



MBX IP™

Hardware & Installation Guide



VERTICAL

THIS PAGE INTENTIONALLY LEFT BLANK.

Vertical Communications, Inc. reserves the right to revise this publication and to make changes in content without notice.

© 2010 by Vertical Communications, Inc. All rights reserved.

This publication contains proprietary and confidential information of Vertical Communications, Inc. The contents of this document may not be disclosed, copied or translated by third parties, in any form, or by any means known, or not now known or conceived, without prior explicit written permission from Vertical Communications, Inc.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY

Vertical Communications, Inc. makes no representation or warranties with respect to the accuracy or completeness of the content of this publication and specifically disclaims any implied warranty of merchantability or fitness for any particular purpose, and shall not be liable for any loss of profit or any other commercial damage, including but not limited to, special, incidental, or consequential.

TRADEMARKS

Vertical Communications and the Vertical Communications logo and combinations thereof are trademarks of Vertical Communications, Inc. All other brand and product names are used for identification only and are the property of their respective holders.

RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure of the technical data contained in this document by the Government is subject to restrictions as set forth in subdivision (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 52.227-7013 and/or in similar or successor clauses in the FAR, or in the DOD or NASA FAR Supplement. Unpublished rights reserved under the Copyright Laws of the United States. Contractor/manufacturer is Vertical Communications, Inc., 10 Canal Park, Suite 602, Cambridge, MA 02141-2249.

REVISION HISTORY

Release	Date	Documentation Changes	Page No.
1.0	07-10	Initial Release	--

Contents

Chapter 1 Introduction

Important Safety Instructions	1-1
Safety Requirements	1-1
Precaution	1-2
Disposal of Old Appliance	1-3
Manual Usage	1-4

Chapter 2 System Overview

MBX IP System Highlights	2-1
System Connection Diagram	2-2
System Components	2-3
Specifications	2-4
General Parameters	2-4

Chapter 3 KSU Installation

Pre-Installation	3-1
Safety Installation Instructions	3-1
Installation Precautions	3-1
Wiring Precautions	3-2
Basic Key Service Unit (BKSU) Unpacking	3-3
Expansion Key Service Unit (EKSU) Unpacking	3-4
KSU Diagram, Exterior and Dimension	3-5
Motherboard (MB) & Motherboard Expansion (MBE) Diagrams	3-6
Power Supply Unit Installation	3-8
Frame Ground Connection	3-10
External Backup Battery Installation	3-11
Types of Connectors	3-12
KSU Mounting	3-13
Expansion KSU Installation	3-16
Using Expansion Cable	3-16
Mounting	3-17

Chapter 4 Board Installation

Installing the Boards	4-1
-----------------------	-----

	Main Processing Board	4-2
	MPB 100/300	4-2
	CO Line Boards	4-14
	LCOB4/8/12 (Loop Start CO Line Interface Board)	4-14
	PRIB (Primary Rate Interface Board)	4-21
	Extension Boards	4-25
	SLIB12/24C (with RJ21 connector)	4-25
	DTIB12C/24C (with RJ21 connector)	4-30
	Function Boards	4-35
	VMIB (Voice Mail Interface Board)	4-35
	VOIB8/24 (Voice over Internet Protocol Board 8ch./24ch.)	4-40
	Serial to Audio Jack Cable Specification	4-44
Chapter 5	Terminal Connection and Wiring Method	
	Terminal and Door Phone Models	5-1
	Terminal Cabling Distance	5-2
	Basic Terminal Connection	5-3
	IP 8000 DSS Installation	5-9
	Connecting Additional Terminals	5-10
	Cable Wiring	5-11
	Wall Mount Wiring	5-11
	Rack Mount Wiring	5-12
Chapter 6	DECT Installation	
	Introduction	6-1
	DECT Installation	6-3
	Board Installation	6-3
	Ferrite Core Installation and Wiring	6-11
	User Subscription/Unsubscription	6-13
Chapter 7	Starting the MBX IP System	
	Initializing Databases	7-1
	Basic Preprogramming	7-1
	Before Admin. Programming	7-2
	Button Explanation	7-2

	How to Enter Programming Mode - - - - -	7-3
	Permanent Update Procedure - - - - -	7-3
	How to Reset the System - - - - -	7-3
	Pre-programming - - - - -	7-4
Chapter 8	Troubleshooting	
	Symptoms & Solutions - - - - -	8-1
Index		

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

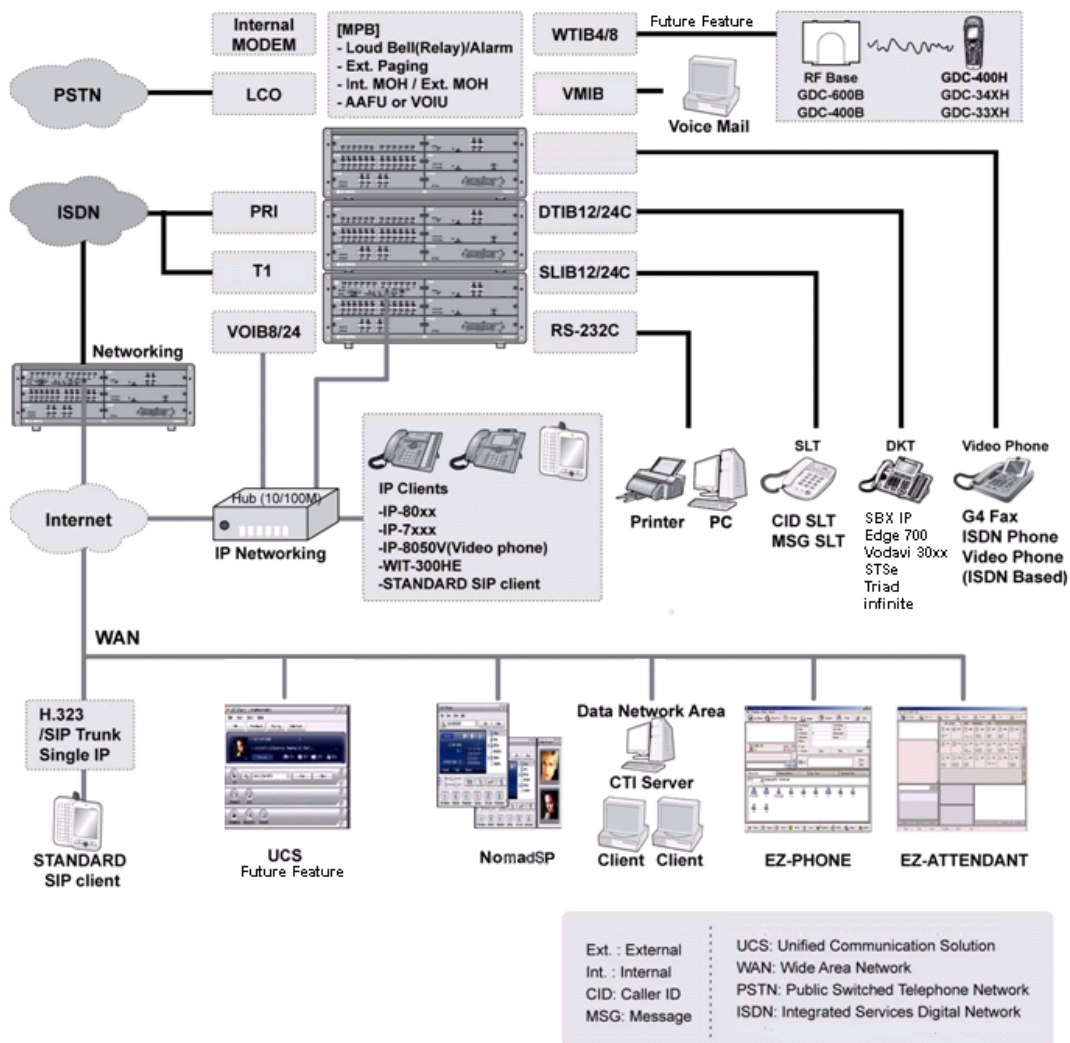
MBX IP System Highlights

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

MBX 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

MBX 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

Chapter 3

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.

