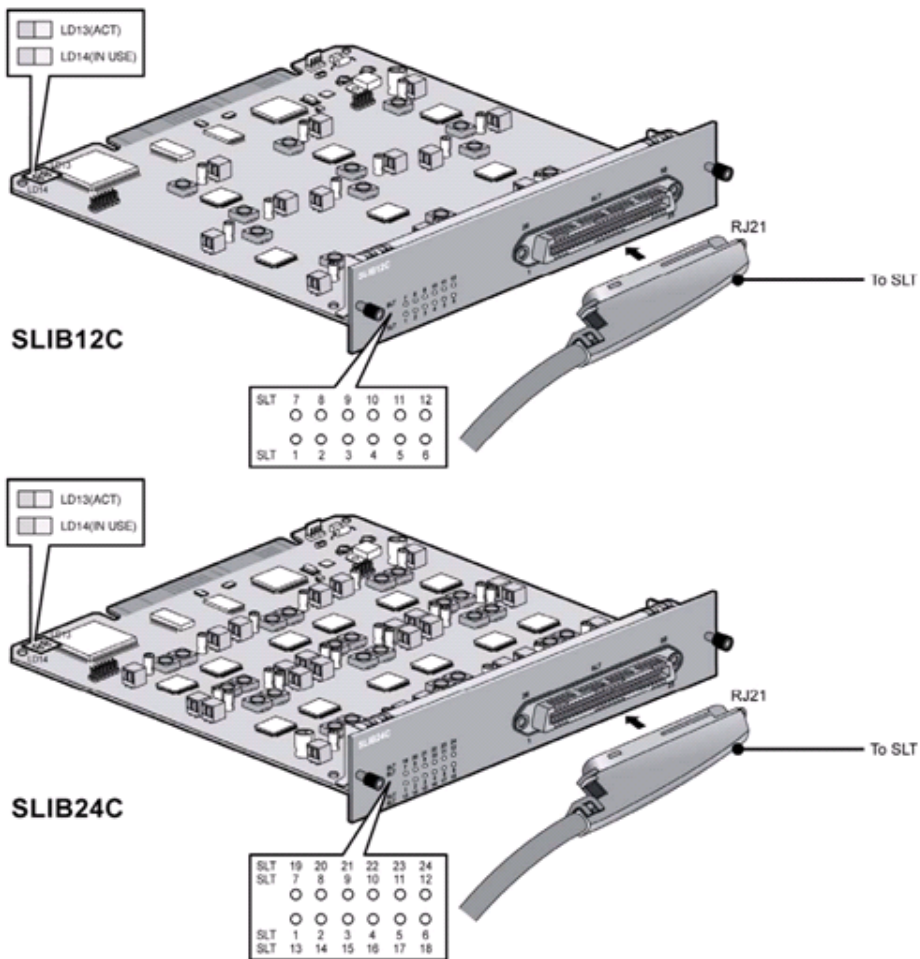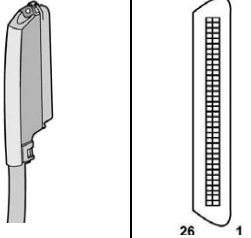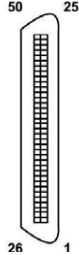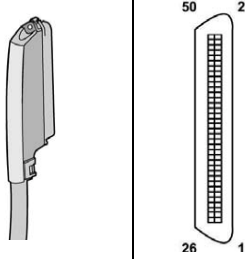
NOTE:

- Caller ID generation of either DTMF or FSK based on the country code is available.
- Dialing Type (DTMF or DP) and MWI function is supported by the selected admin value.
- Max. 4 SLIB24Cs can be installed in each KSU.

Pin Assignment

RJ21

CONNECTOR	PIN NUMBER	RJ21 PIN	SLIB12/24C CONNECTOR		SLIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21	50 25 26 1	1 26	1	1 26	VT-1 VR-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		2 27	2	2 27	VT-2 VR-2	2	
		3 28	3	3 28	VT-3 VR-3	3	
		4 29	4	4 29	VT-4 VR-4	4	
		5 30	5	5 30	VT-5 VR-5	5	
		6 31	6	6 31	VT-6 VR-6	6	
		7 32	7	7 32	VT-7 VR-7	7	
		8 33	8	8 33	VT-8 VR-8	8	
		9 34	9	9 34	VT-9 VR-9	9	
		10 35	10	10 35	VT-10 VR-10	10	
		11 36	11	11 36	VT-11 VR-11	11	
		12 37	12	12 37	VT-12 VR-12	12	
		13 38	13	13 38	VT-13 VR-13	13	
		14 39	14	14 39	VT-14 VR-14	14	

CONNECTOR	PIN NUMBER	RJ21 PIN	SLIB12/24C CONNECTOR		SLIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		15	15	15	VT-15	15	-
		40		40	VR-15		
		16	16	16	VT-16	16	-
		41		41	VR-16		
		17	17	17	VT-17	17	-
		42		42	VR-17		
		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	-
		44		44	VR-19		
		20	20	20	VT-20	20	-
		45		45	VR-20		
		21	21	21	VT-21	21	-
		46		46	VR-21		
		22	22	22	VT-22	22	-
		47		47	VR-22		
		23	23	23	VT-23	23	-
		48		48	VR-23		
		24	24	24	VT-24	24	-
		49		49	VR-24		

Connectors, Switch and LED Functions

Connector and Switch Functions

CONNECTOR/SWITCH	FUNCTION	REMARK
CN1	JTGA port for CPU emulator	For R&D
CN2	JTAG port for FPGA	For R&D
CN3	Serial Port	1PIN: Transmit Data 2PIN: Receive Data 3PIN: +5V 4PIN: Ground

LED Indications

LED	FUNCTION	REMARK
LD1	The status of 1st port or 13th port	ON (Blue) : 1st port Use ON (Yellow Green) : 13th port Use ON (Blush white) : 1st and 13th port Use OFF: Idle
LD2	The status of 2nd port or 14th port	ON (Blue) : 2nd port Use ON (Yellow Green) : 14th port Use ON (Blush white) : 2nd and 14th port Use OFF: Idle
LD3	The status of 3rd port or 15th port	ON (Blue) : 3rd port Use ON (Yellow Green) : 15th port Use ON (Blush white) : 3rd and 15th port Use OFF: Idle
LD4	The status of 4th port or 16th port	ON (Blue) : 4th port Use ON (Yellow Green) : 16th port Use ON (Blush white) : 4th and 16th port Use OFF: Idle
LD5	The status of 5th port or 17th port	ON (Blue) : 5th port Use ON (Yellow Green) : 17th port Use ON (Blush white) : 5th and 17th port Use OFF: Idle
LD6	The status of 6th port or 18th port	ON (Blue) : 6th port Use ON (Yellow Green) : 18th port Use ON (Blush white) : 6th and 18th port Use OFF: Idle
LD7	The status of 7th port or 19th port	ON (Blue) : 7th port Use ON (Yellow Green) : 19th port Use ON (Blush white) : 7th and 19th port Use OFF: Idle
LD8	The status of 8th port or 20th port	ON (Blue) : 8th port Use ON (Yellow Green) : 20th port Use ON (Blush white) : 8th and 20th port Use OFF: Idle

LED	FUNCTION	REMARK
LD9	The status of 9th port or 21st port	ON (Blue) : 9th port Use ON (Yellow Green) : 21st port Use ON (Blush white) : 9th and 21st port Use OFF: Idle
LD10	The status of 10th port or 22nd port	ON (Blue) : 10th port Use ON (Yellow Green) : 22nd port Use ON (Blush white) : 10th and 22nd port Use OFF: Idle
LD11	The status of 11th port or 23rd port	ON (Blue) : 11th port Use ON (Yellow Green) : 23rd port Use ON (Blush white) : 11th and 23rd port Use OFF: Idle
LD12	The status of 12th port or 24th port	ON (Blue) : 12th port Use ON (Yellow Green) : 24th port Use ON (Blush white) : 12th and 24th port Use OFF: Idle
LD13	ACT, Activation or Normal Operating	Blink (Blue Color)
LD14	IN USE	ON: Ch. Use OFF: All channels Idle

DTIB12C/24C (with RJ21 connector)

The connection between the DTIB12C/24C's modular block and DKT is provided using the RJ21cable. Refer to illustration below.

- DTIB 12C: provides 12 ports.
- DTIB 24C: provides 24 ports.

>>> DTIB can be installed on the universal slot in any KSU <u>except</u> the MPB slot of the 1st KSU.

DTIB12C/24C with RJ21 connector (cont'd)

DTIB24C

| LD13(ACT) | | |
| LD14(IN USE) | | |

DKT	19	20	21	22	23	24
DKT	7	8	9	10	11	12
	O	O	O	O	O	O
	O	O	O	O	O	O
DKT	1	2	3	4	5	6
DKT	13	14	15	16	17	18

RJ21

To DK1
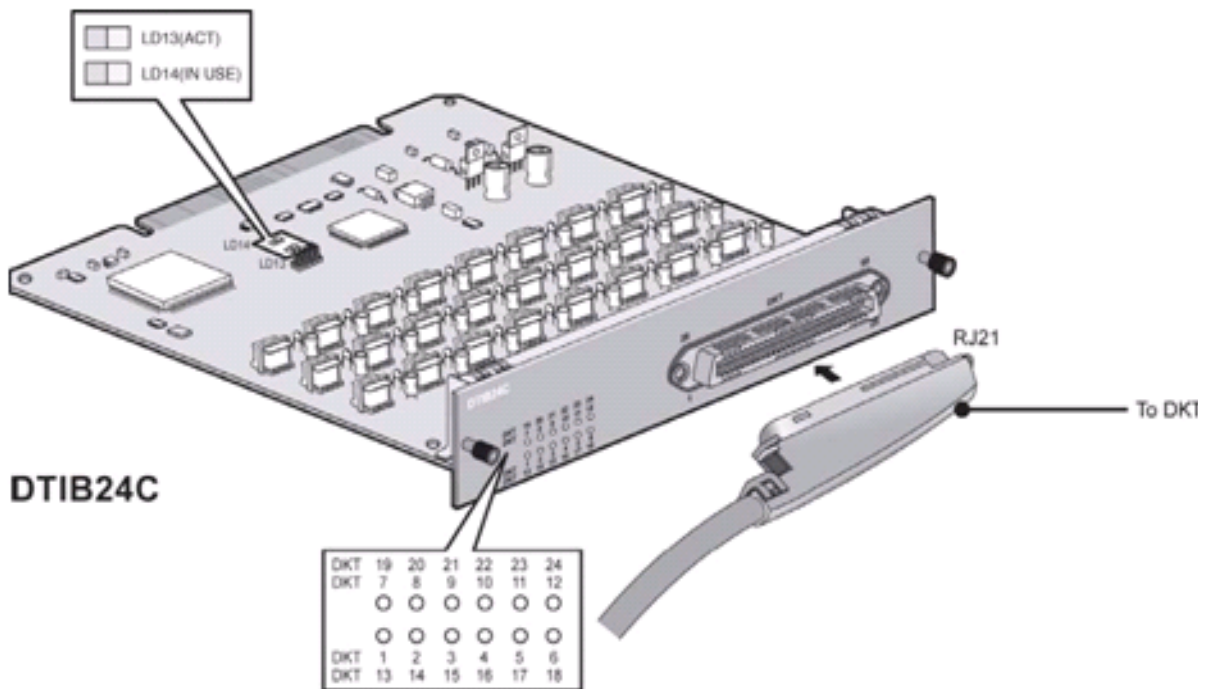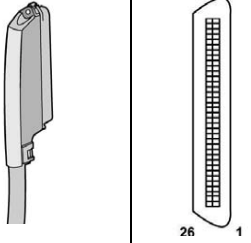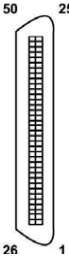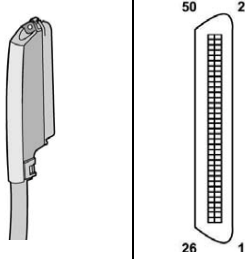
NOTE: 4 DTIB24Cs can be installed in each KSU.

Pin Assignment

DTIB12/24C

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		
		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		18 43	18	18 43	VT-18 VR-18	18	-
		19 44	19	19 44	VT-19 VR-19	19	-
		20 45	20	20 45	VT-20 VR-20	20	-
		21 46	21	21 46	VT-21 VR-21	21	-
		22 47	22	22 47	VT-22 VR-22	22	-
		23 48	23	23 48	VT-23 VR-23	23	-
		24 49	24	24 49	VT-24 VR-24	24	-

Connectors, Switch and LED Functions

Connector and Switch Functions

CONNECTOR/SWITCH	FUNCTION	REMARK
CN1	JTAG port for CPLD	For R&D only

LED Indications

LED	FUNCTION	REMARK
LD1	The status of 1st port or 13th port	ON (Blue) : 1st port Use ON (Yellow Green) : 13th port Use ON (Blush white) : 1st and 13th port Use OFF: Idle
LD2	The status of 2nd port or 14th port	ON (Blue) : 2nd port Use ON (Yellow Green) : 14th port Use ON (Blush white) : 2nd and 14th port Use OFF: Idle
LD3	The status of 3rd port or 15th port	ON (Blue) : 3rd port Use ON (Yellow Green) : 15th port Use ON (Blush white) : 3rd and 15th port Use OFF: Idle

LED Indications (cont'd)

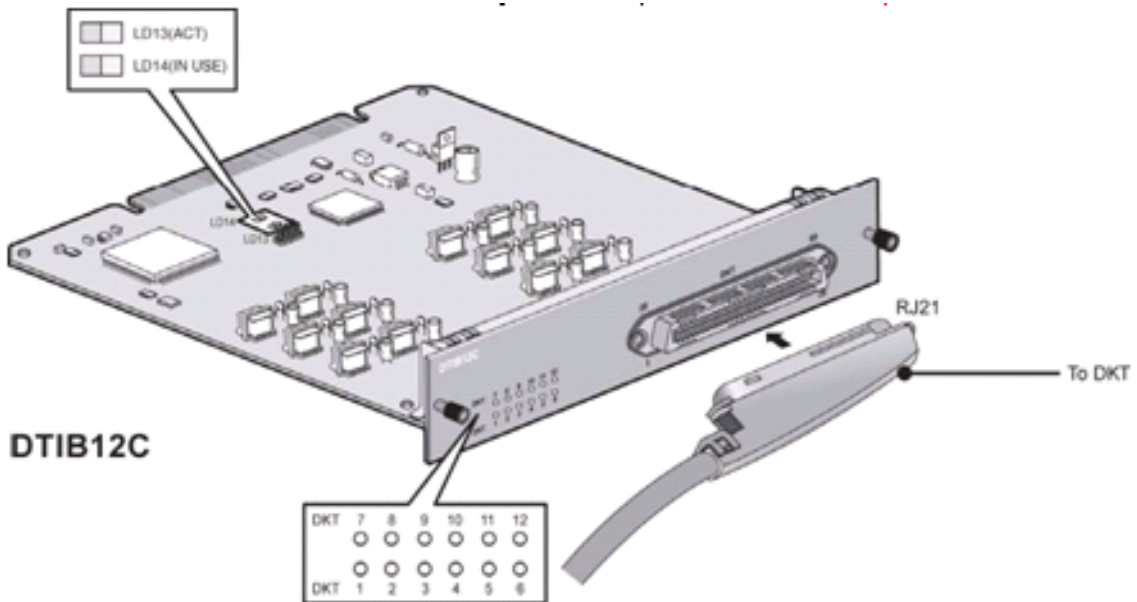| LED	FUNCTION	REMARK
LD4	The status of 4th port or 16th port	ON (Blue) : 4th port Use ON (Yellow Green) : 16th port Use ON (Blush white) : 4th and 16th port Use OFF: Idle
LD5	The status of 5th port or 17th port	ON (Blue) : 5th port Use ON (Yellow Green) : 17th port Use ON (Blush white) : 5th and 17th port Use OFF: Idle
LD6	The status of 6th port or 18th port	ON (Blue) : 6th port Use ON (Yellow Green) : 18th port Use ON (Blush white) : 6th and 18th port Use OFF: Idle
LD7	The status of 7th port or 19th port	ON (Blue) : 7th port Use ON (Yellow Green) : 19th port Use ON (Blush white) : 7th and 19th port Use OFF: Idle
LD8	The status of 8th port or 20th port	ON (Blue) : 8th port Use ON (Yellow Green) : 20th port Use ON (Blush white) : 8th and 20th port Use OFF: Idle
LD9	The status of 9th port or 21st port	ON (Blue) : 9th port Use ON (Yellow Green) : 21st port Use ON (Blush white) : 9th and 21st port Use OFF: Idle
LD10	The status of 10th port or 22nd port	ON (Blue) : 10th port Use ON (Yellow Green) : 22nd port Use ON (Blush white) : 10th and 22nd port Use OFF: Idle
LD11	The status of 11th port or 23rd port	ON (Blue) : 11th port Use ON (Yellow Green) : 23rd port Use ON (Blush white) : 11th and 23rd port Use OFF: Idle
LD12	The status of 12th port or 24th port	ON (Blue) : 12th port Use ON (Yellow Green) : 24th port Use ON (Blush white) : 12th and 24th port Use OFF: Idle
LD13	ACT, Activation or Normal Operating	Blink (Blue Color)
LD14	IN USE	ON: Ch. Use OFF: All channels Idle

Function Boards

VMIB (Voice Mail Interface Board)

The VMIB provides system announcement, ACD/UCD announcement, and User Greeting, along with a processor and DSP circuitry to support 8 simultaneous channels.