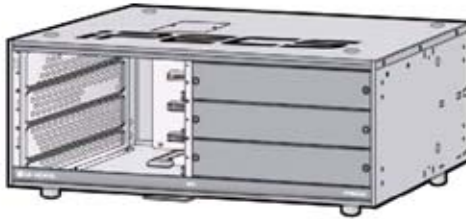
Wiring Precautions

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



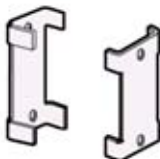
Expansion Cable



Power Cord



Backup Battery Cable



Fastener

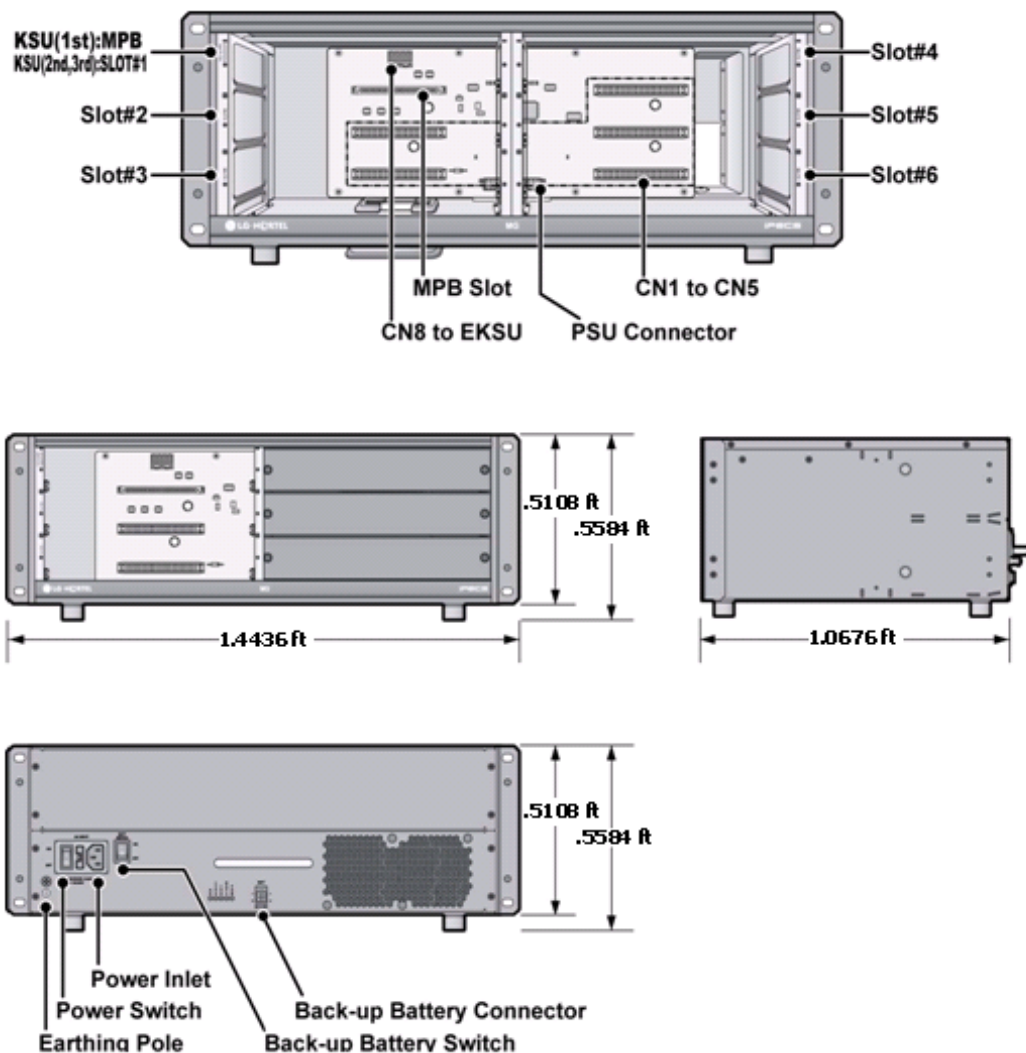


Screw

EKSU Carton Contents

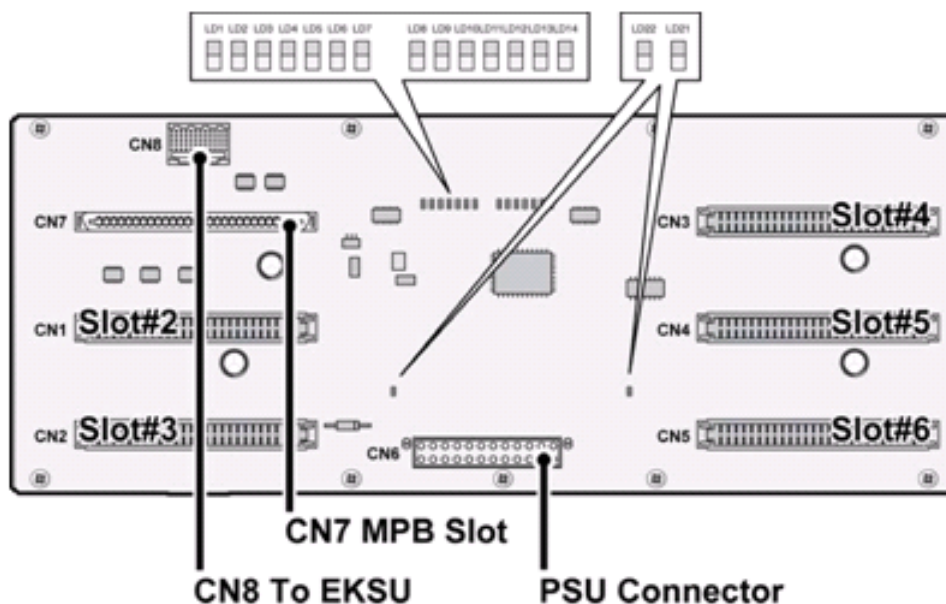
KSU Diagram, Exterior and Dimension

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



KSU Exterior and Dimension

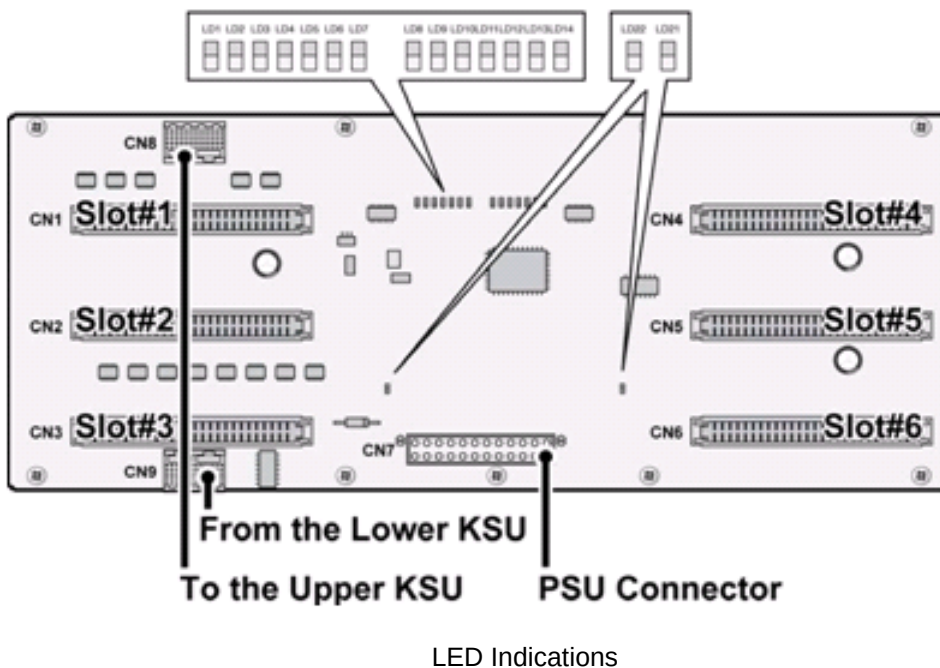
Motherboard (MB) & Motherboard Expansion (MBE) Diagrams



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	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).

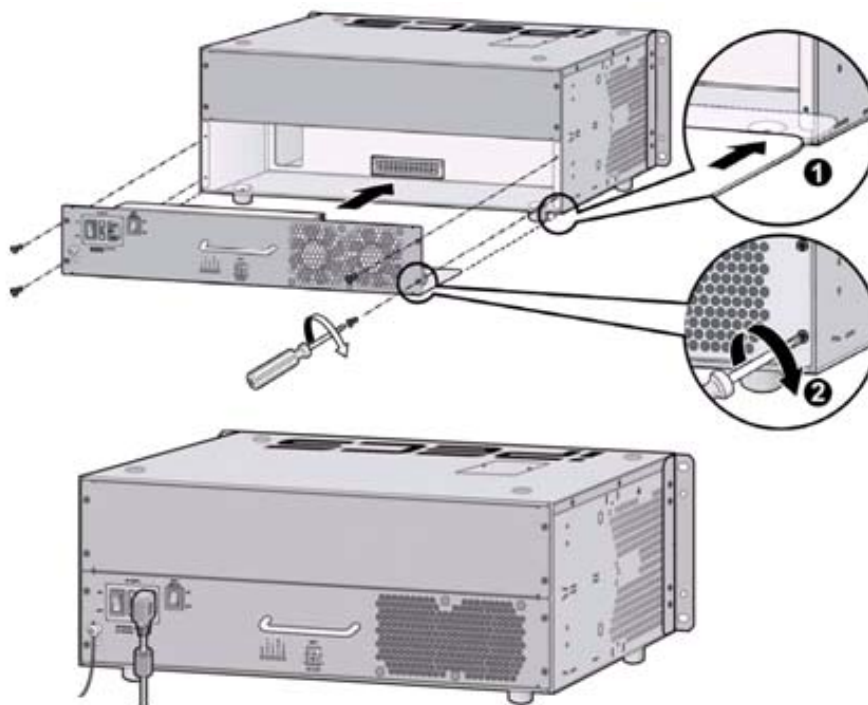
AC Input Voltage and Fuse Rating

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

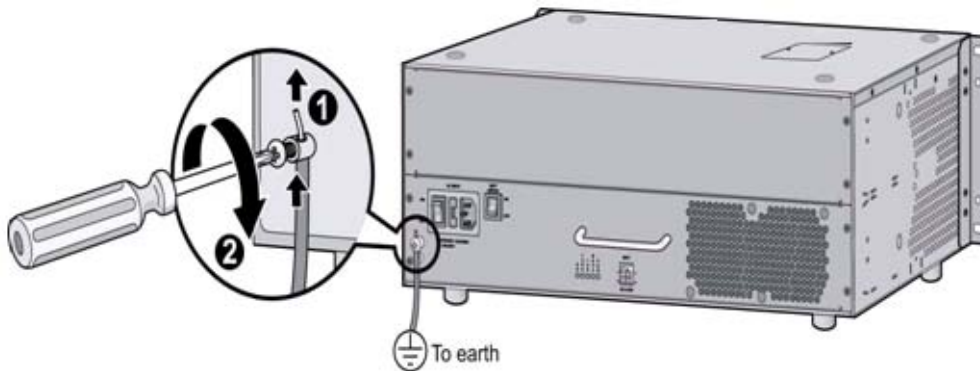
NOTE:

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).