- To provide additional channels and/or storage capacity, up to three (3) VMIB may be installed in the *MBX IP* system with MPB300 for a maximum capacity of 24 channels.
- On an *MBX IP* system with MPB100, a maximum of two (2) VMIB can be supported for a maximum capacity of 16 channels.

ITEM	CHANNEL	SYSTEM GREETING/USER GREETING
VMIB	8	System Greeting (0.5hrs.), User Message (100 Hours)

The VMIB can be installed in the universal slot No. 1-6 of any KSU except the MPB slot of 1st KSU. The maximum 3 VMIB can be installed with MPB300 (MPB100: Max. 2 VMIBs)
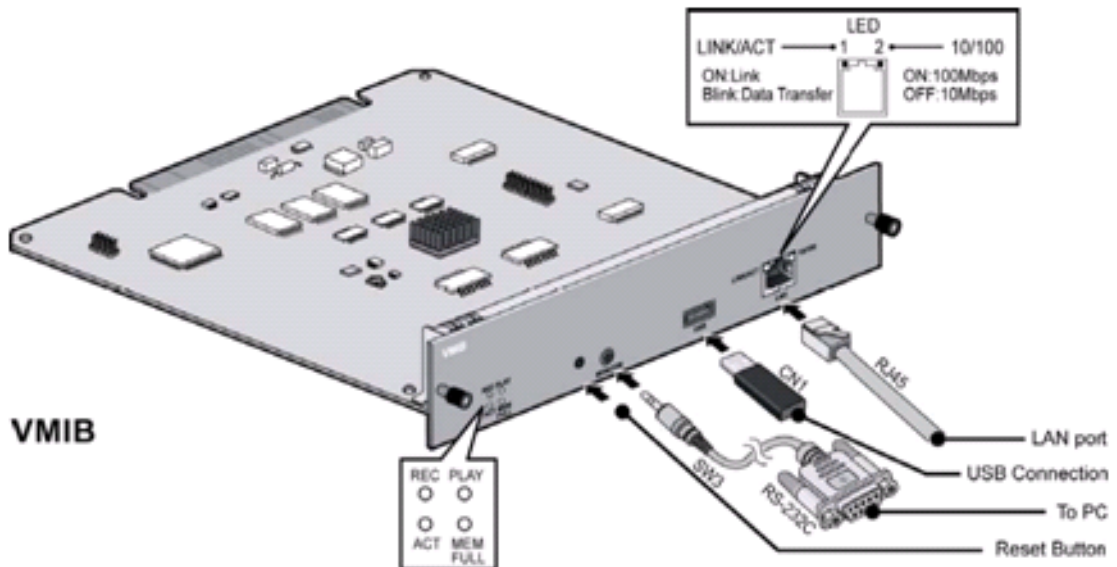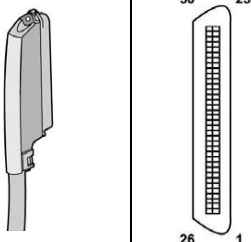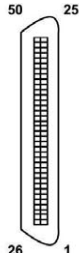
NOTE:
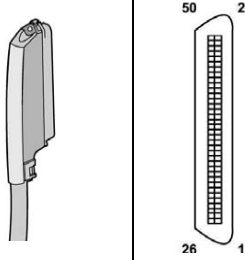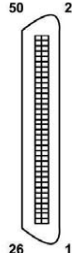
- If the VMIB is installed on a System, voice prompt (Default=1-English, 2-3-Blank) should be uploaded for each country.
- MP Software stores voice prompts on U8, Nand Flash of MPB100/MPB300 for each stored language (Korean, English, Italian, Russian, German, Danish, Hebrew, Spanish, Turkey and Swedish).
- Voice prompt can be changed using the Web Admin, VMIB upgrade function.

LAN Specification

ITEM	SPECIFICATION
LAN Interface	100 Base-T Ethernet (IEEE 802.3)
Speed	100 Mbps (Auto-Negotiation)
Duplex	Half Duplex or Full Duplex (Auto-Negotiation)

RJ21, LAN Port

CONNECTOR	PIN NUMBER	RJ21 PIN	LAN CONNECTOR		LAN DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21	50 25 26 1	1 26	1	1 26	VT-1 VR-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		2 27	2	2 27	VT-2 VR-2	2	
		3 28	3	3 28	VT-3 VR-3	3	
		4 29	4	4 29	VT-4 VR-4	4	
		5 30	5	5 30	VT-5 VR-5	5	

CONNECTOR	PIN NUMBER	RJ21 PIN	LAN CONNECTOR		LAN DESIGNATION	PORT NO	REMARK
RJ21	50 25 26 1	6 31	6	6 31	VT-6 VR-6	6	-
		7 32	7	7 32	VT-7 VR-7	7	-
		8 33	8	8 33	VT-8 VR-8	8	-
		9 34	9	9 34	VT-9 VR-9	9	-
		10 35	10	10 35	VT-10 VR-10	10	-
		11 36	11	11 36	VT-11 VR-11	11	-
		12 37	12	12 37	VT-12 VR-12	12	-
		13 38	13	13 38	VT-13 VR-13	13	-
		14 39	14	14 39	VT-14 VR-14	14	-
		15 40	15	15 40	VT-15 VR-15	15	-
		16 41	16	16 41	VT-16 VR-16	16	-
		17 42	17	17 42	VT-17 VR-17	17	-
		18 43	18	18 43	VT-18 VR-18	18	-
		19 44	19	19 44	VT-19 VR-19	19	-
		20 45	20	20 45	VT-20 VR-20	20	-
		21 46	21	21 46	VT-21 VR-21	21	-
		22 47	22	22 47	VT-22 VR-22	22	-
		23 48	23	23 48	VT-23 VR-23	23	-
		24 49	24	24 49	VT-24 VR-24	24	-

Serial Port

CONNECTOR	PIN NUMBER	NO	SIGNAL HERE
Serial to Audio Jack		1	Signal Ground
		2	Receive Data
		3	Transmit Data
		4	Signal Ground

USB

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
USB Type A		1	GND
		2	D+
		3	D-
		4	VBUS (+5V)

Connectors, Switch, and LED Functions

CONNECTOR/SWITCH	FUNCTION	REMARK
SW1	4-POLE Dip Switch (Function : not defined)	Default: Off
SW2	Battery back-up switch	Not Assembled at MP
SW3	Reset switch	-
SW4	Watch-dog Enable/ Disable (OFF:Enable, ON:Disable)	Not Assembled at MP
CN3	JTGA port for CPU emulator	For R&D Test
CN4	JTAG port for FPGA	For R&D only

LED Indication

LED	FUNCTION	REMARK
LD1	Normal operation indication (Activity Indication)	Blink (blue Color)
LD2	Memory Full (ON – Full, OFF – Usable)	-
LD3	Record (ON – Active, OFF – Idle)	-
LD4	Play (ON – Active, OFF – Idle)	-
MJ1-LD1 (Green/Orange)	ON – Link, Blink – Data Transfer	-
MJ1-LD2 (Yellow)	ON - 100Mbps, OFF – 10Mbps	-

VOIB8/24 (Voice over Internet Protocol Board 8ch./24ch.)

The VOIB8/VOIB24 provides the Ethernet interface for S/W applications and VoIP features. The VOIB8/24 is used to provide packet relay for remote devices to communicate with the host and translate between the *MBX IP* proprietary protocols and other standard protocols (H323, SIP).

ITEM	CHANNEL	REMARK
VOIB8	8	-
VOIB24	24	-

VOIB8/VOIB24 can be installed on universal slot No. 1-6 of any KSU except slot No. 1 of 1st KSU.
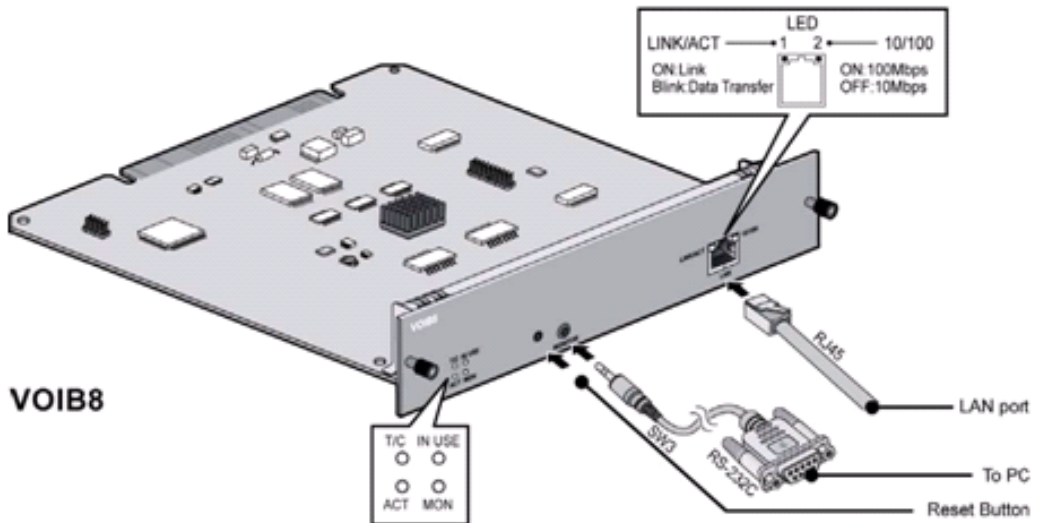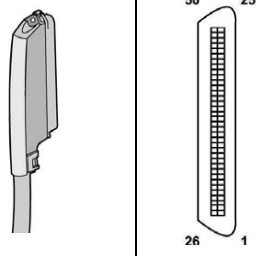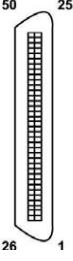
VOIB8/24 (Voice over Internet Protocol Board 8ch./24ch.) con'd
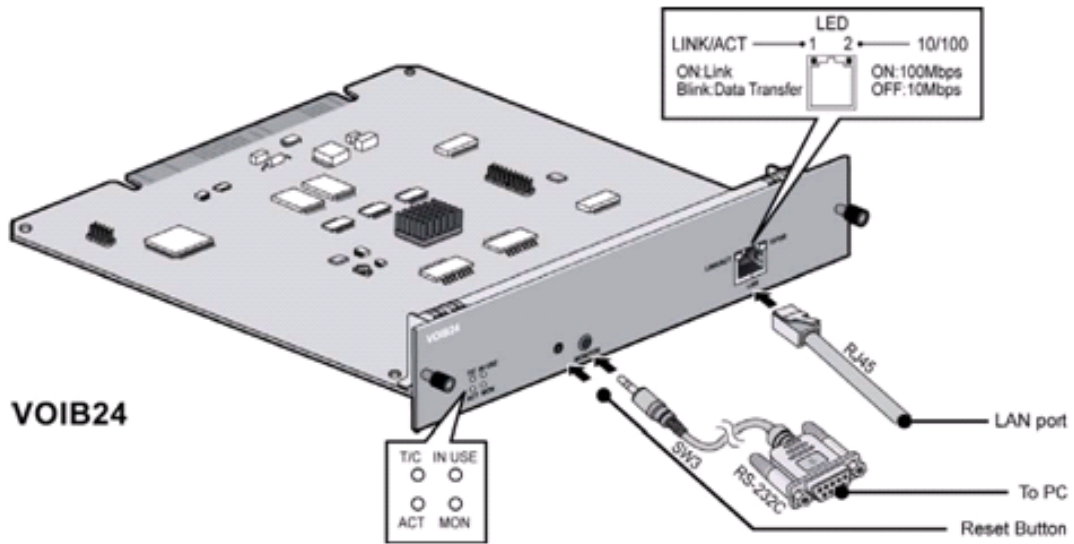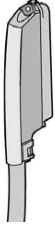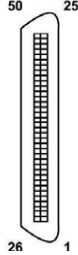
LAN, VoIP Specification
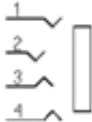
ITEM	SPECIFICATION
LAN Interface	100 Base-T Ethernet (IEEE 802.3)
Speed	100 Mbps (Auto-Negotiation)
Duplex	Half Duplex or Full Duplex (Auto-Negotiation)
VoIP Protocol	H.323 Revision 4, SIP Revision 4
Voice Compression	G.711/G.726/G729/G.723.1
Voice/Fax Switching	T.38
Echo cancellation	G.165

VOIB Port

CONNECTOR	PIN NUMBER	RJ21 PIN	VOIB CONNECTOR		VOIB DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	-
		31		31	VR-6		
		7	7	7	VT-7	7	-
		32		32	VR-7		
		8	8	8	VT-8	8	-
		33		33	VR-8		
		9	9	9	VT-9	9	-
		34		34	VR-9		
		10	10	10	VT-10	10	-
		35		35	VR-10		
		11	11	11	VT-11	11	-
		36		36	VR-11		
		12	12	12	VT-12	12	-
		37		37	VR-12		
		13	13	13	VT-13	13	-
		38		38	VR-13		
		14	14	14	VT-14	14	-
		39		39	VR-14		
		15	15	15	VT-15	15	-
		40		40	VR-15		
		16	16	16	VT-16	16	-
		41		41	VR-16		
		17	17	17	VT-17	17	-
		42		42	VR-17		

CONNECTOR	PIN NUMBER	RJ21 PIN	VOIB CONNECTOR		VOIB DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	-
		44		44	VR-19		
		20	20	20	VT-20	20	-
		45		45	VR-20		
		21	21	21	VT-21	21	-
		46		46	VR-21		
		22	22	22	VT-22	22	-
		47		47	VR-22		
		23	23	23	VT-23	23	-
		48		48	VR-23		
		24	24	24	VT-24	24	-
		49		49	VR-24		

Serial Port

CONNECTOR	PIN NUMBER	NO	SIGNAL HERE
Serial to Audio Jack		1	Signal Ground
		2	Receive Data
		3	Transmit Data
		4	Signal Ground