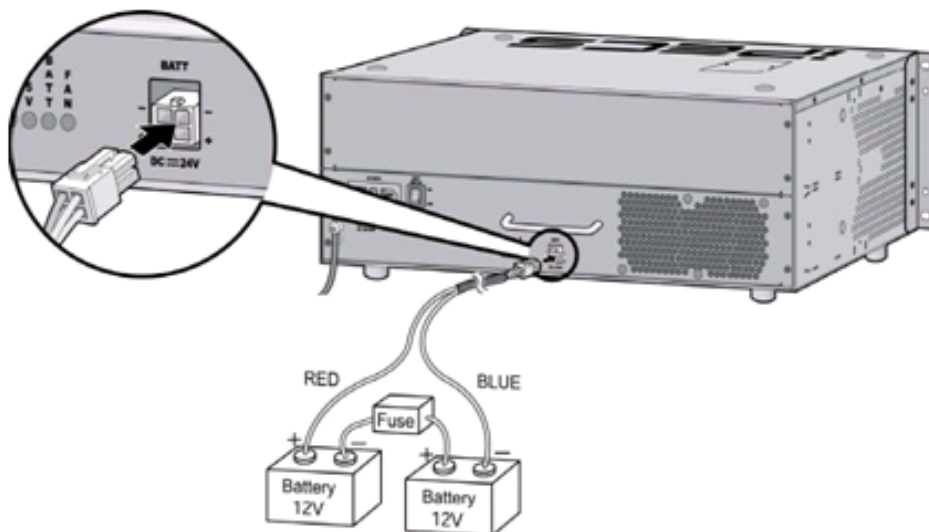
CAUTION:

- 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.

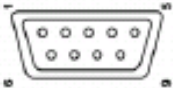
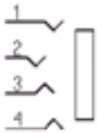
Battery Capacities

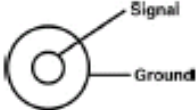
BATTERY CAPACITY	DKT 24 PORTS	DKT 72 PORTS	DKT 120 PORTS
20AH	6 hours	3 hours	1.5 Hours
40AH	12 hours	6 hours	3 hours

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

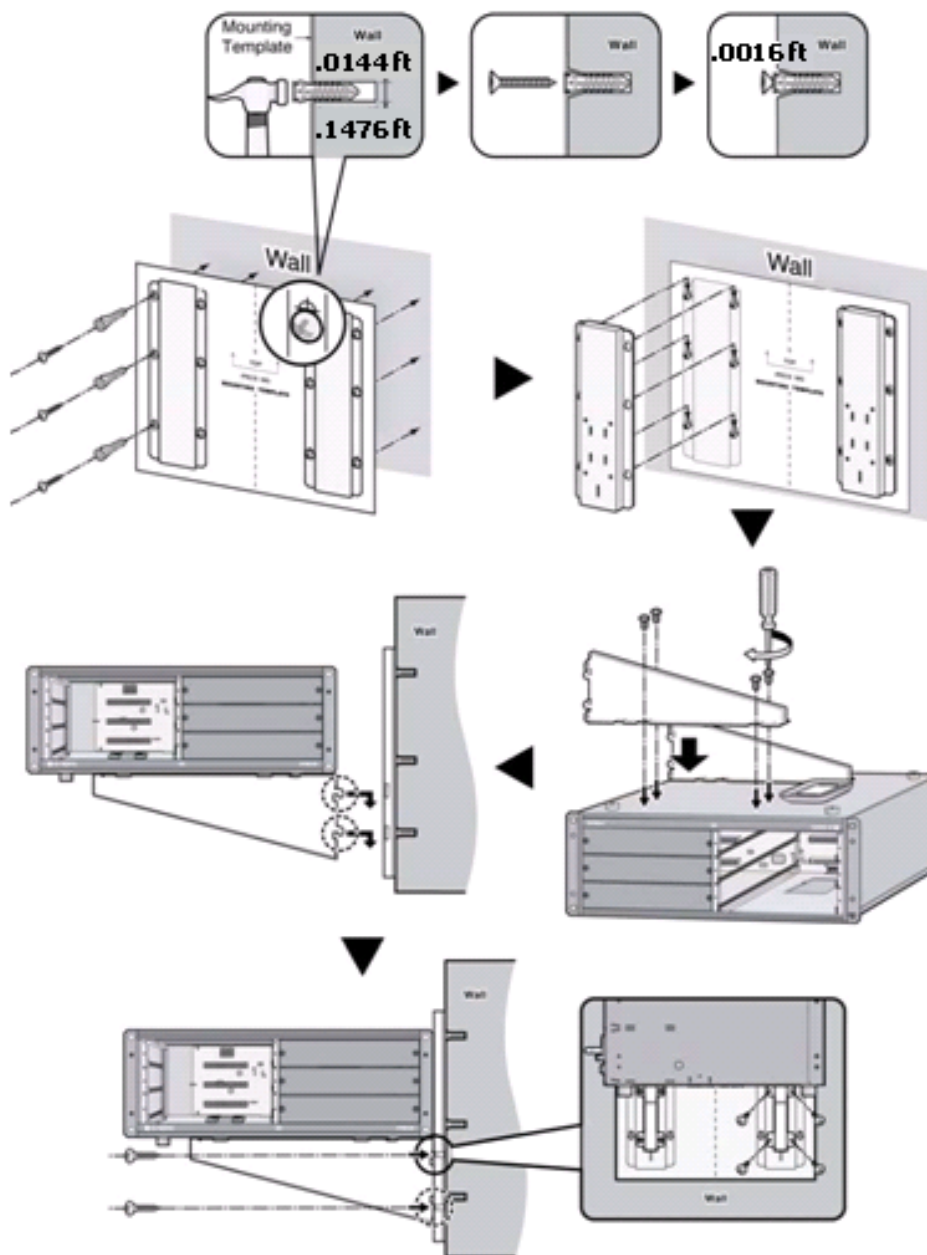
CONNECTOR TYPE	PIN NUMBER	BOARD	REMARK
RJ21 (Male) 	(Female) 	MPB, VOIB8, VOIB24, VMIB, PRIB, DSIU, LCOB4, LCOB8, LCOB12, DTIB12C, DTIB24C, SLIB12C, SLIB24C	DKT Ports SLT Ports
RS-232C 		MPB	Serial Port
Serial to Audio Jack 		VOIB8, VOIB24, VMIB, PRIB, WTIB4, WTIB8	Serial Port

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

KSU Mounting

Wall Mounting

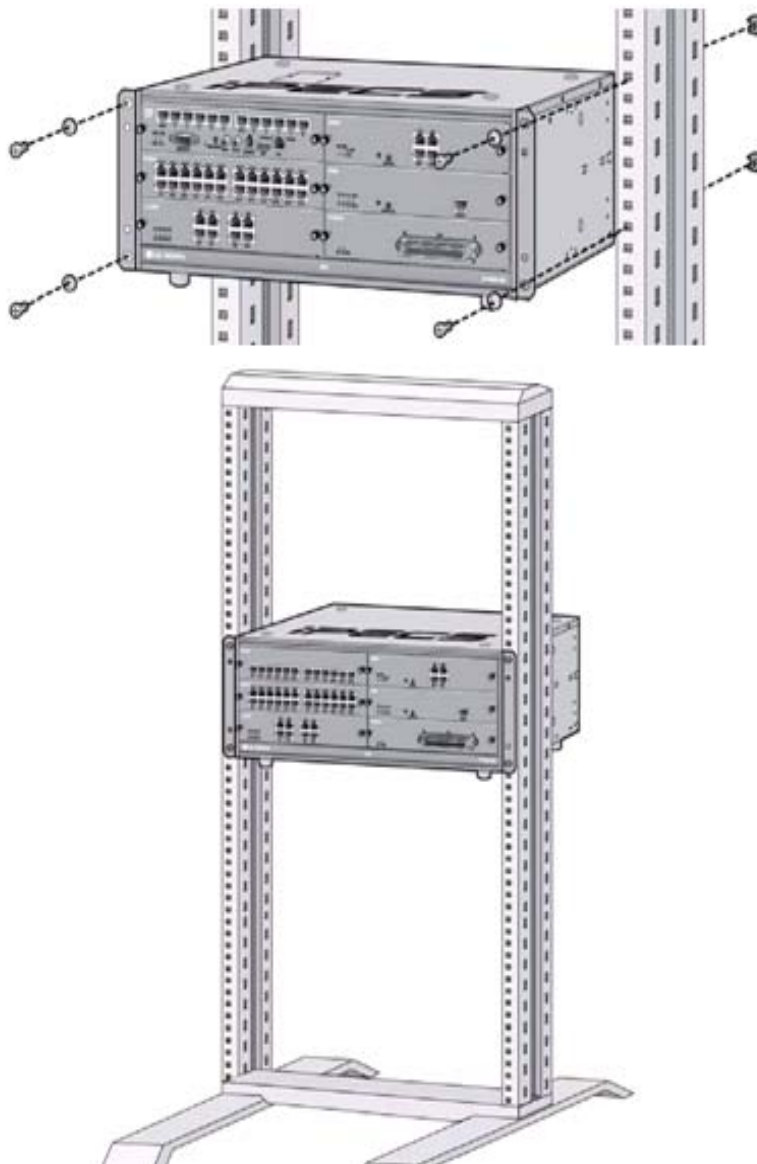
1. Attach the mounting template for accurate placement to the wall and drill the hole.
2. Install 12 anchor plugs into the wall using the mounting template shown below.
3. Insert 12 included screws into the 12 anchor plugs.
4. Hook Wall Bracket onto installed screws.
5. Attach Wall Shelf to the bottom 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 securely.
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.

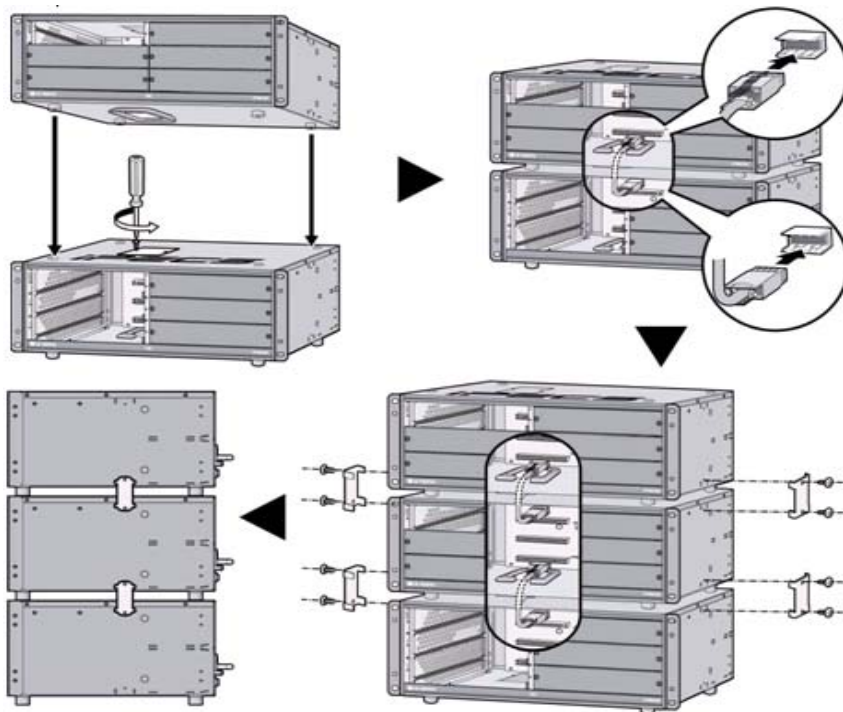


KSU Rack Mounting

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 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

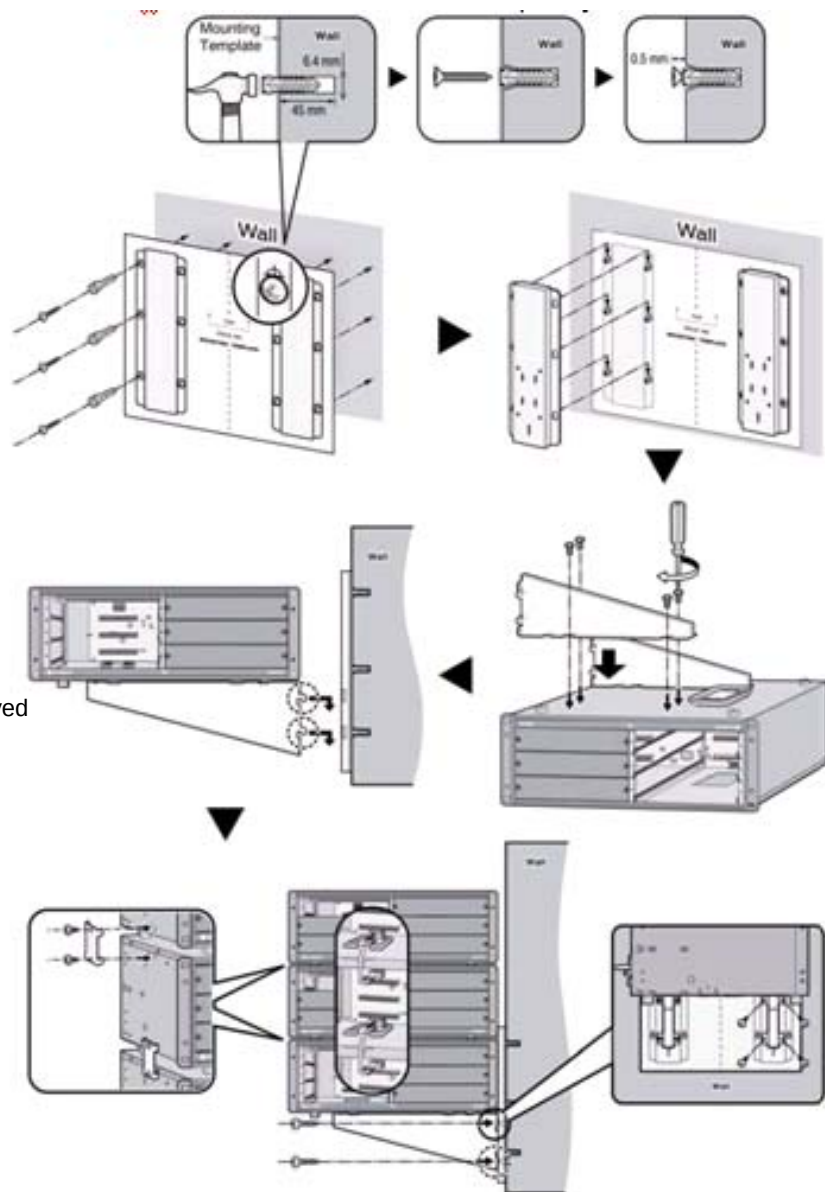
NOTE: Be careful not to bend the pins of connectors.

- 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, Dummy cap on top of KSU should be open, and Dummy plates in front should be removed in order to connect Expansion Cable as shown on [page 3-17](#).

Expansion KSU Wall Mounting

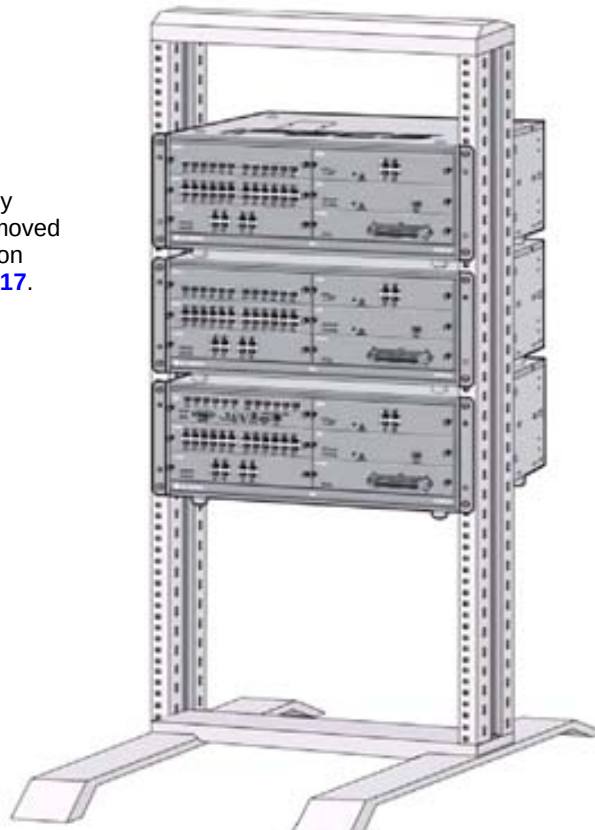
Rack Mounting

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



NOTE --

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



KSU Rack Mounting

THIS PAGE INTENTIONALLY LEFT BLANK.

Chapter 4

Board Installation

Installing the Boards

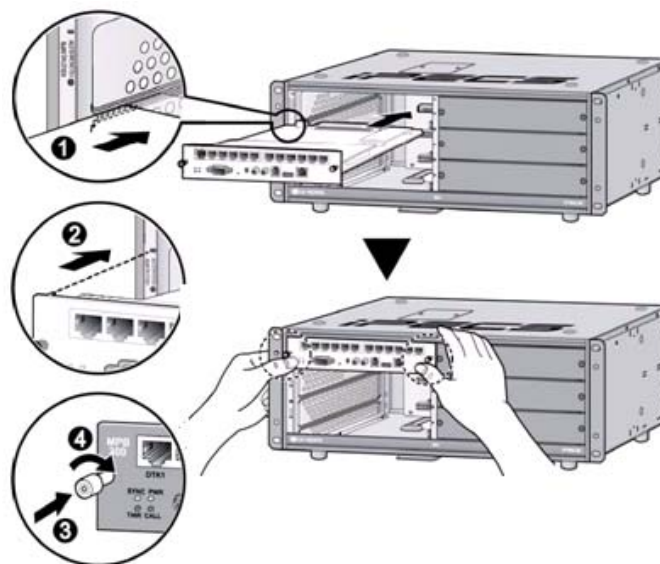
Prior to installing the Boards, the following should be considered:

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 second 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.