Connectors, Switch, and LED Functions

| CONNECTOR/SWITCH	FUNCTION	REMARK
SW1	4-POLE Dip Switch (Function : not defined)	Default: Off
SW2	Battery back-up switch	Not Assembled at MP
SW3	Reset switch	--
SW4	Watch-dog Enable/ Disable (OFF:Enable, ON:Disable)	Not Assembled at MP
CN3	JTGA port for CPU emulator	For R&D Test
CN4	JTAG port for FPGA	For R&D only

LED Indication

LED	FUNCTION	REMARK
LD1	VOIB Task Active (CMD/Event Processing)	Blink (blue Color)
LD2	Trace Task Active (Line Monitor)	--
LD3	Transcoding is used	ON: TRANSCODEC
LD4	VOIP call is active (Channel in use)	ON: Channel use. OFF: All Channel Idle
MJ1-LD1 (Green/Orange)	ON – Link, Blink – Data Transfer	--
MJ1-LD2 (Yellow)	ON - 100Mbps, OFF – 10Mbps	--

Serial to Audio Jack Cable Specification

Related Boards include: PRIB, VMIB, VOIB8/VOIB24, WTIB4/WTIB8.
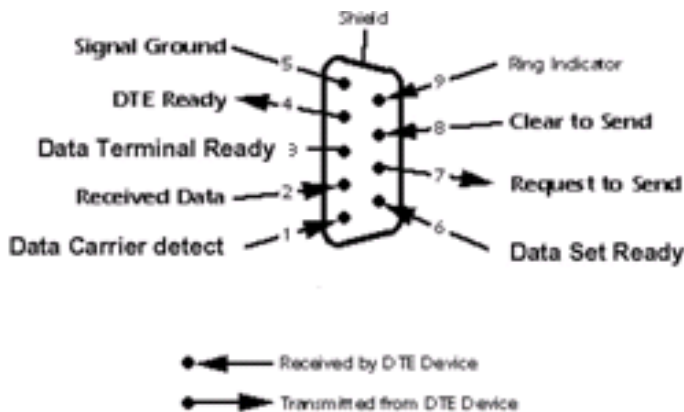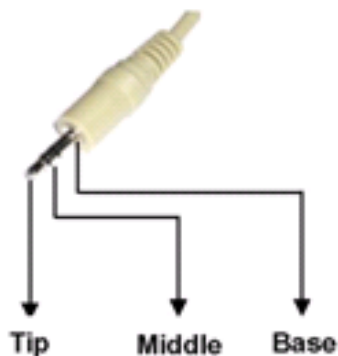
Pin Assignment

- DB9 Pin #2 to tip Receive Data on computer end. (Pin #2 - Tip)
- DB9 Pin #3 to middle Transmit Data on computer end. (Pin #3 - Middle)
- DB9 Pin #5 to base Signal ground on computer end. (Pin #5 - Base)

Chapter 5

Terminal Connection and Wiring Method

Terminal and Door Phone Models

Various types of digital terminals and IP Terminals can be used with the *MBX IP* systems DSIU/DTIB12C//DTIB24C and with VOIB8/VOIB24 as listed in the Table and shown below:

MODEL	DESCRIPTION
Edge 8000 - IP Phone	12 and 24 Flexible Button Display
Edge 700 - Digital Phone	8 and 24 Flexible Button Display
SBX - Digital Phone	8 and 24 Flexible Button Display
STS - Digital Phone	24 Flexible Button Display
Vodavi/Uniphone - Digital Phone	8 and 30 Flexible Button Display
Triad - Digital Phone	8, 12, and 24 Flexible Button Display & Non-display
infinite - Digital Phone	8, 12, and 24 Flexible Button Display & Non-display

IP 8012   IP 8024

Terminal Cabling Distance

DKT (Digital Key Terminal)

Type	Maximum Distance
AWG22 (Diam .025 in)	Under 1,640.4 ft
AWG24 (Diam .019 in)	Under 1,082.67 ft

(MPB/DTIB12C/DTIB24C)

SLT (Single Line Terminal)

Type	Maximum Distance
AWG22 (Diam .025 in)	Under 24,606.3 ft
AWG24 (Diam .019 in)	Under 16,404.2 ft

(MPB/SLIB12C/SLIB24C)
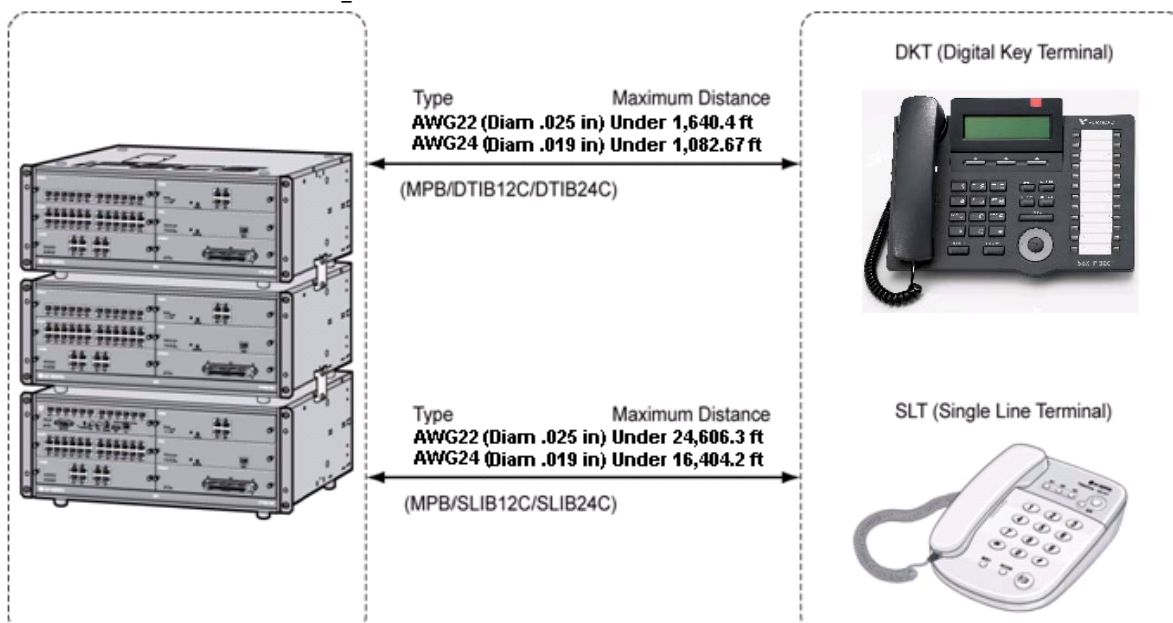
Basic Terminal Connection

DKT Phone
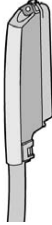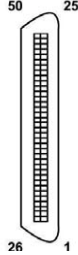
The following illustrates how to connect the DKT to your System:

MPB/DTIB12C/DTIB24C

DKT Connection

Terminal DKT Pin Assignment

CONNECTOR	PIN NUMBER	RJ21 PIN	DKT CONNECTOR		DKT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		

CONNECTOR	PIN NUMBER	RJ21 PIN	DKT CONNECTOR		DKT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21	50 25 26 1	13 38	13	13 38	VT-13 VR-13	13	
		14 39	14	14 39	VT-14 VR-14	14	
		15 40	15	15 40	VT-15 VR-15	15	
		16 41	16	16 41	VT-16 VR-16	16	
		17 42	17	17 42	VT-17 VR-17	17	
		18 43	18	18 43	VT-18 VR-18	18	-
		19 44	19	19 44	VT-19 VR-19	19	-
		20 45	20	20 45	VT-20 VR-20	20	-
		21 46	21	21 46	VT-21 VR-21	21	-
		22 47	22	22 47	VT-22 VR-22	22	-
		23 48	23	23 48	VT-23 VR-23	23	-
		24 49	24	24 49	VT-24 VR-24	24	-

SLT Phone

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

MPB/SLIB12C/SLIB24C

SLT Connection

SLT Pin Assignment

CONNECTOR	PIN NUMBER	RJ21 PIN	SLT CONNECTOR		SLT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		

CONNECTOR	PIN NUMBER	RJ21 PIN	SLT CONNECTOR		SLT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21	50 25 26 1	14 39	14	14 39	VT-14 VR-14	14	
		15 40	15	15 40	VT-15 VR-15	15	
		16 41	16	16 41	VT-16 VR-16	16	
		17 42	17	17 42	VT-17 VR-17	17	
		18 43	18	18 43	VT-18 VR-18	18	-
		19 44	19	19 44	VT-19 VR-19	19	
		20 45	20	20 45	VT-20 VR-20	20	
		21 46	21	21 46	VT-21 VR-21	21	
		22 47	22	22 47	VT-22 VR-22	22	
		23 48	23	23 48	VT-23 VR-23	23	
		24 49	24	24 49	VT-24 VR-24	24	

IP 8000 Series Keyset

VOIB8/VOIB24

Hub

IP Phone Connection

IP Phone Pin Assignmet

CONNECTOR	PIN NUMBER	RJ21 PIN	IP Phone CONNECTOR		IP Phone DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		

CONNECTOR	PIN NUMBER	RJ21 PIN	IP Phone CONNECTOR		IP Phone DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		
		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	
		44		44	VR-19		
		20	20	20	VT-20	20	
		45		45	VR-20		
		21	21	21	VT-21	21	
		46		46	VR-21		
		22	22	22	VT-22	22	
		47		47	VR-22		
		23	23	23	VT-23	23	
		48		48	VR-23		
		24	24	24	VT-24	24	
		49		49	VR-24		

Connecting the SBX Phone

The SBX phone is connected to pins 2 and 5. A standard wall jack uses pins 3-4 (RD/GN) and 2-5 (YL/BK). NOTE -- systems like MBX and XTS use pins 3-4.

When you wire an SBX phone to an MBX system, you must insure that the digital pair (pins 1-26, 2-27) from the MBX digital station connector terminate on the YL/BK pair of the jack to which the SBX phone is connected. NOTE -- XTS, STS and most other phones use the GN/RD pair, not the YL/BK.

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
RJ11		1	n/a
		2	DKT-T
		3, 4	*Reserved*
		5	DKT-R
		6	n/a

IP 8000 DSS Installation
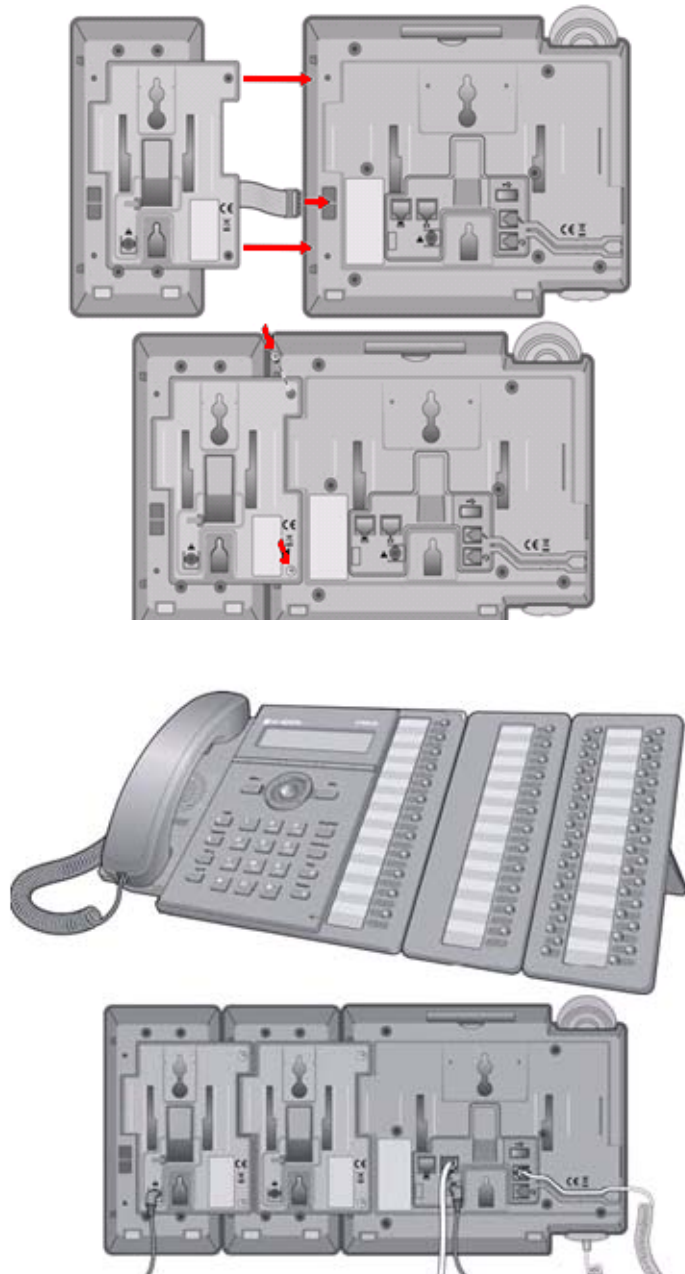
Connecting Additional Terminals

The MPB100/MPB300 provides connections for one external music source, one external page port, one relay contact, and an alarm detection input monitor through the PJ1 (RED, External MOH) and PJ2 (BLUE, External Page) audio jack and a MJ3 (RJ21 Modular Jack).
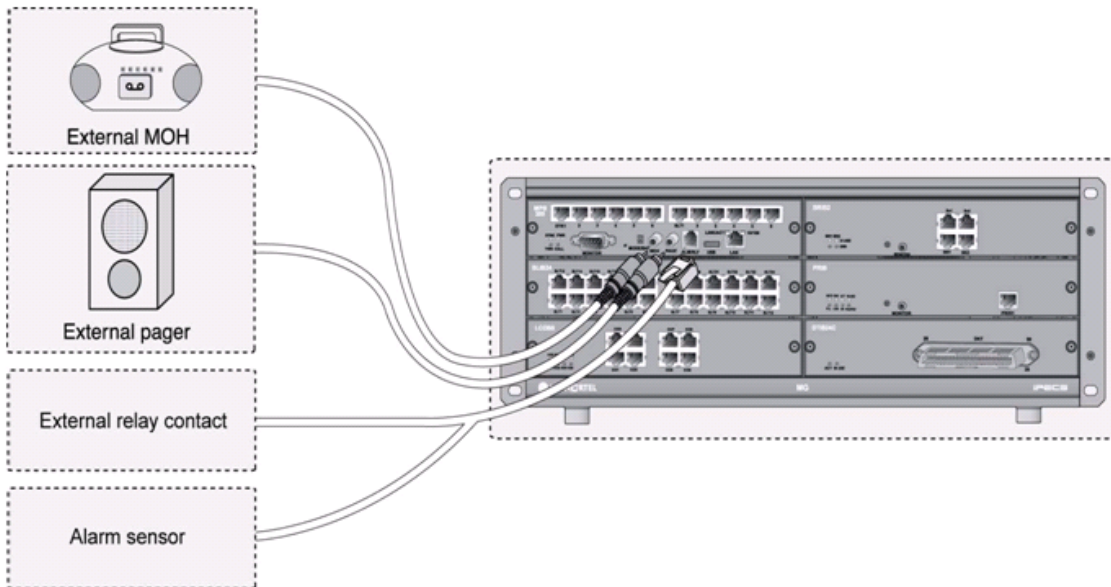
External Music Source Wiring

The MPB100/MPB300 supports 1 external music port through a PJ1 (RED) audio jack.

External Paging Port wiring

The MPB100/MPB300 supports 1 external paging port through a PJ2 (BLUE) audio jack.

Alarm Detection Wiring

The MPB 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. 2-3 of MJ3.

Relay Contacts

The MPB100/MPB300 provides 1 relay contact that is used for loud bell or general purpose through pin No. 4-5 of MJ3.