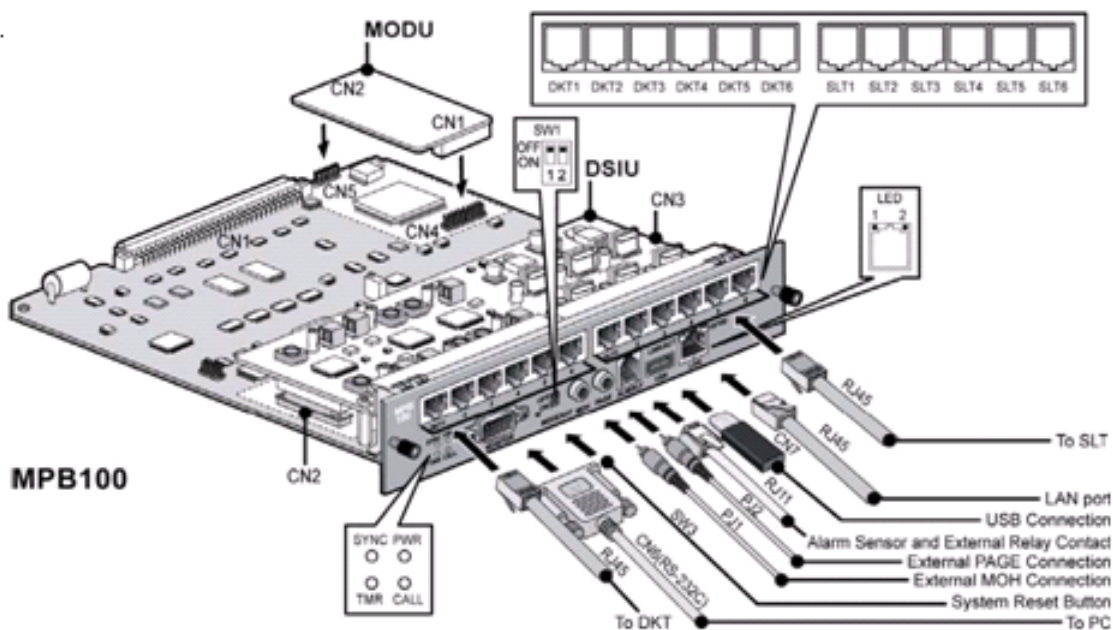
Board Installation

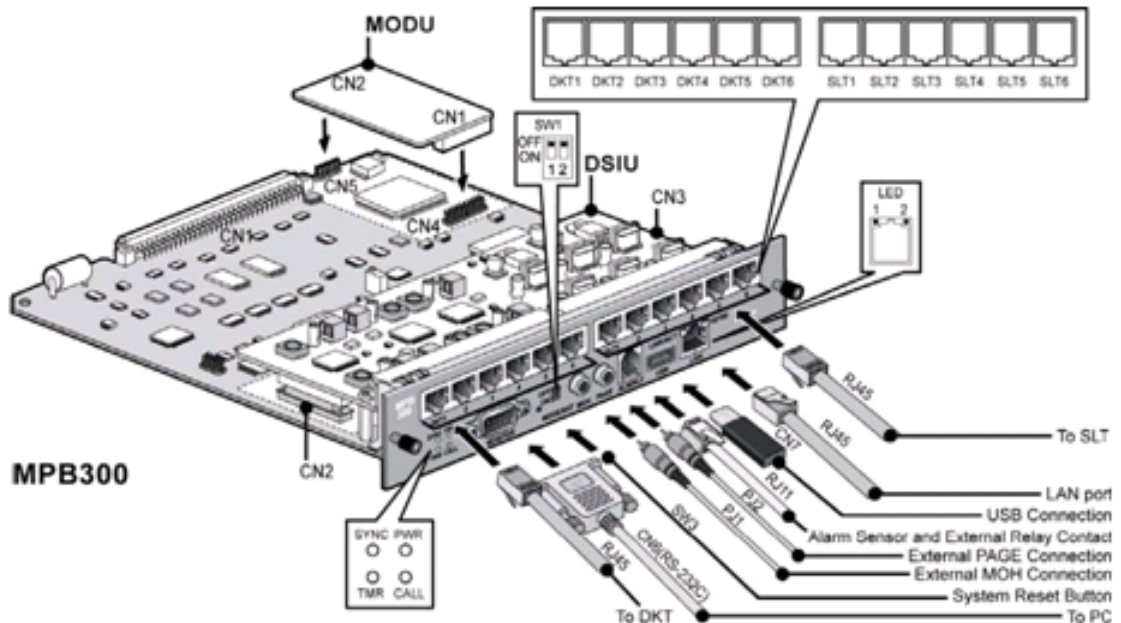
Main Processing Board

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 must be installed in the MPB slot of the Basic KSU (BKSU).



MPB 100/300 (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

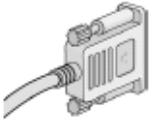
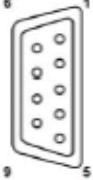
ITEM	MPB100	MPB300	REMARK
SRAM	2 ea (4MB)	4 ea (8 MB)	User Database back up
ACT2	1 ea (32 DSP chs)	2 ea (64 DSP chs)	DTMF,CPT,CID Detection channels at the same time
MAX Ports	200	414	Available MAX.(Trunk + Extension) Ports

Pin Assignment

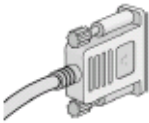
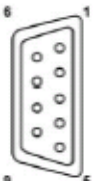
MJ4,USB

CONNECTOR	PIN NUMBER	NO	SIGNAL NAME
USB Type A 		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

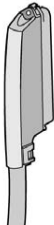
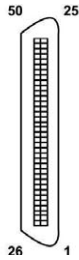
DSIU (Digital and Single Line Interface Unit)

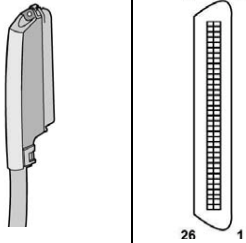
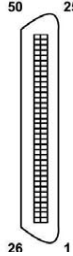
The DSIU is included by default on the MPB100/300, and provides 6 Digital Terminal (DKT) ports and 6 Single Line analog (SLT) ports with FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID function. The 6 SLT ports support the Message Wait Indication, DTMF or Pulse Dial receive, Polarity reversal, 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.

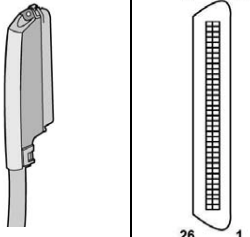
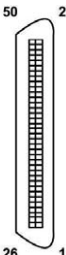
Pin Assignment, MJ1 (DKT Only)

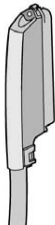
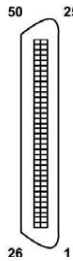
CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21 		1	1	1	VT-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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		

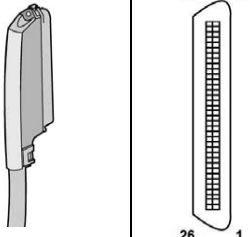
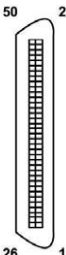
Pin Assignment, MJ2 (SLT Only)

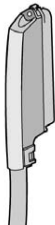
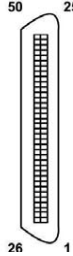
Pin Assignment, Terminal DKT

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

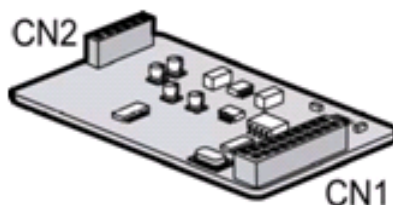
Pin Assignment, Terminal SLT

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 BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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			
		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.

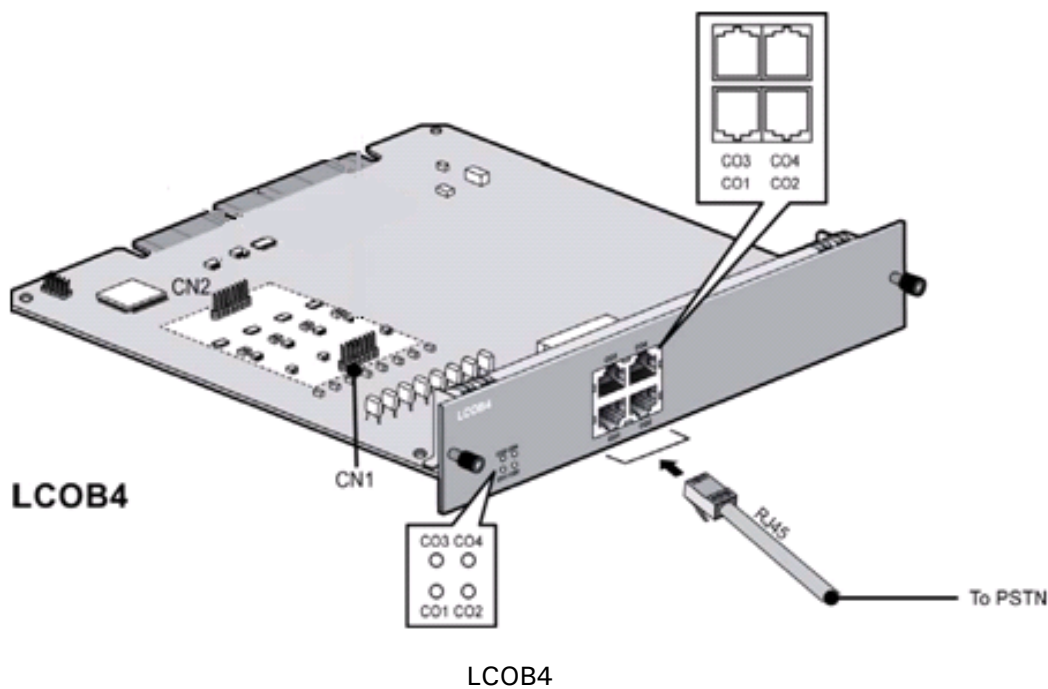


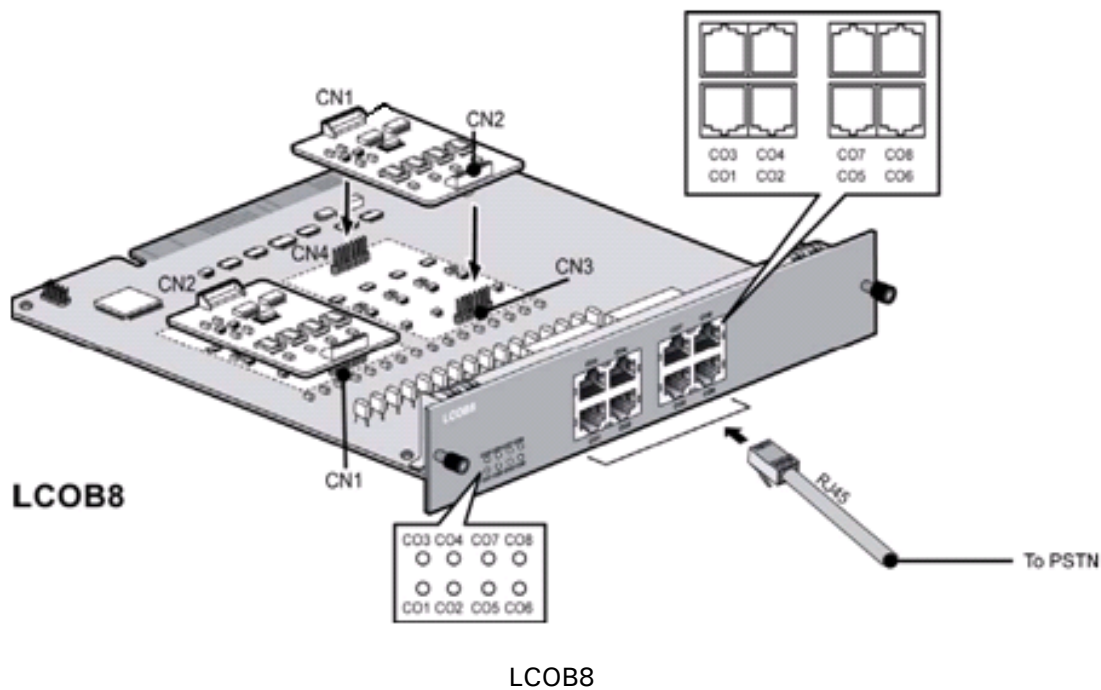
CO Line Boards

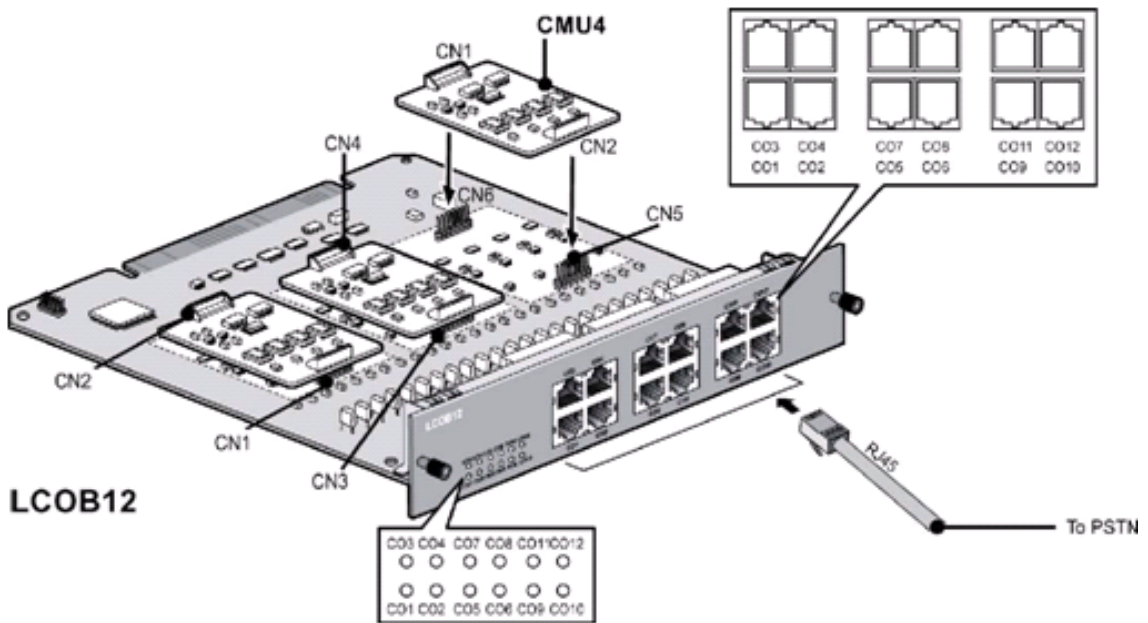
LCOB4/8/12 (Loop Start CO Line Interface Board)

The MBX IP LCOB (Loop Start CO Interface Board) is a board for PSTN interface on MBX IP system. There are three kinds of LCOB. The LCOB4 is for 4 ports PSTN Interface. The LCOB8 is for 8 ports PSTN Interface. The 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.



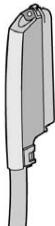
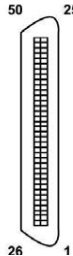
LCOB4/LCOB8/LCOB12 (cont'd)

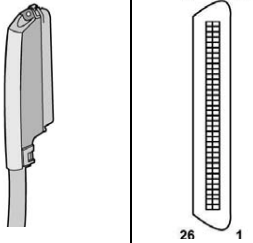
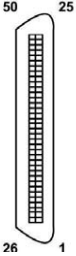
LCOB4/LCOB8/LCOB12 (cont'd)

LCOB12

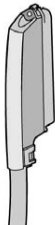
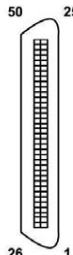
Pin Assignment

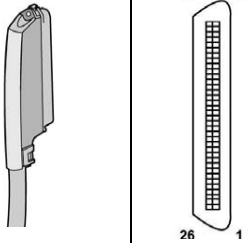
LCOB 1st Port (supports PFT function)

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

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 BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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		

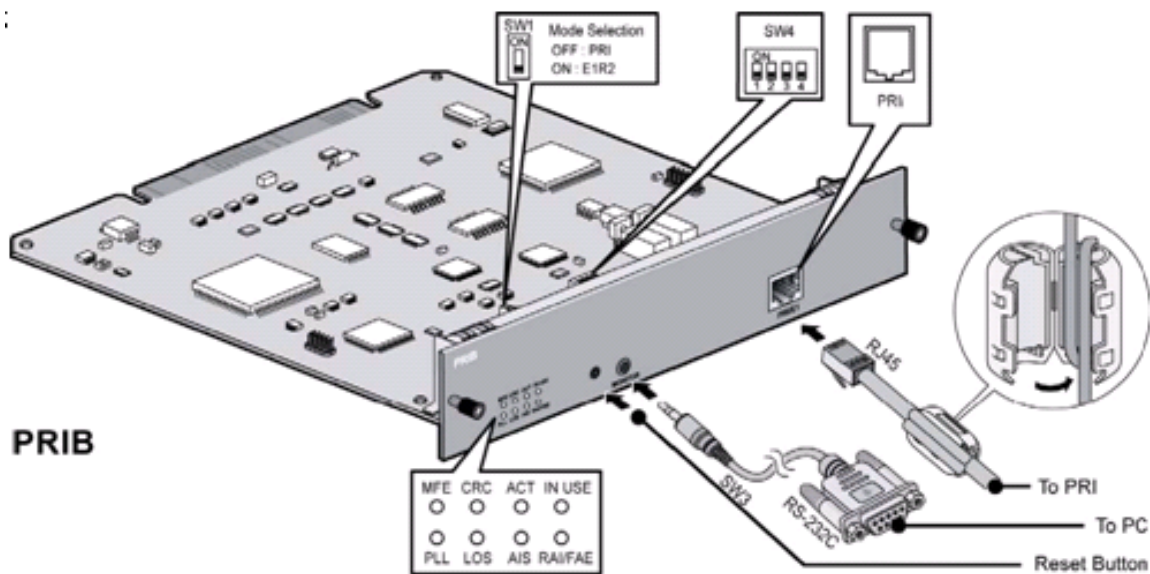
LED Indications

LED	DESCRIPTION
LD1 (BLUE)	The status of 1 st port - ON, In use ; OFF, Idle
LD2 (BLUE)	The status of 2 nd port - ON, In use ; OFF, Idle
LD3 (BLUE)	The status of 3 rd port - ON, In use ; OFF, Idle
LD4 (BLUE)	The status of 4 th port - ON, In use ; OFF, Idle
LD5 (BLUE)	The status of 5 th port - ON, In use ; OFF, Idle
LD6 (BLUE)	The status of 6 th port - ON, In use ; OFF, Idle
LD7 (BLUE)	The status of 7 th port - ON, In use ; OFF, Idle
LD8 (BLUE)	The status of 8 th port - ON, In use ; OFF, Idle
LD9 (BLUE)	The status of 9 th port - ON, In use ; OFF, Idle
LD10 (BLUE)	The status of 10 th port - ON, In use ; OFF, Idle
LD11 (BLUE)	The status of 11 th port - ON, In use ; OFF, Idle
LD12 (BLUE)	The status of 12 th 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 and 1 signaling channels. 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 except the slot No. 1 of 1st KSU.