Cable Wiring

Wall Mount Wiring

To install using wall mount wiring, perform the following steps:

1. Ensure the BKSU and EKSU have been installed correctly.

2. Connect cables to the CO/STA port and the MOH/LAN/RS-232C ports as shown in the Figure below.

3. Connect the Power cord and the Battery cable.

4. Tie all the cables and the Power cord (if desired) through holes at the left rack mount bracket using the 6 tie cables provided.
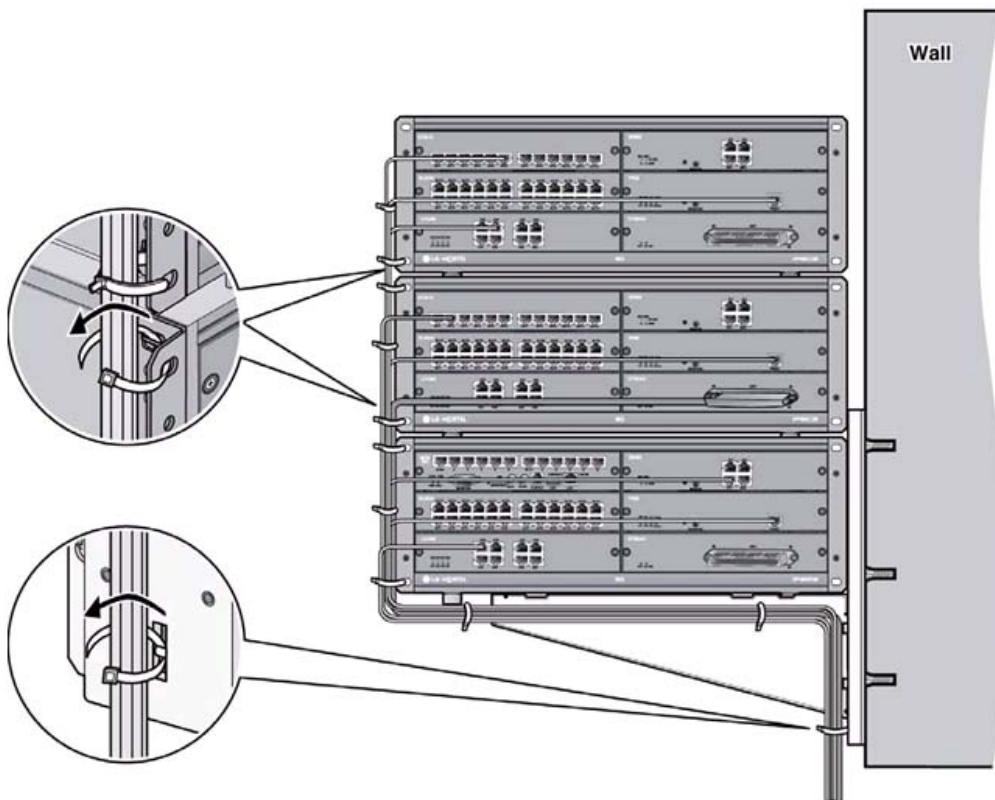
Rack Mount Wiring

To install using rack mount wiring, perform the following steps:

1. Ensure the BKSU and EKSU have been installed correctly.

2. Connect cables to the CO/STA port and the MOH/LAN/RS-232C ports as shown in the Figure below.

3. Connect the Power cord and the Battery cable.

4. Tie all the cables and the Power cord (if desired) through the holes at both sides of the rack mount bracket using the 6 tie cables provided.

5. Finally, tie all cables to the Rack.
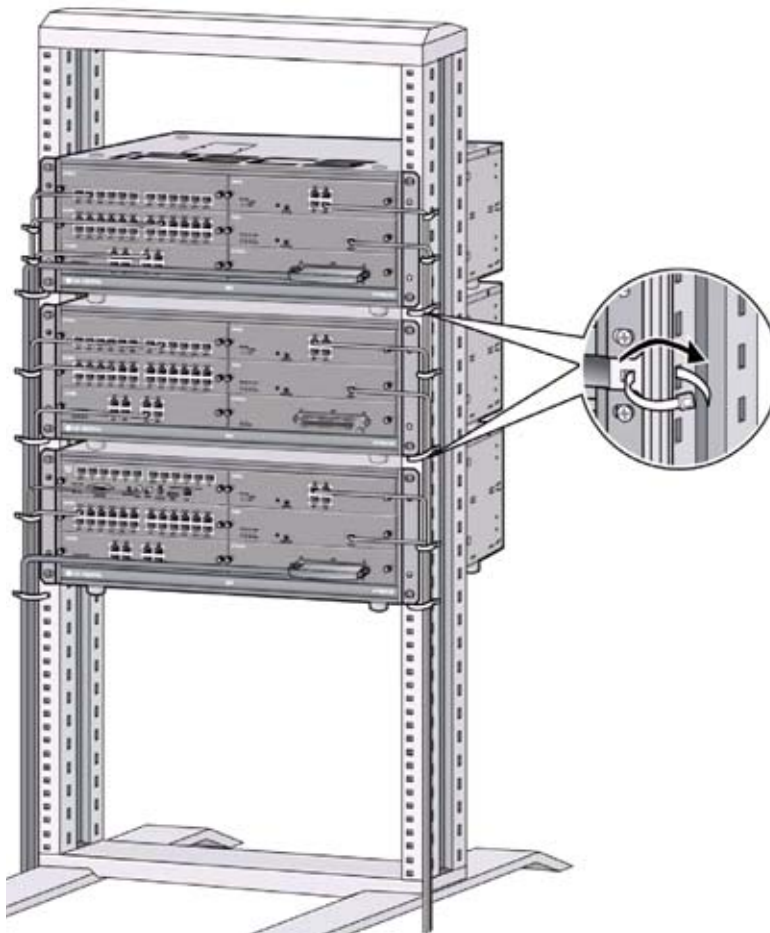
DECT Installation

Introduction

The MBX IP system coordinates with the System DECT solution which is comprised of WTIB4/8, Base Station (RPF), an DECT terminal. The figure shows a general DECT reference model of a Wireless Office Terminal System (WOTS).
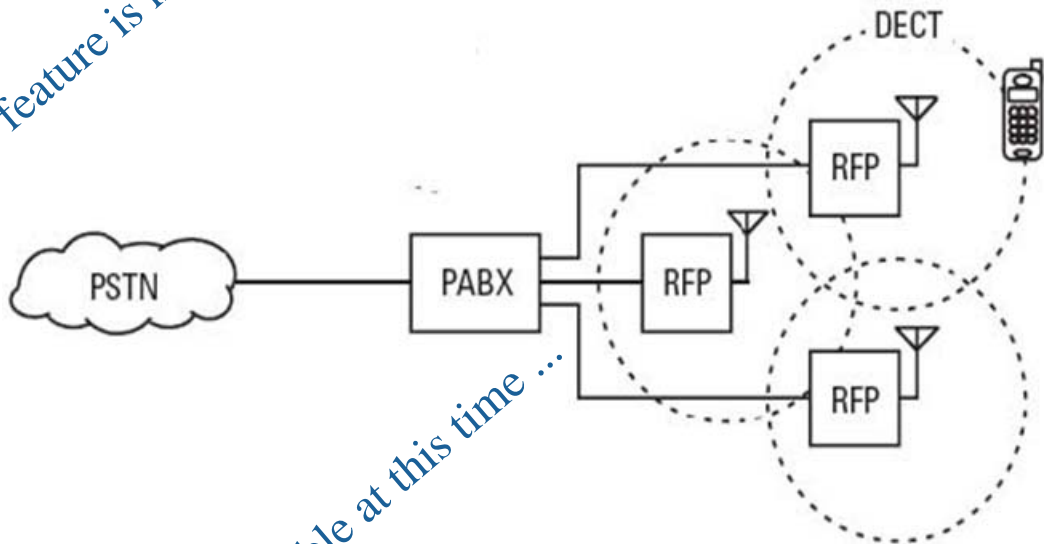
General DECT reference model of Wireless Office Terminal System

- PABX – Private Automatic Branch Exchange
- RFP – Radio Fixed Part (Base Station)
- PSTN – Public Switched Telephone Network

The following is needed to configure the System using DECT phones:

- WTIB4, WTIB8 board - Up to three WTIB4s or WTIB8s can be connected to the MBX IP System. Each WTIB4 and WTIB8 can support up to 4 or 8 Base Stations (respectively).
- Base Station (GDC-400B) - Each Base Station can process up to four simultaneous calls. The Base Station should be installed indoors and protected from surge because it is designed to be an indoor Base Station.
  OR
- Base Station (GDC-600B) - The Base Station can process up to six simultaneous calls. The Base Station should be installed indoors and protected from surge because it is designed for indoor station.
- Wireless Terminal (GDC-33xH, 34xH, 400H) - Up to 192 wireless terminals can be registered (refer to the DECT Wireless Terminal User Guide).

Base Station Specifications

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 WTIB4/8	600m (twisted 2-pair cable)

Wireless Terminal Specifications

ITEM	SPECIFICATION
Max. Transmission Power	250mW
Modulation Method	GFSK
Frequency Band	1,880MHz - 1,900MHz

DECT Installation

For detailed instructions on Site Planning for Base Stations, Cell-coverage Region Survey, RSSI Monitoring, and Base Station Installation, refer to the DECT Installation Guide.

Board Installation

In the MBX IP system, WTIB4 and WTIB8 are both Base Station interface boards. The MBX IP System can have up to two (with MPB100) or three (with MPB300) WTIB4 (up to 4 ports) or WTIB8 (up to 8 ports).

WTIB4/WTIB8

The WTIB4/8 can be installed on universal slot 1-6 of any KSU except slot 1 of 1st KSU and should be installed on the same KSU when installing more than one WTIB4/8.

CAUTION: **- Prior to installing the WTIB4/8 System power should be turned OFF, to avoid any damage.**

- If the WTIB4/8 is plugged back into the System after being removed, the WTIB4/8 should be plugged into the original slot to avoid the loss of programmed data.

WTIB4

This feature is not available at this time ...

WTIB4/WTIB8
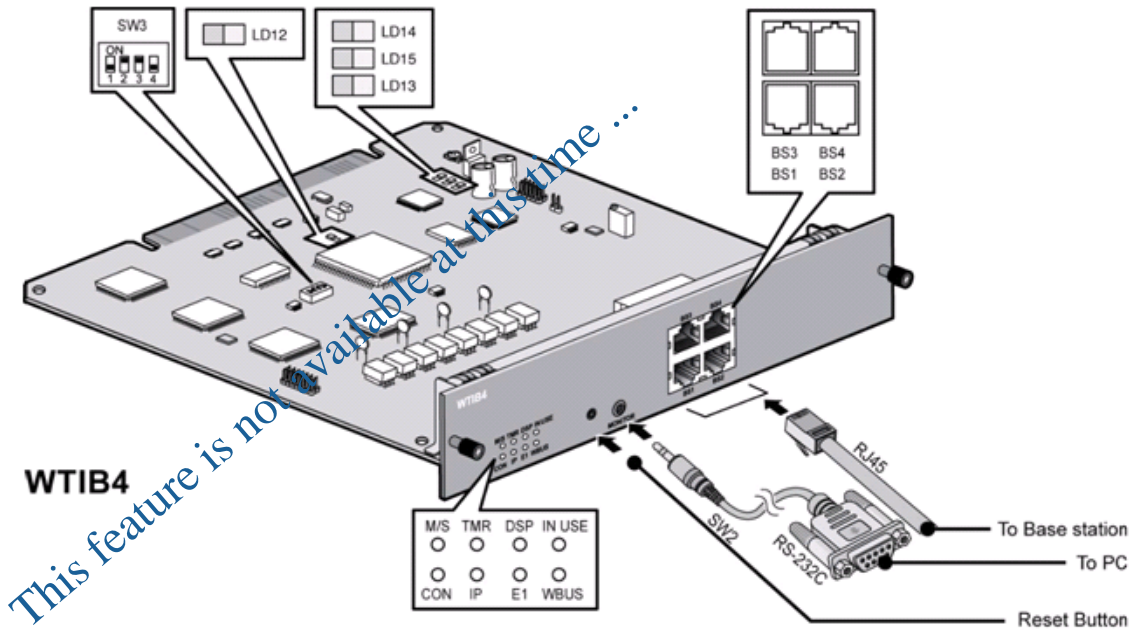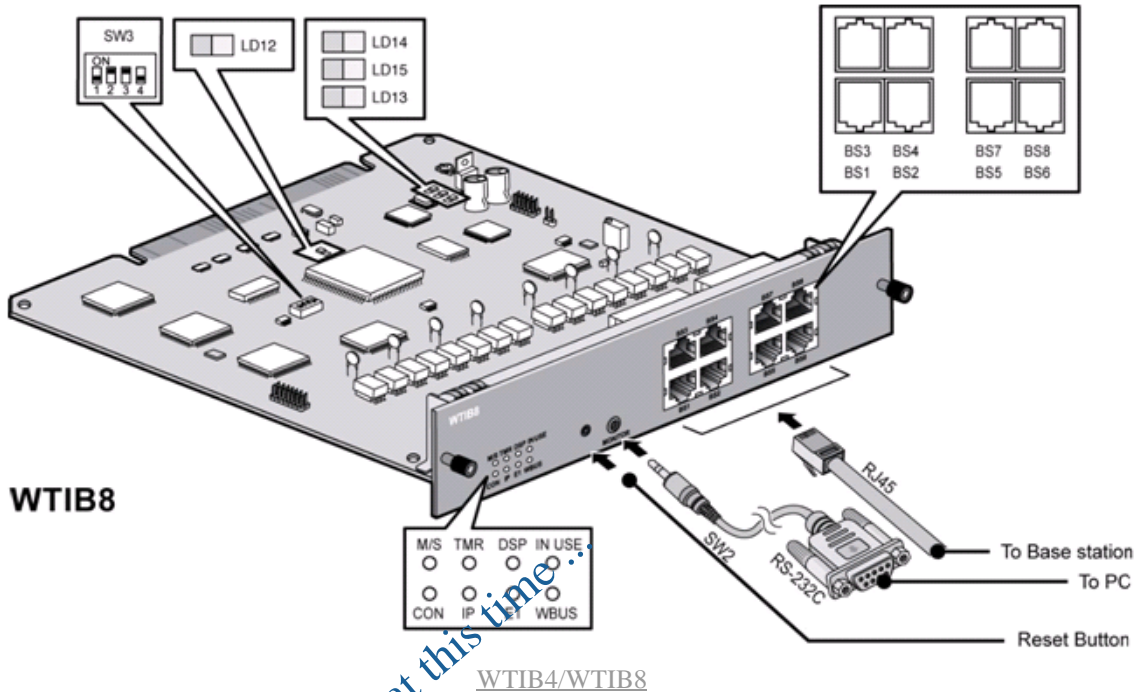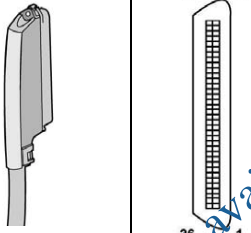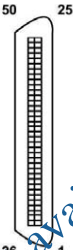
CAUTION: The Base Station is connected to the WTIB4/8 by an unshielded twisted pair cable (at least CAT3).
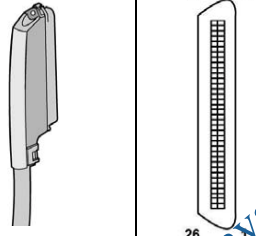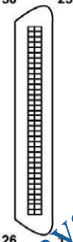
NOTE: - The unshielded twisted pair cable (at least CAT3) should be used to connect WTIB4/8 with a Base Station.
- Shielded cable can be used if it can withstand interference from noise sources such as an AC power cable with high voltage. A shorter cable length and/or clear line-of-view between the WTIB4/8 and Base Station will decrease the possibility of data degradation.
- Even though there are connection points such as MDF or the connection tab between WTIB4/8 and Base Station, the connection points should be connected with twisted-pair cable (at least CAT3). For example, WTIB4/8 to MDF, MDF to MDF, MDF to connection tab, and connection tab to Base Station should be joined using twisted-pair cable.

Pin Assignment

WTIB4/8

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1	1	1	VT-1	1	BL:BLUE
		26		26	VR-1		BK:BLACK
		2	2	2	VT-2	2	BN:BROWN
		27		27	VR-2		OR:ORANGE
		3	3	3	VT-3	3	WH:WHITE
		28		28	VR-3		GN:GREEN
		4	4	4	VT-4	4	SL: SILVER
		29		29	VR-4		VI:VIOLET
		5	5	5	VT-5	5	RD:RED
		30		30	VR-5		YL:YELLOW
		6	6	6	VT-6	6	
		31		31	VR-6		
		7	7	7	VT-7	7	
		32		32	VR-7		
		8	8	8	VT-8	8	
		33		33	VR-8		
		9	9	9	VT-9	9	
		34		34	VR-9		
		10	10	10	VT-10	10	
		35		35	VR-10		
		11	11	11	VT-11	11	
		36		36	VR-11		
		12	12	12	VT-12	12	
		37		37	VR-12		
		13	13	13	VT-13	13	
		38		38	VR-13		
		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	
		44		44	VR-19		
		20	20	20	VT-20	20	
		45		45	VR-20		
		21	21	21	VT-21	21	
		46		46	VR-21		
		22	22	22	VT-22	22	
		47		47	VR-22		
		23	23	23	VT-23	23	
		48		48	VR-23		
		24	24	24	VT-24	24	
		49		49	VR-24		

Base Station

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		1 26	1	1 26	VT-1 VR-1	1	BL:BLUE
		2 27	2	2 27	VT-2 VR-2	2	BK:BLACK BN:BROWN OR:ORANGE
		3 28	3	3 28	VT-3 VR-3	3	WH:WHITE GN:GREEN
		4 29	4	4 29	VT-4 VR-4	4	SL: SILVER VI:VIOLET
		5 30	5	5 30	VT-5 VR-5	5	RD:RED YL:YELLOW
		6 31	6	6 31	VT-6 VR-6	6	
		7 32	7	7 32	VT-7 VR-7	7	
		8 33	8	8 33	VT-8 VR-8	8	
		9 34	9	9 34	VT-9 VR-9	9	
		10 35	10	10 35	VT-10 VR-10	10	
		11 36	11	11 36	VT-11 VR-11	11	
		12 37	12	12 37	VT-12 VR-12	12	
		13 38	13	13 38	VT-13 VR-13	13	
		14 39	14	14 39	VT-14 VR-14	14	
		15 40	15	15 40	VT-15 VR-15	15	
		16 41	16	16 41	VT-16 VR-16	16	
		17 42	17	17 42	VT-17 VR-17	17	

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21		18	18	18	VT-18	18	-
		43		43	VR-18		
		19	19	19	VT-19	19	
		44		44	VR-19		
		20	20	20	VT-20	20	
		45		45	VR-20		
		21	21	21	VT-21	21	
		46		46	VR-21		
		22	22	22	VT-22	22	
		47		47	VR-22		
		23	23	23	VT-23	23	
		48		48	VR-23		
		24	24	24	VT-24	24	
		49		49	VR-24		

NOTE: - Using unshielded twisted-pair cable (more than CAT3), wire the Base Station RJ-11 to the termination point/MDF for connection to a WTIB4/8.
   - Tag or number wiring for maintenance.

Connectors, Switch and LED Functions

The following Table shows the relation between modular connector & associated cell numbers.

Connector Functions

CONNECTOR	CELL NUMBER
MJ1-1(WTIB4/8)	Cell 0
MJ1-2(WTIB4/8)	Cell 1
MJ1-3(WTIB4/8)	Cell 2
MJ1-4(WTIB4/8)	Cell 3
MJ2-1(WTIB8)	Cell 4
MJ2-2(WTIB8)	Cell 5
MJ2-3(WTIB8)	Cell 6
MJ2-4(WTIB8)	Cell 7

The 9 LEDs mounted on the MBX IP WTIB4/8 provide diagnostic information for status of the board. The following table shows the meaning of the different LED status indicators.

Switch Functions

SW	ON	OFF	DESCRIPTION	DEFAULT
SW3-1	TBR6 test mode	Normal	Reserved for test	OFF
SW3-2	Enable Echo-can.	Disable Echo-can.	Echo-canceller control	ON
SW3-3	NOT USED	NOT USED	NOT USED	ON
SW3-4	All base reset	Only new base reset	On: All base reset Off: One base reset	OFF

NOTE: TBR6 test mode needs not to be set for normal operation because TBR6 test mode is used only for DECT confirmation test.

LED Indications

LED	NORMAL	LABEL
1	ON: Master WTIB, Toggle: Slave 1 WTIB, OFF: Slave 2 WTIB	M/S
2	When Nios CPU is normal, TMR LED toggles every 100msec.	TMR
3	ON: DSP Echo cancellation enabled, OFF: DSP Echo cancellation disabled	DSP
4	When more than one DECT channel is used, LED8 is ON.	IN USE
5	When WTIB is connected with MPB, CON LED is ON.	CON
6	When WTIB sends or receives data from MPB, IP LED toggles.	IP
7	When WTIB sends or receives data from Base Station, E1 LED toggles.	E1
8	When WTIB sends or receives data from other WTIB, WBUS LED toggles.	WBUS

Ferrite Core Installation and Wiring

Ferrite core is provided in the packaging of the Base Station for EMI. The Ferrite core should be installed when the WTIB4/8 is installed in the MBX IP system. One Ferrite core is to be used with the line cord between the Base Station and each port of WTIB4/8 (as shown).
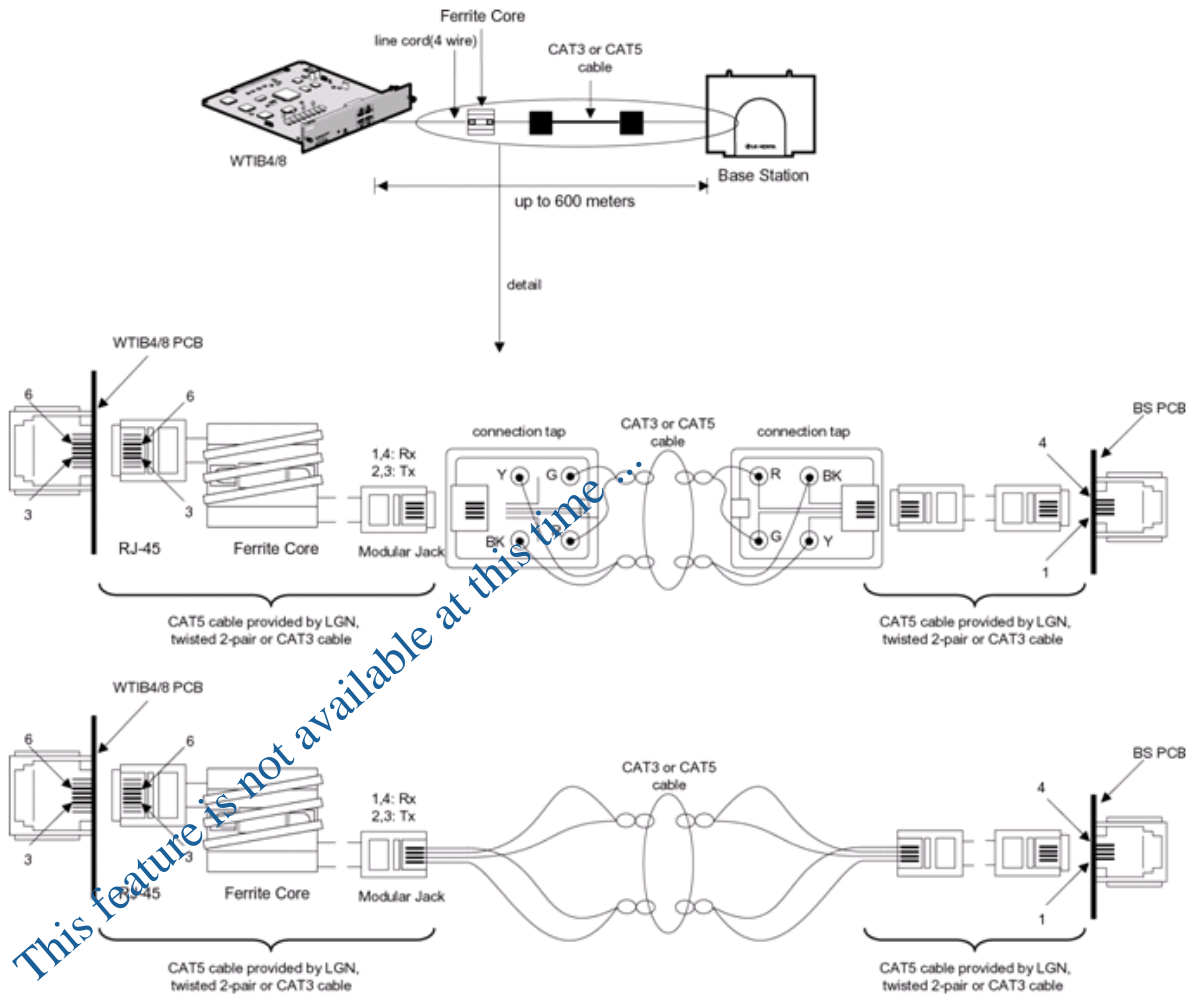
Cable Connection with Ferrite Core between WTIB4/8 and Base Station
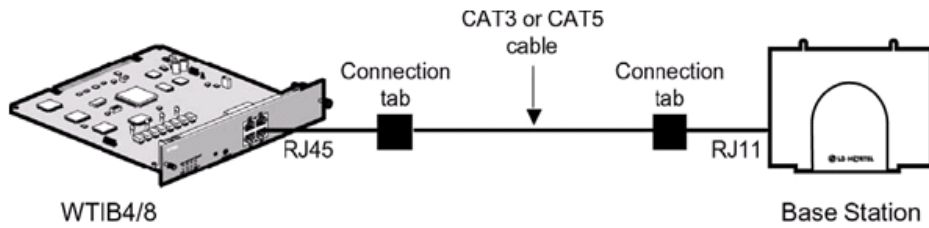
Wiring with connection tab between WTIB4/8 and Base Station
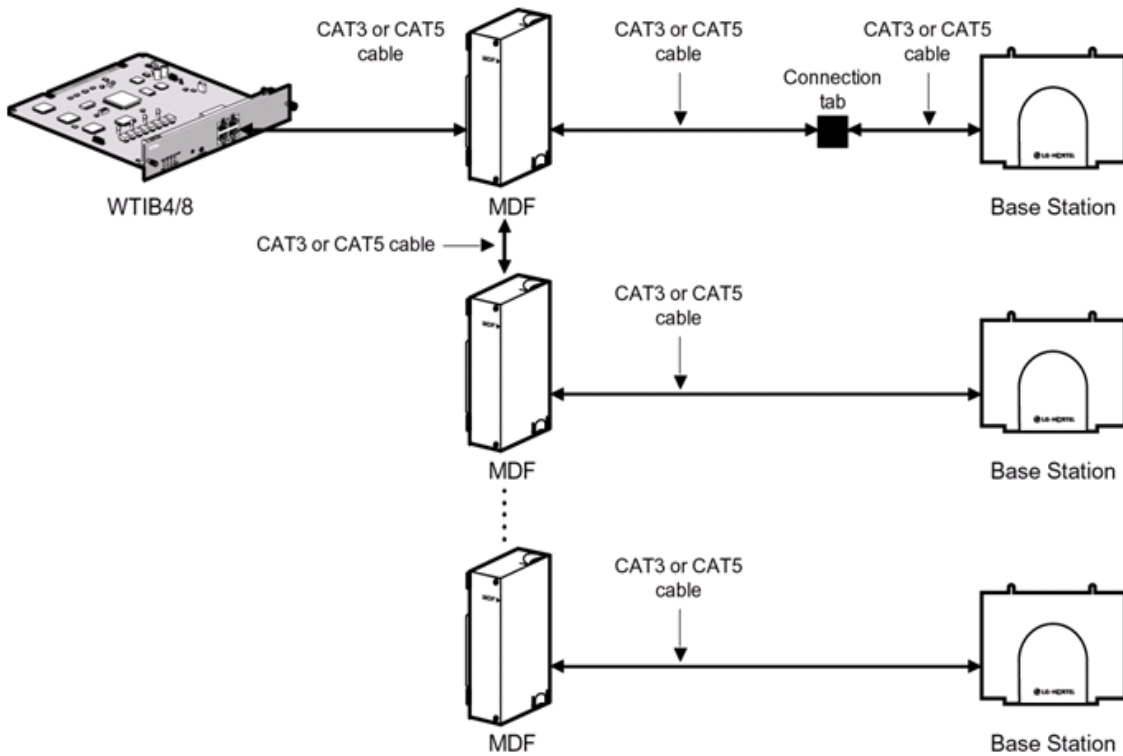
Wiring with MDF and connection tab between WTIB4/8 and Base Station

NOTE: Even though there are connection points such as MDF or connection tab between WTIB4/8 and Base Station, the connection points should be connected with twisted-pair cable (at least CAT3 class). For example, WTIB4/8 to MDF, MDF to MDF, MDF to connection tab, and connection tab to Base Station should be connected with twisted-pair cable.
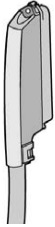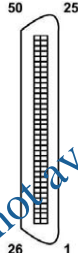
User Subscription/Unsubscription
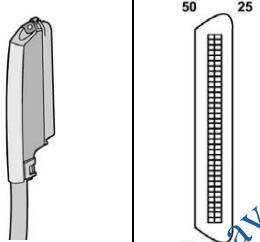
In order for the DECT terminals to work with the MBX IP system, the terminals must be registered (subscribed) to the system. For detailed instructions, refer to the DECT Installation Guide or the DECT User Guide.

THIS PAGE INTENTIONALLY LEFT BLANK.

Chapter 7

Starting the MBX IP System

Initializing Databases

The first step in starting the newly installed *MBX IP* system is initializing the databases. To perform this function, do the following procedure:

1. Verify MPB100/MPB300 has been inserted into the MPB slot of the first KSU.

   - Before programming the System, Switch 1-1 pole should be OFF and then power cycle OFF and ON to initialize the default System database.

2. Plug the AC power cord into the *MBX IP* System and AC outlet. Turn on the *MBX IP* System; after installing the 1st, 2nd and 3rd KSUs, Power-On sequence is as follows:

   - Order of Power-On Procedure: 3rd KSU ' 2nd KSU ' 1st KSU.

   - After KSU(s) have been turned-On, you have to reset the MPB100/MPB300 in the *MBX IP*1st KSU.

3. Once the database has been initialized, switch 1-1 should be placed in the ON position to protect the User database and to protect the features being programmed in Admin. programming.

4. Switch 1-2 should be placed in the ON position to feed the Lithium Battery Voltage to SRAM/RTC (protects the User Database and System Time/Date information, etc.).

Areas not reset by Database Initialization (Trans/PGM 499)

If "All of Database Initialization" is selected in PGM499, all Database items will be reset except the ones listed below:

- Nation Code
- Slot Assignment (with Logical Info)
- IP-Phone Registration
- DTIM/SLTM Registration
- IP Information of MPB
- DECT Data

If Database Protection option is selected (VM DB), VM related data will be maintained.