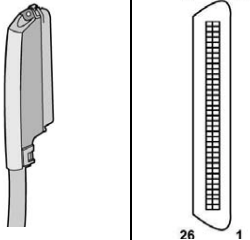
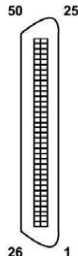
CAUTION: For QSIG operation, check the mode setting method and the contact assignments of RJ21 type connector according to the mode of line, TE or NT.

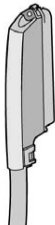
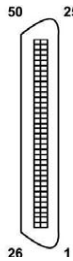
NOTE: MBX IP does not support daisy chained clock cable. The ISDN clock priority and synchronization is controlled by the MPB software (refer to PGM 301). The default clock priority for Slots and KSUs is as follows unless modified by the Admin.:

- 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 BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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

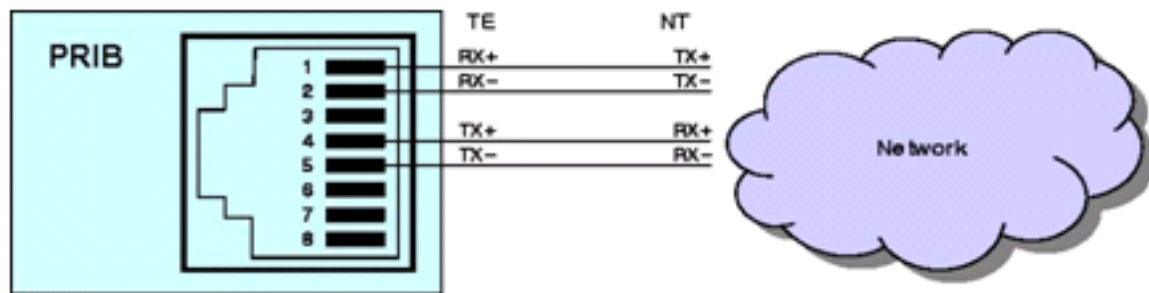
Connectors, Switch, and LED Functions

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)

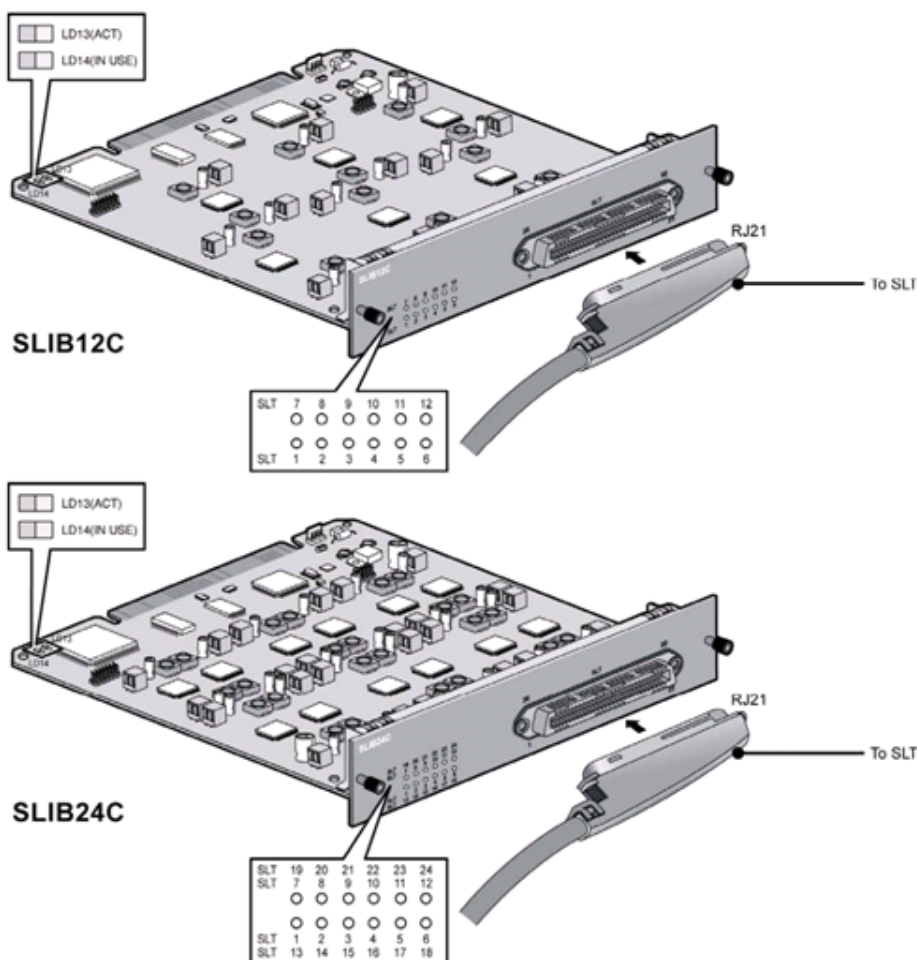
PRI Line Connector Configuration

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.

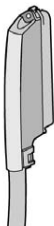
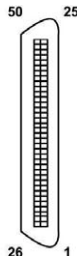
>>> SLIB12/24C can be installed in the universal slot in any KSU except MPB slot of 1st KSU.

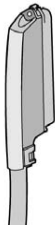
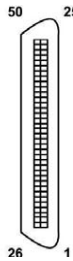


NOTE:

- 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 		1	1	1	VT-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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		

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

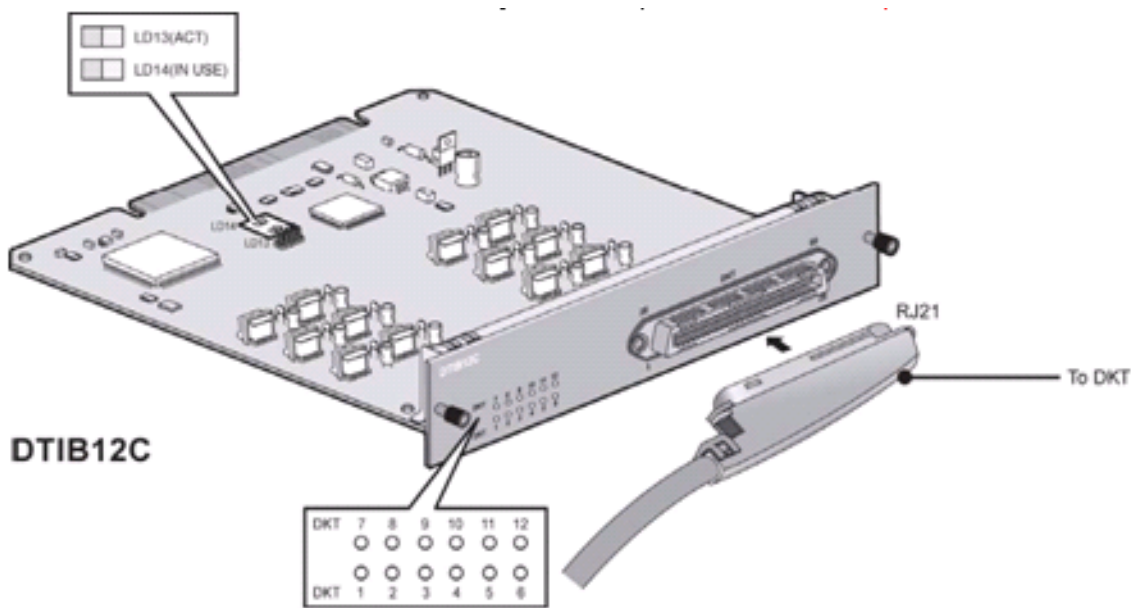
LED	FUNCTION	REMARK
LD9	The status of 9 th port or 21 st port	ON (Blue) : 9 th port Use ON (Yellow Green) : 21 st port Use ON (Blush white) : 9 th and 21 st port Use OFF: Idle
LD10	The status of 10 th port or 22 nd port	ON (Blue) : 10 th port Use ON (Yellow Green) : 22 nd port Use ON (Blush white) :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