Basic Preprogramming

The *MBX IP* System can be programmed to meet each customer's individual need. This section contains the following topics:

- Before ADMIN programming
- Button explanation
- How to enter the programming mode
- Permanent update procedure
- How to reset the system

Before Admin. Programming

There are two ways to access and perform Admin. Programming functions:

Web ADMIN (refer to the *MBX IP* Web Admin. Programming manual)

DKTU (Station 100) Admin. Programming

All DKTU programming is conducted at Station 100 (MPB100/MPB300 DKT1 port) using a LDP-7024D, KD-36D, or LKD-30/44 digital key telephone.

Additional programming stations may be assigned (PGM 121 - FLEX 5), but only 1 DKTU can be active in the programming mode by default.

Upon entering Programming mode, Station 100 cannot operate as a normal telephone but 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. The buttons located at the side of the phone (Flexible Buttons) are used to indicate the specific data field and to enter information. If the keyset doesn't have 3 soft buttons, the [SPEED] button is used to delete the data and the [CONF] button is used to move to upper step.

Button Explanation
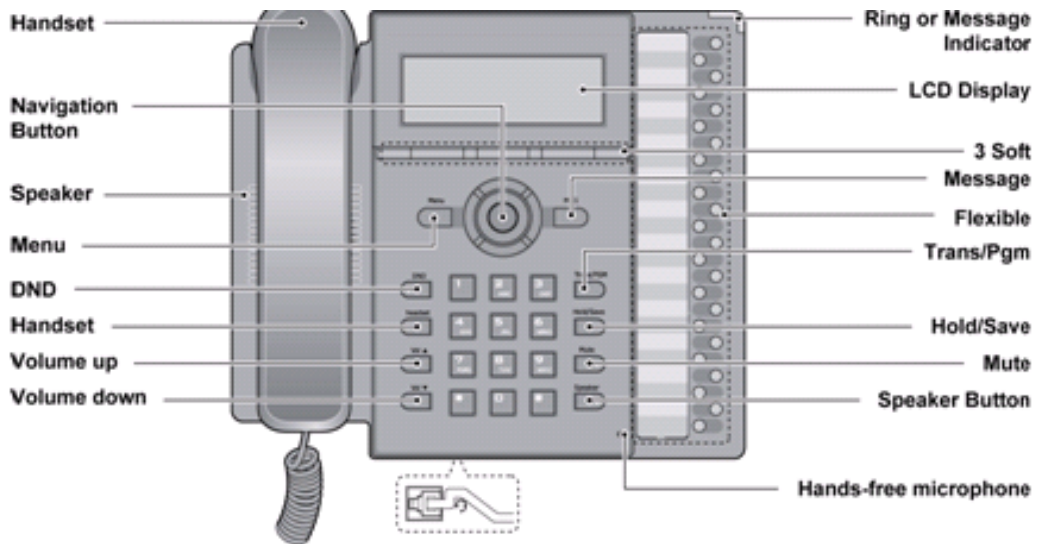
8024 Button Description

This model of an IP 8024 is a sample for the purpose of showing each button. Detailed information about specific DKTUs and other keysets is described in the Terminal Connection and Wiring Method section.

How to Enter Programming Mode

To enter programming mode, perform the following steps:

1. Lift handset or press the [MON] button on the ADMIN station; the ICM dial tone (optional) will be presented.

2. Press the [TRANS/PGM] button and dial *#; the confirmation tone will be heard.

3. Enter the ADMIN password (if applicable); the station will be in ADMIN programming mode (confirmation tone is heard).

4. Each program is accessed by pressing the [TRANS/PGM] button; the following will display:

```
Enter PGM Number
```

5. Enter the 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 the previous state while in ADMIN programming, press the [CONF] button; pressing the [CONF] button will clear the temporary data fields.

Permanent Update Procedure

To commit data entered to permanent memory, perform the following steps:

1. When data has been entered, press the [HOLD/SAVE] button to permanently store the data; if all data was entered correctly, a confirmation tone will be heard.

2. If there were any errors in the entry, an error tone will be presented and data is not stored in the permanent memory, and the terminal will return to the previous state.

How to Reset the System

To reset the system:

1. Press the [Trans/PGM] button.
2. Dial 499 (Reset System Code).
3. Press the FLEX2 button.
4. Press [HOLD/SAVE]. NOTE: The system should be reset after entering PGM100 - FLEX 1 (Nation Code Assign).

Pre-programming

LOCATION PGM-NATION CODE & SITE NAME (PGM100)

When programming, the 'MODE' switch on the MPB100/300 should be set to ON.

Nation Code

To program the Nation Code, perform the following steps:

1. Press the [Trans/PGM] button.
2. Dial 100 (Program Number).
3. Press the FLEX1 button.
4. Enter the appropriate Nation code.

Nation/Code		Nation/Code		Nation/Code		Nation/Code	
Argentina	54	Gabon	241	Libya	218	Saudi Arabia	966
Australia	61	Georgia	995	Luxembourg	352	Senegal	221
Azerbaijan	994	German	49	Malaysia	60	Singapore	65
Bahrain	973	Ghana	233	Moldova	373	South Africa	27
Bangladesh	880	Greece	30	Malta	356	Spain	34
Belarus	375	Guam	671	Mexico	52	Sri Lanka	94
Belgium	32	Guatemala	502	Monaco	377	Swaziland	268
Bolivia	591	Guyana	592	Morocco	212	Sweden	46
Brazil	55	Haiti	509	Myanmar (Burma)	95	Switzerland	41
Brunei	673	Honduras	504	Netherlands	31	Tajikistan	992
Cameroon	237	Hong Kong	852	New Zealand	64	Telkom	*27
Chile	56	India	91	Nigeria	234	Telstra	*61
China (P.R.C	86	Indonesia	62	Norway	47	Thailand	66
Colombia	57	Iran	98	Oman	968	Tunisia	216
Costa Rica	506	Iraq	964	Pakistan	92	Turkey	90
Cyprus	357	Ireland	353	Panama	507	Turkmenistan	993
Czech (Slovak)	42	Israel	972	P.N.G	675	U.A.E.	971
Denmark	45	Italy	39	Paraguay	595	Ukraine	380
Ecuador	593	Japan	81	Peru	51	United Kingdom	44
Egypt	20	Jordan	962	Philippines	63	Uruguay	598
El Salvador	503	Kenya	254	Poland	48	U.S.A	1
Ethiopia	251	Korea	82	Portugal	351	Uzbekistan	998
Fiji	679	Kuwait	965	Qatar	974	Venezuela	58
Finland	358	Kyrgyzstan	996	Rumania	40	Vietnam	84
France	33	Liberia	231	Russia	7	Y.A.R.	967

5. Press the [Hold/Save] button.

6. When finished, the reset button should be pressed to restart the System.

Site Name

To set the Site Name, perform the following Steps:

1. Press the [Trans/PGM] button.

2. Dial 100 (Program Number).

3. Press the FLEX2 button.
4. Enter the appropriate Site name (up to 23 digits, refer to character entry chart).
5. Press the [Hold/Save] button.

Character Entry Chart

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
Blank - *1 : - *2 , - *3	0-00	#

SLOT ASSIGNMENT (PGM 101)

The following items are for programming the slot numbers in use.

To set the Slot Number:

1. Press the [Trans/PGM] button.
2. Dial 101 (Program Number).
3. Enter the Slot Number that is being programmed.
4. Press the FLEX1 button.
5. Enter the Board Type code (refer to table)

STA	CODE
DSIB	11
DTIB12	12
DTIB24	13
SLIB12	14
SLIB24	15
WTIB	16
DTIM8	17
SLTM4/8	18
SLTM32	19

COL	CODE
VOIU	31
VOIB8	32
VOIB	33
LCOB4	34
LCOB8	35
LCOB12	36
PRIB	37

ETC.	CODE
VMIB	51
AAFU	53

6.   Board Type Listing
7.   Press the FLEX2 button.
8.   Enter the logical port number (2 digits, if PRIB is in use logical port assignment may apply).
9.   Press the [Hold/Save] button.

LOGICAL SLOT ASSIGNMENT (PGM 103)

The following items are for programming the logical slot numbers in use.

CO Board

To set the CO Board Slot Number:
1.   Press the [Trans/PGM] button.
2.   Dial 103 (Program Number).
3.   Press the FLEX1 button.
4.   Enter the CO Board Slot Number (00-18).
5.   Press the [Hold/Save] button.

Extension Board

To set the Extension Board Slot Number:

1. Press the [Trans/PGM] button.
2. Dial 103 (Program Number).
3. Press the FLEX2 button.
4. Enter the Extension Board Slot Number (01-18, 88 for SIP Phone, 99 for IP Phone).
5. Press the [Hold/Save] button.

VMIB Board

To set the VMIB Board Slot Number:

1. Press the [Trans/PGM] button.
2. Dial 103 (Program Number).
3. Press the FLEX3 button.
4. Enter the VMIB Board Slot Number (00-18) that is being programmed.
5. Press the [Hold/Save] button.

DECT/IP/SIP MAX PORT (PGM 104)

The following items are for programming the DECT/IP/SIP MAX Port.

MAX. Number of DECT Terminals

To program the number of DECT terminals:

1. Press the [Trans/PGM] button.
2. Dial 104 (Program Number).
3. Press the FLEX1 button.
4. Enter the DECT Number (000-192).
5. Press the [Hold/Save] button.

MAX. Number of IP Phones

To program the number of IP Phones:

1. Press the [Trans/PGM] button.
2. Dial 104 (Program Number).
3. Press the FLEX2 button.
4. Enter the number of IP Phones (000-324).
5. Press the [Hold/Save] button.

MAX. Number of SIP Phones

To program the number of SIP Phones:

1. Press the [Trans/PGM] button.
2. Dial 104 (Program Number).
3. Press the FLEX3 button.
4. Enter the number of SIP Phones (000-324).
5. Press the [Hold/Save] button.

IP-PHONE/PHONTAGE REGISTER (PGM 106)

The following items are for programming an IP Phone / Phontage.

IP Phone Mac Address

To register an IP Phone MAC Address:

1. Press the [Trans/PGM] button.
2. Dial 106 (Program Number).
3. Enter the appropriate BIN number (001-324).
4. Press the FLEX1 button.
5. Enter the IP Phone MAC Address.
6. Press the [Hold/Save] button.

IP Phone User ID

To register an IP Phone User ID:

1. Press the [Trans/PGM] button.
2. Dial 106 (Program Number).
3. Enter the appropriate BIN number (001-324).
4. Press the FLEX2 button.
5. Enter the User ID.
6. Press the [Hold/Save] button.

IP Phone User Password

To register an IP Phone Password:
1. Press the [Trans/PGM] button.
2. Dial 106 (Program Number).
3. Enter the appropriate BIN number (001-324).
4. Press the FLEX3 button.
5. Enter the User Password.
6. Press the [Hold/Save] button.

DTIM/SLIM REGISTRATION (PGM 107)

The following items are for programming a DTIM/SLIM

Gateway MAC Address

To program the Gateway MAC Address:
1. Press the [Trans/PGM] button.
2. Dial 107 (Program Number).
3. Enter the appropriate Slot number (19-56).
4. Press the FLEX1 button.
5. Enter the MAC Address.
6. Press the [Hold/Save] button.

Gateway Station Range (view only)

To view the Gateway Station Range:
1. Press the [Trans/PGM] button.
2. Dial 107 (Program Number).
3. Enter the appropriate Slot number (19-56).
4. Press the FLEX2 button.
5. Enter the MAC Address.

Gateway IP Address

To program the Gateway IP Address:

1. Press the [Trans/PGM] button.
2. Dial 107 (Program Number).
3. Enter the appropriate BIN number (19-56).
4. Press the FLEX3 button.
5. Enter the IP Address.
6. Press the [Hold/Save] button.

Gateway Firewall IP Address

To program the Gateway Firewall IP Address:

1. Press the [Trans/PGM] button.
2. Dial 107 (Program Number).
3. Enter the appropriate BIN number (19-56).
4. Press the FLEX4 button.
5. Enter the Firewall IP Address.
6. Press the [Hold/Save] button.

RTP Security

To program RTP Security:

1. Press the [Trans/PGM] button.
2. Dial 107 (Program Number).
3. Enter the appropriate BIN number (19-56).
4. Press the FLEX5 button.
5. Press 1 (ON) or 0 (OFF).
6. Press the [Hold/Save] button.

IP ADDRESS PLAN (PGM 108)

The following items are used for performing pre-programming of the System information.

NOTE: The # key can be used to skip to the next program item.

IP Address

To program the IP Address to be used, perform the following Steps:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX1 button.
4. Enter the appropriate IP Address (up to 12 digits).
5. Press the [Hold/Save] button.

Network Mask Address

To program the Network Mask address:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX2 button.
4. Enter the appropriate Network Mask Address (up to 12 digits).
5. Press the [Hold/Save] button.

Gateway IP Address

To program the Gateway IP Address:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX3 button.
4. Enter the appropriate Gateway IP Address (up to 12 digits).
5. Press the [Hold/Save] button.

Firewall IP Address

To program the Firewall IP Address:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX4 button.
4. Enter the appropriate Firewall IP Address (up to 12 digits).
5. Press the [Hold/Save] button.

DNS IP Address

To program the DNS IP Address:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX5 button.
4. Enter the appropriate DNS IP Address (up to 12 digits).
5. Press the [Hold/Save] button.

H.323 PORT

To program the H.323 PORT:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX6 button.
4. Enter the H.323 Port Number (9500-9999).
5. Press the [Hold/Save] button.

SIP PORT (0000 - 9999)

To program the SIP Port:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX7 button.
4. Enter the SIP Port Number (4 digits, 0000-9999).
5. Press the [Hold/Save] button.

DHCP Usage

To program the DHCP usage:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX8 button.
4. Enter the DHCP usage (1-ON, 2=OFF).
5. Press the [Hold/Save] button.

DiffServ

To program the Diffserv:

1. Press the [Trans/PGM] button.
2. Dial 108 (Program Number).
3. Press the FLEX9 button.
4. Enter the Diffserv Number (01-62).
5. Press the [Hold/Save] button.

SYSTEM INFORMATION DISPLAY (PGM 109)

The values presented in this section are for viewing only and cannot be modified.

NOTE: The # key can be used to skip to the next program item.

MAC Address

To view the MAC Address:

1. Press the [Trans/PGM] button.
2. Dial 109 (Program Number).
3. Press the FLEX1 button.

IPKTS Protocol Port

To view the Protocol Port:

1. Press the [Trans/PGM] button.
2. Dial 109 (Program Number).
3. Press the FLEX2 button.

Private Net Mask

To view the Private Net Mask:

1. Press the [Trans/PGM] button.
2. Dial 109 (Program Number).
3. Press the FLEX3 button.

Application Release Version

To view the Application Release Version:

1. Press the [Trans/PGM] button.
2. Dial 109 (Program Number).
3. Press the FLEX4 button.

Application Release Date

To view the Application Release Date:

1. Press the [Trans/PGM] button.
2. Dial 109 (Program Number).
3. Press the FLEX5 button.

Boot Version

To view the Boot Version:

1. Press the [Trans/PGM] button.
2. Dial 109 (Program Number).
3. Press the FLEX6 button.

Boot Release Date

To view the Boot Release Date:

1. Press the [Trans/PGM] button.
2. Dial 109 (Program Number).
3. Press the FLEX7 button.

PREFIX CODE NUMBER PLAN (PGM 111)

To program the Prefix Code Number Plan:

1. Press the [Trans/PGM] button.
2. Dial 111 (Program Number).
3. Enter the Index (001-150).
4. Press the FLEX1 button.
5. Enter the Prefix Code (4 digits).
6. Press the FLEX2 button.
7. Enter the More Digits (0-4).
8. Press the [Hold/Save] button.

STATION NUMBER EDIT (PGM 112)

The following items are for performing edit functions on Stations.

Range of Station

To edit Station Range:

1. Press the [Trans/PGM] button.
2. Dial 112 (Program Number).
3. Press the FLEX1 button.
4. Enter the new Station Range (100-423).
5. Press the [Hold/Save] button.

Station Number Input

To edit Station Number Input:

1. Press the [Trans/PGM] button.
2. Dial 112 (Program Number).
3. Press the FLEX2 button.
4. Enter the Index (001-648).
5. Enter the Station Number
6. Press the [Hold/Save] button.

FEATURE CODE SETTING (PGM 113)

To set the Feature Code, perform the following:

1. Press the [Trans/PGM] button.
2. Dial 113 (Program Number).
3. Enter the Button Number (01-91).
4. Enter the Code.
5. Press the [Hold/Save] button.

Feature Code Index (PGM 113)

BUTTON	ITEM	DEFAULT VALUE (Numbering Plan Type 1)
1	Attendant Call	0
2	Conference Room 1	571
3	Conference Room 2	572
4	Conference Room 3	573
5	Conference Room 4	574
6	Conference Room 5	575
7	Conference Room 6	576
8	Conference Room 7	577
9	Conference Room 8	578
10	Conference Room 9	579
11	Internal Page	543
12	Personal VM Page	544
13	Announcement Page For Attendant	545
14	Page Auto Answer	546
15	Internal Page Answer (Meet-Me Page)	547
16	External Page	548
17	Internal-External Page All	549
18	Call Forward Register	554
19	Pilot Hunt Call Forward Register	514
20	Pilot Hunt Call Forward Cancel	515
21	DND Status Change	516
22	DND Delete	517
23	Account Code	550
24	CO Flash	551
25	Last Number Redial	552
26	Station Speed PGM	553
27	Speed Dial	555
28	MWI Register	556
29	MWI Answer	557
30	MWI Cancel	559
31	Call Back Register	518
32	Call Back Cancel	519
33	Group Call Pickup	566

BUTTON	ITEM	DEFAULT VALUE (Numbering Plan Type 1)
34	Direct Call Pickup	7
35	Walking COS	520
36	Call Parking Location	541
37	PGM Mode Access	521
38	Two-Way Record	522
39	VMIB Access	523
40	AME Access	524
41	CO Line Access	88
42	VM MWI Enable	*8
43	VM MWI Cancel	*9
44	MCID Request	*0
45	Unsupervised Conf Extend	5##
46	PTT Group Access	538
47	Hot Desk Log In/Log out	525
48	Name Register	526
49	Create Conf Room	527
50	Delete Conf Room	528
51	Wake Up Register	529
52	Wake Up Cancel	530
53	Temporarily COS Down	531
54	Cancel Temp COS Down	532
55	Password Change	533
56	Inter-Phone Group Access	534
57	Call Wait Request	535
58	Preselected MSG PGM	536
59	Forced Handsfree Call	537
60	Call Based CLIR	582
61	CLIR Access	583
62	COLR Access	584
63	Pilot Hunt Call	585
64	Command Call Oneway	581
65	Command Call Conf	580
66	Intrude Register	589
67	Camp On Register	590

BUTTON	ITEM	DEFAULT VALUE
		(Numbering Plan Type 1)
68	OHVO Register	591
69	Mobile Num Register	592
70	Mobile CLI Register	593
71	Mobile Access	594
72	CCR Access	670
73	CCR Access And Drop	671
74	System Hold	560
75	Return Held CO	8**
76	Sys Memo	675
77	DISA Tone Service	678
78	All Feature Cancel	679
79	Add Conf Member	680
80	System Alarm Reset	565
81	Fault Alarm Reset	564
82	Door Open	#*1
83	Keypad Facility	##*
84	T-Net Log-In/Out	586
85	Universal Answer	587
86	USB Call Record	588
87	Delete All VM Message	681
88	VM Page Message Record	682
89	Direct VM Transfer	683
90	Loop Key	684
91	Call Log	685

CO GROUP ACCESS CODE (PGM 114)

The following items are for performing edit functions on CO Group Access Codes.

Range of CO Group Access Code

To edit Station Range:
1. Press the [Trans/PGM] button.
2. Dial 114 (Program Number).
3. Press the FLEX1 button.
4. Enter the new CO Group Access Code Range (801-872).
5. Press the [Hold/Save] button.

CO Group Access Code Input

To edit CO Group Access Code Input:

1. Press the [Trans/PGM] button.
2. Dial 114 (Program Number).
3. Press the FLEX2 button.
4. Enter the Index (01-73).
5. Enter the CO Group Access Code
6. Press the [Hold/Save] button.

STATION GROUP NUMBER (PGM 115)

The following items are for performing edit functions on Station Group Number.

Range of Station Group Number

To edit Station Range:

1. Press the [Trans/PGM] button.
2. Dial 115 (Program Number).
3. Press the FLEX1 button.
4. Enter the new Station Group Number Range (620-669).
5. Press the [Hold/Save] button.

Station Group Number Input

To edit Station Group Number Input:

1. Press the [Trans/PGM] button.
2. Dial 115 (Program Number).
3. Press the FLEX2 button.
4. Enter the Index (01-50).
5. Enter the Station Group Number
6. Press the [Hold/Save] button.

Troubleshooting

Symptons & Solutions

A list of problems and solutions that your may encounter when using the *MBX IP* system.

PROBLEM	CAUSE/SYMPTOM	SOLUTION
Hardware		
System power failure	AC Power Fail	• Check the AC Power source. • Check the Inlet fuse and PSU Fuse • Check LD21,LD22 on MB/MBE - Replace the PSU with a good one.
	+5V, +30V Fail	• Check MPB board was installed and verify which board has a short circuit by extracting the boards one by one
	LD4 LED OFF on the MPB	• Check DC Output status on MB
System does not operate	Power short circuit in some board(s)	• Check the connection of each board with the MPB. • Check the PSU. Check a short circuit on the MPB or other boards. • Press the Reset button when the DIP switch (SW1 for database protection) is in the default position.
	Bad board connection	
	System database not working	
	MPB Operation	• Check MPB status and SW1 position
SLT does not operate	Bad DSIU/SLIB12/SLIB24/ SLIB12C/SLIB24C	• Exchange the board with one in good working condition.
	Bad connection between the DSIU/SLIB12/SLIB24/ SLIB12C/SLIB24C and SLT	• Check that the board connection between the lines of the SLT and DKT on the MDF, and fix any mismatching.

PROBLEM	CAUSE/SYMPTOM	SOLUTION
Hardware		
DKT does not operate	Bad DTIB circuit	• Exchange the malfunctioning board by one in good working condition.
	Bad connection between the DSIU /DTIB12/DTIB24/DTIB12C/DTIB24C and DKT Terminals	• Check the connection between the SLT and DKT line on MDF, and fix any mismatching. • Repair any broken connection between the Board and DKTs.
	Installation Distance of DKT and System	• Check the maximum distance between the DSIU/DTIB12/DTIB24/ DTIB12C/DTIB24C and the DKT
	Bad DKT	• Plug the DKT into another extension port that has been verified as working. If the DKT still does not work properly, replace the DKT.
CO line operation failure	CID/Tone Detection Fail	• Check the U12/U63 (Voice processing and Tone detection device) and MPB.
	Bad connection	• Check all connections.
Expansion KSU does not operate	Power ON sequence	• Turn on the Basic KSU after turning on the Expansion KSU. Then press the Reset button
	Expansion cable connection	• Check Expansion cable to verify the connection and its working condition.
	2nd KSU, 3rd KSU PSU OFF	• Check 1st KSU for Power OFF
Noise on External MOH (Music on Hold) and Paging port	Induced noise on the wire between the System and the amplifier	• Make sure a shielded cable is in use as the connection wire between the system and the amplifier.
	Excessive input level from the external music source	• Decrease the output level of the external music source by using the volume control on the music source.

Chapter 9

Hotel - Property Management System (PMS)

Introduction

The Hotel package supports features for a hotel in which services range from Check-In to Check-Out (e.g., hotel, condominium). To use the hotel package more easily, the PMS (Property Management System) solution can be used.

Through the PMS interface, the computer system can be connected to the *MBX IP* through the LAN and used to manage the overall hotel features.

The computer system provides a user-friendly and easier interface for the administrator to use the hotel feature in a more efficient way.

PMS includes the following features:

- Check in / check out notification
- Room move
- Guest information support for name and language
- Class of service handling (bar / unbar an extension)
- Room status
- Voice mail notification from the *MBX IP* system
- Message lamp handling
- Do not disturb handling
- Simple posting of phone charges based on total amount
- Minibar charge by total and by article number
- Wake up calls handling

The interface works with the following MICROS-Fidelio PMS versions:

- Suite8 PMS version 8.6.x and up
- OPERA Suite PMS version 4.0.04.x and up
- OPERA Suite PMS version 5.0.x and up

Configuration

The figure below illustrates a configuration diagram of the general Hotel function:
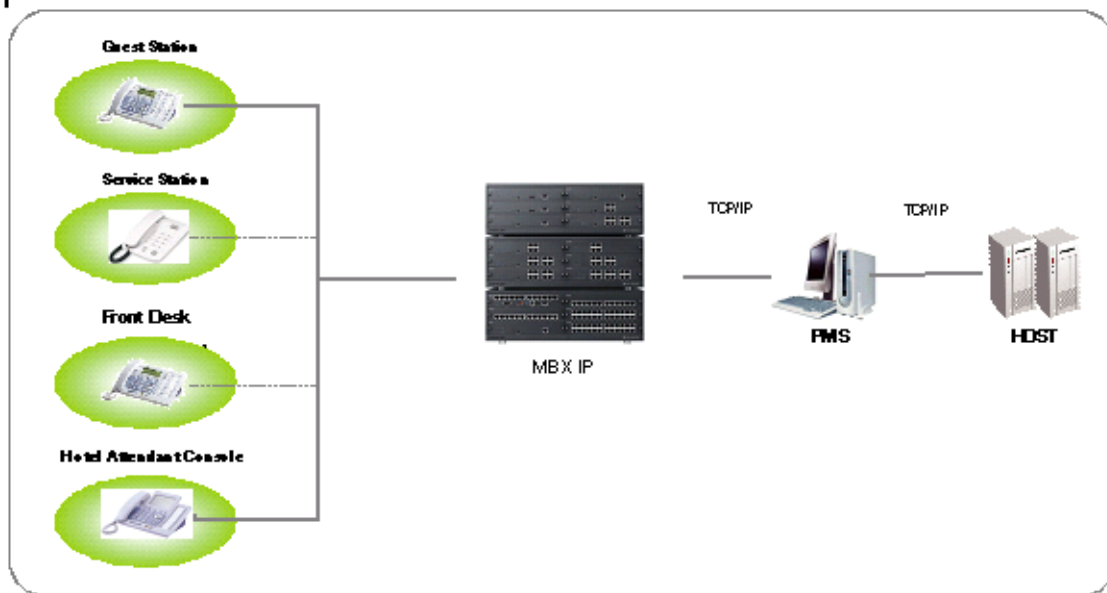
1. **PMS --** PMS receives information such as room status from *MBX IP*, and delivers it to the HOST**,** and receives information from the HOST, and delivers it to the *MBX IP* system.

   Max. number of available PMSs is 2 (LAN 2EA). Usually, only one PMS is connected for operation, and the other is for redundancy and backup solution.

   NOTE: Information, such as guest information and wakeup call registration information entered in front desk which should be delivered to PMS immediately upon registration, is simultaneously transmitted to all connected PMSs.

2. **Guest Station** -- Guest station is a phone used in a hotel room, and all types of stations are available.

   NOTE: Guest station belongs to one group of PMS Group upon Check-in, and it belongs to PMS Group '0' if not assigned. PMS Group is used to restrict a call service between the PMS Groups.

3. **Front Desk --** the Front Desk terminal provides guest data management service such as Check-in**.**

4. **Service Station --** is used in accommodation facilities (e.g., laundry, restaurant) in a hotel, except room, and this terminal can call guest stations without restriction.

Precaution

1. Usually, the LAN connected to the system should be separated from the Intranet in order to operate the system in a more stable manner.

2. If hotel service type is front desk, hotel PMS-related information can be programmed through the personal web and the changed information is sent to the PMS.

3. To remove any overload in the system due to the messages from the PMS, PMS should send a message at the minimum interval of 200ms.

PMS Connection Spec

1. LAN connection system spec:

   10/100 Base-T Ethernet

2. Server/Client:

   MBX IP acts as a server and the PMS program as a client.

3. Logic Connection Port

   (Tx/Rx is used from the system's point of view.)

   SMDA1 (LAN1) - 6016(Tx), 6018(Rx)

   SMDA2 (LAN2) - 6017(Tx), 6019(Rx)

4. Flow control

   In case there are multiple messages to send, the TX side should send each message one by one. After one message is sent, it must wait for the Answer message to be received. Answer message can be ACK or NAK. If an ACK message is received, the TX side can send the next message. But if a NAK message is received or there is a no Answer message for 7 seconds, the TX side should retransmit the message. The TX side retries 4 times for the unanswered message. If the retry count overflows, the current connection is closed and a new connection should be re-established.
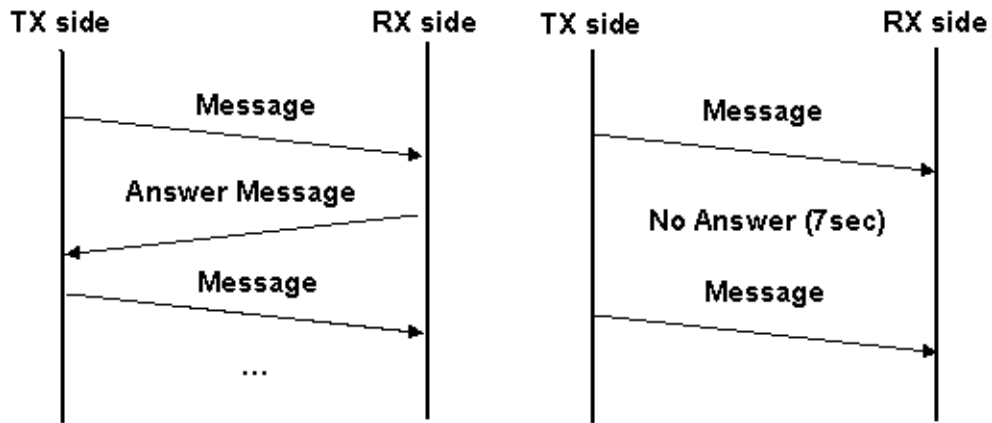
Flow Control Diagram

5. Link Check Mechanism

To check if the link is alive, the *MBX IP* system sends a Link Check message every 5 seconds. The client should respond to this message with an ACK message. If there is no Answer message for 3 seconds, the *MBX IP* system retransmits the Link Check message. If the client (PMS program) does not receive a message for 20 seconds, the connection is closed and a new connection should be re-established.

PMS Message

The message exchanged between the PMS and the system is divided into Header and Body.

The Header is used in all messages in common, and the Body depends on the message type and the feature code.

All messages are Little Endian.

General Message Format

The following shows the general message format used in PMS.

Byte Order	Contents	Remarks
0 1	Message Length (Low) (High)	0x0006 -0x01FF
2	Packet Sequence Number	0x00 - 0xFF
3	Type	0x00 or 0x01
4	Feature Code	0x00 - 0xFF
5	Direction	0x00 or 0x01
6 - n	Data Field	

Header, Message Length, Body

General Message Format

Message Length:

Little Endian

Min -   6 Bytes (0x0006)

Max -   511 Byte (0x01ff)

Packet Sequence Number:

It is used to check if duplicated message is received, and for debugging.

If the current Packet Sequence Number and the previous Packet Sequence Number are equal, the current message is removed.

Type:

0x00 - non-PMS

0x01 - PMS

Feature Code:

It means unique ID for the message type.

It is used to check if the client is properly connected to the system.

0x00   Answer Back Check message

Hotel PMS feature codes (0x20-0xFF) are defined as follows:

0x20   Check In

0x21   Check Out

0x22   WakeUp

0x23   WakeUp Result Report

0x24   Maid Status

0x25   Room CutOff

0x26   Mini Bar

0x27   DND

0x28   Message Wait

0x29   Room Swapping

0x2A   Guest Info Display Request

0x2B   Guest Info Display Request Result

Direction:

0x00 - MBX IP $\rightarrow$ PMS

0x01 - MBX IP $\leftarrow$ PMS

Data Field:

Unique data by function

ACK/NAK MESSAGE

The Answer message can be either ACK or NAK message as follows.

Byte Order	Contents	Data or Range
0	Message Length	0x06
1		0x00
2	Packet Sequence Number	0x00 - 0xFF
3	Type	0x01
4	Feature Code	0x20 - 0xFF
5	Direction	0x00 - 0x01

ACK Message Format

Packet Sequence Number:

Packet Sequence Number of the received message

Feature Code:

Feature Code of the received message

Byte Order	Contents	Data or Range
0 1	Message Length	Original message length + 7
2	Packet Sequence Number	0x00 - 0xFF
3	Type	0x01
4	Feature Code	0xA0
5	Direction	0x00 - 0x01
6	Error Code	0x01 - 0xFF
7	Data	Original message

<u>NAK Message Format</u>

Message Length:

Original message length + 7

Packet Sequence Number:

Packet Sequence Number of the received message

Feature Code:

0xA0 - Message Parameter Error

Error Code:

Message Parameter Error

Error Code	Contents
0x01	Start Phone Number does not exist
0x02	End Phone Number does not exist
0x03	Invalid Function Code
0x04	Invalid Length
0x05	Invalid Input Location
0x06	Invalid Guest Grade (Check-in)
0x07	Invalid Toll Check Class (Check-in)
0x08	Invalid Digit Trans Class (Check-in)
0x09	Invalid Wake Up Type (Wake Up)
0x0A	Invalid Wake Up Time (Wake Up)
0x0B	Invalid Room Cuf Off Status (Room Cut Off)
0x0C	Invalid DND Status (DND)
0x0D	Invalid Message Wait Status (Message Wait)
0x0E	Telno Range Error (Start > End, except Room Swapping)
0x0F	Invalid CheckIn Status (Room Swapping)
0x10	DB Retrieve Error

Error Code Table

Link Check Message

Link Check message is used to check if the link or the client is in normal status.

MBX IP sends Link Check message every 5 seconds and the device should respond with an Answer message to system. Link Check message can be simply discarded after sending Answer message.

Byte Order	Contents	Data or Range
0	Message Length	0x06
1		0x00
2	Packet Sequence Number	0x00-0xFF
3	Type	0x00
4	Feature Code	0x00
5	Direction	0x00

Link Check Message Format

PMS Messages

Byte Order	Contents		Value & Description
0 1	Message Length (Low) (High)		0x29 (41) 0x00
2	Packet Sequence Number		0x00 - 0xff
3	PMS Type		0x01
4	Feature Code		0x20
5	Direction		0x00 (MBX IP → PMS) 0x01 (MBX IP ← PMS)
6 - 9	Room Telephone Number (Start)	1 2 3 4	Exe1) 1234 Exe2) 1200 0x12 0x12 0x34 0xAA 0xFF 0xFF 0xFF 0xFF
10 - 13	Room Telephone Number (End)	1 2 3 4	0xFFFFFFFF, if phone number does not exist.
14	Guest Grade		0x01: VIP 0x02: Non-VIP
15	Language ID		0x00 : English 0x01 : Italian 0x02 : Finnish 0x03 : Dutch 0x04 : Swedish 0x05 : Danish 0x06 : Norwegian 0x07 : Hebrews 0x08 : German 0x09 : French 0x0A : Portuguese 0x0B : Spanish 0x0C : Korean 0x0D : Estonian 0x0E : Russian

Byte Order	Contents	Value & Description
16	Toll Check Class	0x01 - 0x40
17	Digit Trans Class	0x01 - 0x40
18 - 32	Guest Name 1 - 15	0 (NULL) if name does not exist.

33 - 34	PMS Group Number
	
	1
	2
		0x00 means that Group does not exist.
		0x0001 - 0x2710(10000) (little endian)
		Ex)1 10000
		  0x01 0x10
		  0x00 0x27

35 - 39	Check Out Time
	
	1
	
	-
	
	5
		YYYY/MM/DD/HH(year/month/day/hour)
		0xFF if time does not exist.
		Ex) 2009/10/2/14
		  0x14
		  0x09
		  0x0A
		  0x02
		  0x0E

40	Input Location	0x01 : PMS 0x02 : Hotel Attendant 0x03 : Front Desk D-TEL 0x04 : WEB ADMIN

Check In

Byte Order	Contents	Value & Description
0 1	Message Length (Low) (High)	0x0F (15) 0x00
2	Packet Sequence Number	0x00 - 0xff
3	PMS Type	0x01
4	Feature Code	0x21
5	Direction	0x00 (MBX IP → PMS) 0x01 (MBX IP ← PMS)

6 - 9	Room Telephone Number
	
	                                1
	             (Start) 2
	                                3
	                                4
		Exe1) 1234 Exe2) 1200
		    0x12 0x12
		    0x34 0xAA
		    0xFF 0xFF
		    0xFF 0xFF

10 - 13	Room Telephone Number
	
	                                1
	              (End) 2
	                                3
	                                4
		0xFFFFFFFF, if phone number does not exist.

14	Input Location	0x01: PMS 0x02: Hotel Attendant 0x03: Front Desk D-TEL 0x04: WEB ADMIN

Check Out

Byte Order	Contents	Value & Description
0 1	Message Length (Low) (High)	0x12(18) 0x00
2	Packet Sequence Number	0x00 - 0xff
3	PMS Type	0x01
4	Feature Code	0x21
5	Direction	0x00 (MBX IP → PMS) 0x01 (MBX IP ← PMS)
6 - 9	Room Telephone Number 1 (Start) 2 3 4	Exe1) 1234 Exe2) 1200 0x12 0x12 0x34 0xAA 0xFF 0xFF 0xFF 0xFF
10 - 13	Room Telephone Number 1 (End) 2 3 4	0xFFFFFFFF if phone number does not exist
14	Wake Up Type	0x00 : Cancel 0x01 : once 0x02 : every day
15 - 16	Wake Up Time 1 2	HH:MM HH MM
17	Input Location	0x01 : PMS 0x02 : Hotel Attendant 0x03 : Front Desk D-TEL 0x04 : WEB ADMIN 0x05 : General Station

Wake Up Registration

Byte Order	Contents	Value & Description
0 1	Message Length	0x0D (13) 0x00
2	Packet Sequence Number	0x00 - 0xff
3	PMS Type	0x01
4	Feature Code	0x023
5	Direction	0x00 (MBX IP → PMS)

6 - 9	Room Telephone Number
	               1
	               2
	               3
	               4
			Exe1) 1234 Exe2) 1200
			    0x12 0x12
			    0x34 0xAA
			    0xFF 0xFF
			    0xFF 0xFF

10	Wake Up Service Result	0x00 : Answer 0x01 : No-Answer 0x02 : Busy

11 - 12	Wake Up Time
	               1
	               2
			HH:MM
			HH
			MM

Wake Up Result

Byte Order	Contents	Value & Description
0 1	Message Length	0x14 (20) 0x00
2	Packet Sequence Number	0x00 - 0xff
3	PMS Type	0x01
4	Feature Code	0x24
5	Direction	0x00 (MBX IP → PMS)

6 - 9	Room Telephone Number
	        1
	        2
	        3
	        4
		Exe1) 1234 Exe2) 1200
		   0x12 0x12
		   0x34 0xAA
		   0xFF 0xFF
		   0xFF 0xFF

10	Maid Status Code	0x01 : To Be Cleaned 0x02 : Under Cleaning 0x03 : Ready For Sell(Cleaned up) 0x04 : Out Of Service 0x05 : Under Repair 0x06 : Repair Completed 0x07 : Room Occupied

11 -16	Registered Date & Time
	        1
	        2
	        3
	        4
	        5
	        6
		YYYY/MM/DD/HH:MM
		YY
		YY
		MM
		DD
		HH
		MM

17 - 18	Maid ID	0x0000 ~ 0xFFFF
19	Input Location	0x01 : PMS 0x02 : Hotel Attendant 0x03 : Front Desk D-TEL 0x04 : WEB ADMIN 0x05 : Guest Station

Maid Status Registration

Byte Order	Contents		Value & Description
0 1	Message Length		0x12 (18) 0x00
2	Packet Sequence Number		0x00~0xff
3	PMS Type		0x01
4	Feature Code		0x24
5	Direction		0x00 (MBX IP → PMS)

6 ~ 9	Room Telephone Number
	
	(Start)
		1
		2
		3
		4
			Exe1) 1234 Exe2) 1200
			  0x12 0x12
			  0x34 0xAA
			  0xFF 0xFF
			  0xFF 0xFF

10 ~ 13	Room Telephone Number (End)	1 2 3 4	0xFFFFFFFF if phone number does not exist
14	Cut-Off Status		0x00 : Room Cut-Off Cancel Request 0x01 : Room Cut-Off Register Request
15	Toll Check Class		Same as Check In
16	Digit Trans Class		Same as Check In
17	Input Location		0x01 : PMS 0x02 : Hotel Attendant 0x03 : Front Desk D-TEL 0x04 : WEB ADMIN

Room Cut Off

Byte Order	Contents		Value & Description
0 1	Message Length		0x0E (14) 0x00
2	Packet Sequence Number		0x00 - 0xff
3	PMS Type		0x01
4	Feature Code		0x26
5	Direction		0x00 (MBX IP → PMS)
6 - 9	Room Telephone Number	1 2 3 4	Exe1) 1234 Exe2) 1200 　0x12　　0x12 　0x34　　0xAA 　0xFF　　0xFF 　0xFF　　0xFF
10 - 11	Item ID	1 2	0x00 - 0xffff
12 -13	Total number of Item ID used	1 2	0x00 - 0xffff

Mini Bar Service

Byte Order	Contents		Value & Description
0 1	Message Length		0x10 (16) 0x00
2	Packet Sequence Number		0x00 - 0xff
3	PMS Type		0x01
4	Feature Code		0x27
5	Direction		0x00 (MBX IP → PMS) 0x01 (MBX IP ← PMS)

6 - 9	Room Telephone Number
	
	(Start
		1
		)2
		3
		4
			Exe1) 1234 Exe2) 1200
			   0x12 0x12
			   0x34 0xAA
			   0xFF 0xFF
			   0xFF 0xFF

10 - 13	Room Telephone Number (End)	1 2 3 4	0xFFFFFFFF if phone number does not exist
14	DND Status		0x00 : DND Register Cancel 0x01 : DND Register
15	Input Location		0x01 : PMS 0x02 : Hotel Attendant 0x03 : Front Desk D-TEL 0x04 : WEB ADMIN 0x05 : Guest Station

DND Service

Byte Order	Contents	Value & Description
0 1	Message Length	0x10 (16) 0x00
2	Packet Sequence Number	0x00 - 0xff
3	PMS Type	0x01
4	Feature Code	0x28
5	Direction	0x00 (MBX IP → PMS) 0x01 (MBX IP ← PMS)

6 - 9	Called Room Telephone No.
	
	           1
	           2
	           3
	           4
		Exe1) 1234 Exe2) 1200
		   0x12 0x12
		   0x34 0xAA
		   0xFF 0xFF
		    0xFF 0xFF

10 - 13	Calling Room Telephone No.
	
	           1
	           2
	           3
	           4
		0xFFFFFFFF if phone number does not exist

14	Message Status	0x00: Message / VMS Message Wait Register Cancel 0x01: Message Wait Register 0x02: VMS Message Wait Register
15	Input Location	0x01: PMS 0x02: Hotel Attendant 0x03: Front Desk D-TEL

Message Wait Service

Byte Order	Contents	Value & Description
0 1	Message Length	0x0E (14) 0x00
2	Packet Sequence Number	0x00~0xff
3	PMS Type	0x01
4	Feature Code	0x29
5	Direction	0x00 (MBX IP → PMS) 0x01 (MBX IP ← PMS)

6 - 9	Room Telephone Number
	1
	(Before Swapping)
	2
	3
	4
		Should be Check-in number.
		Exe1) 1234 Exe2) 1200
		    0x12 0x12
		    0x34 0xAA
		    0xFF 0xFF
		    0xFF 0xFF

10 - 13	Room Telephone Number 1 (After Swapping) 2 3 4	Should be Check-out number.

Room Swapping

Byte Order	Contents		Value & Description
0 1	Message Length		0x0E (14) 0x00
2	Packet Sequence Number		0x00~0xff
3	PMS Type		0x01
4	Feature Code		0x2A
5	Direction		0x00 (MBX IP → PMS)
6 - 9	Front Desk Telephone No.	1 2 3 4	Exe1) 1234 Exe2) 1200 0x12 0x12 0x34 0xAA 0xFF 0xFF 0xFF 0xFF
10 - 13	Room Telephone No. (Guest)	1 2 3 4	

<u>Guest Information Display Request</u>

NOTE: If PMS requests this message, it may cause overload in the system. In other words, PMS loads
information about all subscribers or tens of subscribers at the same time.

To prevent instantaneous overload, load information at intervals of 200ms, at least.

Byte Order	Contents		Value & Description
0 1	Message Length (Low) (High)		0x39 (57) 0x00
2	Packet Sequence Number		0x00~0xff
3	PMS Type		0x01
4	Feature Code		0x2B
5	Direction		0x00 (MBX IP → PMS) 0x01 (MBX IP ← PMS)
6 - 9	Front Desk Telephone No.	1 2 3 4	Same as Guest Information Display Request
10 - 13	Room Telephone No. (Guest)	1 2 3 4	Same as Check In
14	Guest Grade		Same as Check In
15	Language ID		Same as Check In
16	Toll Check Class		Same as Check In
17	Digit Trans Class		Same as Check In
18 - 32	Guest Name	1 - 15	0 (NULL) if name does not exist.
33 - 34	Group Number	1 2	Same as Check In
35 - 39	Check Out Time	1 - 5	Same as Check In

Byte Order	Contents		Value & Description
40 - 44	Check In Time	1 - 5	Same as Check Out Time
45	Country		0x00 - 0xFF
46	Guests in total		0x00 - 0x63 (0 - 99)
47	Messasge Wait Status		Same as Message Wait Service
48 - 51	Message Wait Calling Room Telephone No.	1 2 3 4	Same as Message Wait Service
52	Room Cut Off Status		Same as Room Cut Off Service
53	DND Status		Same as DND Service
54	Wake Up Type		Same as Wake Up Service
55 - 56	Wake Up Time		Same as Wake Up Service

Guest Information Display Request Result

Byte Order	Contents		Value & Description
0 1	Message Length (Low) (High)		0x10 - 0x1E (16 - 30) 0x00
2	Packet Sequence Number		0x00 - 0xff
3	PMS Type		0x01
4	Feature Code		0x2C
5	Direction		0x01 (MBX IP ← PMS)
6 - 9	Room Telephone Number (Start)	1 2 3 4	
10 - 13	End Room Telephone Number (End)	1 2 3 4	0xFFFFFFFF if phone number does not exist
14	Item		0x01 : Guest Grade 0x02 : Language ID 0x03 : Toll Check Class 0x04 : Digit Trans Class 0x05 : Guest Name 0x06 : Group Number 0x07 : Check Out Time
15 - 29	Change Value		Refer to Check In

Check-In Information Change

Index

T

U

V

W