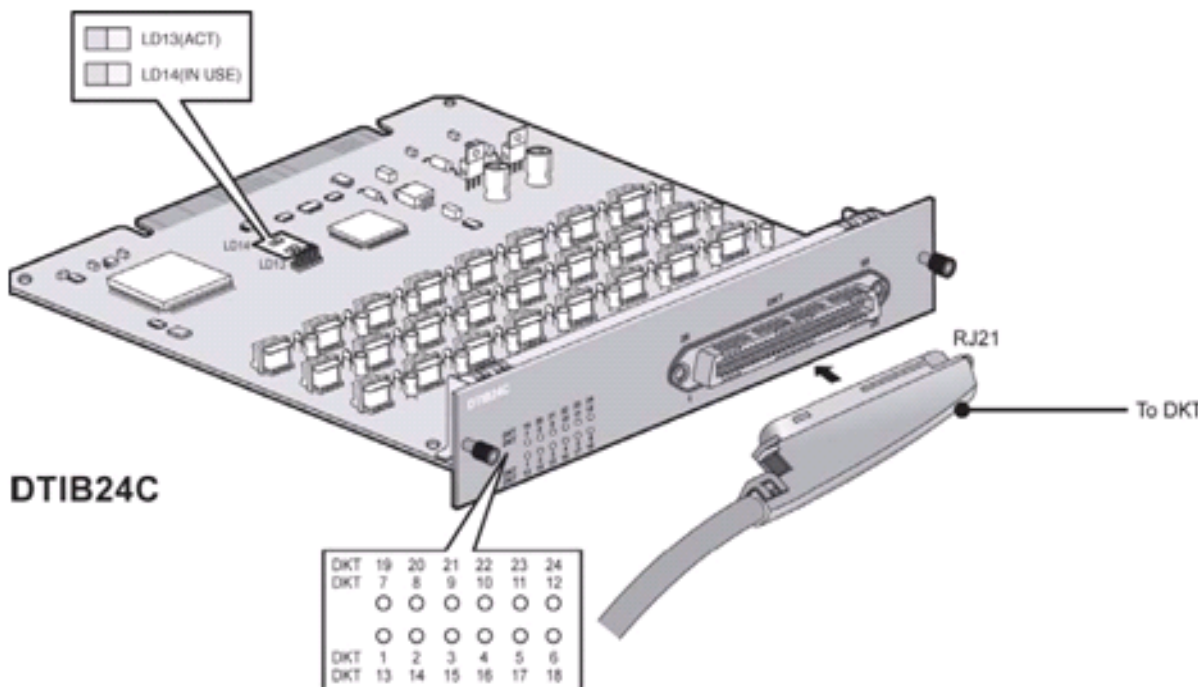
DTIB12C/24C (with RJ21 connector)

The connection between the DTIB12C/24C's modular block and DKT is provided using RJ21 cable. 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 except the MPB slot of the 1st KSU.

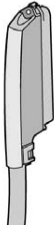
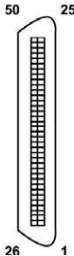


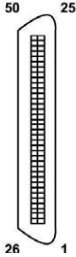
DTIB12C/24C with RJ21 connector (cont'd)

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 BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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			
		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	JTAG port for CPLD	For R&D only

LED Indications

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

LED Indications (cont'd)

LED	FUNCTION	REMARK
LD4	The status of 4 th port or 16 th port	ON (Blue) : 4 th port Use ON (Yellow Green) : 16 th port Use ON (Blush white) : 4 th and 16 th port Use OFF: Idle
LD5	The status of 5 th port or 17 th port	ON (Blue) : 5 th port Use ON (Yellow Green) : 17 th port Use ON (Blush white) : 5 th and 17 th port Use OFF: Idle
LD6	The status of 6 th port or 18 th port	ON (Blue) : 6 th port Use ON (Yellow Green) : 18 th port Use ON (Blush white) : 6 th and 18 th port Use OFF: Idle
LD7	The status of 7 th port or 19 th port	ON (Blue) : 7 th port Use ON (Yellow Green) : 19 th port Use ON (Blush white) : 7 th and 19 th port Use OFF: Idle
LD8	The status of 8 th port or 20 th port	ON (Blue) : 8 th port Use ON (Yellow Green) : 20 th port Use ON (Blush white) : 8 th and 20 th port Use OFF: Idle
LD9	The status of 9 th port or 21 st port	ON (Blue) : 9 th port Use ON (Yellow Green) : 21 st port Use ON (Blush white) : 9 th and 21 st port Use OFF: Idle
LD10	The status of 10 th port or 22 nd port	ON (Blue) : 10 th port Use ON (Yellow Green) : 22 nd port Use ON (Blush white) : 10 th and 22 nd port Use OFF: Idle
LD11	The status of 11 th port or 23 rd port	ON (Blue) : 11 th port Use ON (Yellow Green) : 23 rd port Use ON (Blush white) : 11 th and 23 rd port Use OFF: Idle
LD12	The status of 12 th port or 24 th port	ON (Blue) : 12 th port Use ON (Yellow Green) : 24 th port Use ON (Blush white) : 12 th and 24 th 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)

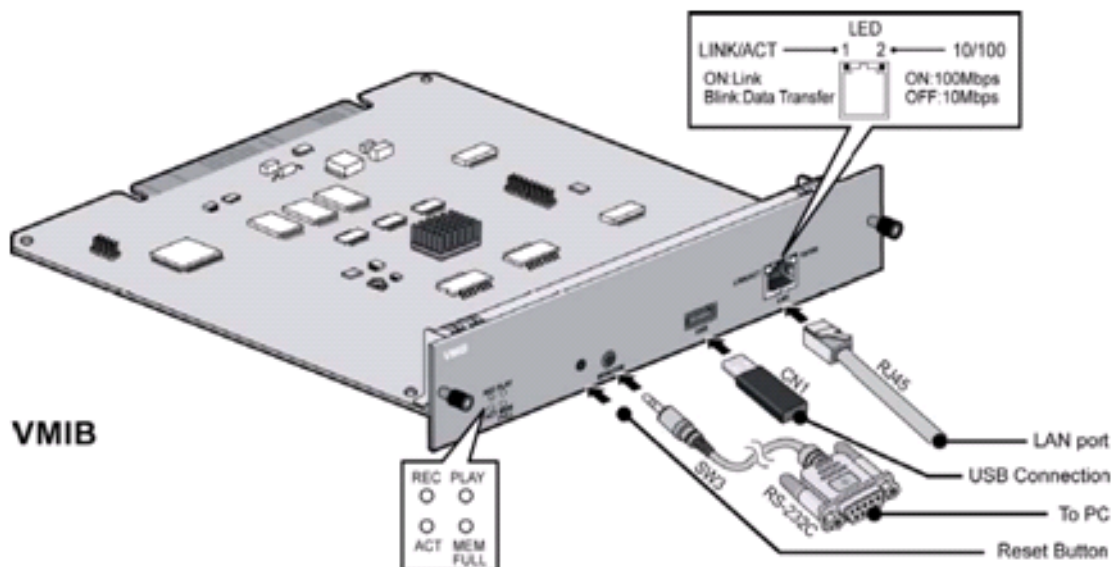
The VMIB provides system announcement, ACD/UCD announcement, and User Greeting, along with a processor and DSP circuitry to support 8 simultaneous channels.

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)



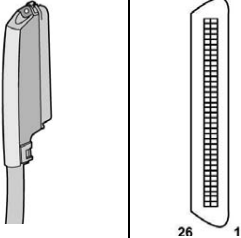
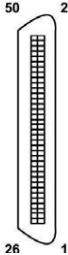
NOTE:

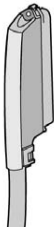
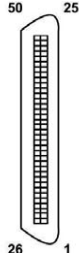
- If the VMIB is installed on a System, voice prompt (Default=1-English, 2-3-Blank) should be uploaded for each country.
- MP Software stores voice prompts on U8, Nand Flash of MPB100/MPB300 for each stored language (Korean, English, Italian, Russian, German, Danish, Hebrew, Spanish, Turkey and Swedish).
- 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 		1	1	1	VT-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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	LAN CONNECTOR		LAN 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

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

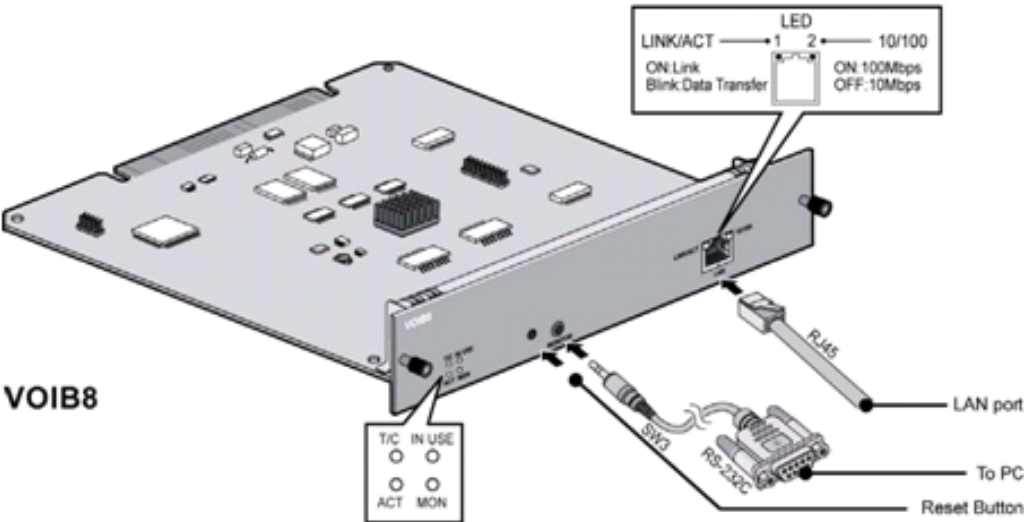
LED	FUNCTION	REMARK
LD1	Normal operation indication (Activity Indication)	Blink (blue Color)
LD2	Memory Full (ON – Full, OFF – Usable)	-
LD3	Record (ON – Active, OFF – Idle)	-
LD4	Play (ON – Active, OFF – Idle)	-
MJ1-LD1 (Green/Orange)	ON – Link, Blink – Data Transfer	-
MJ1-LD2 (Yellow)	ON - 100Mbps,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

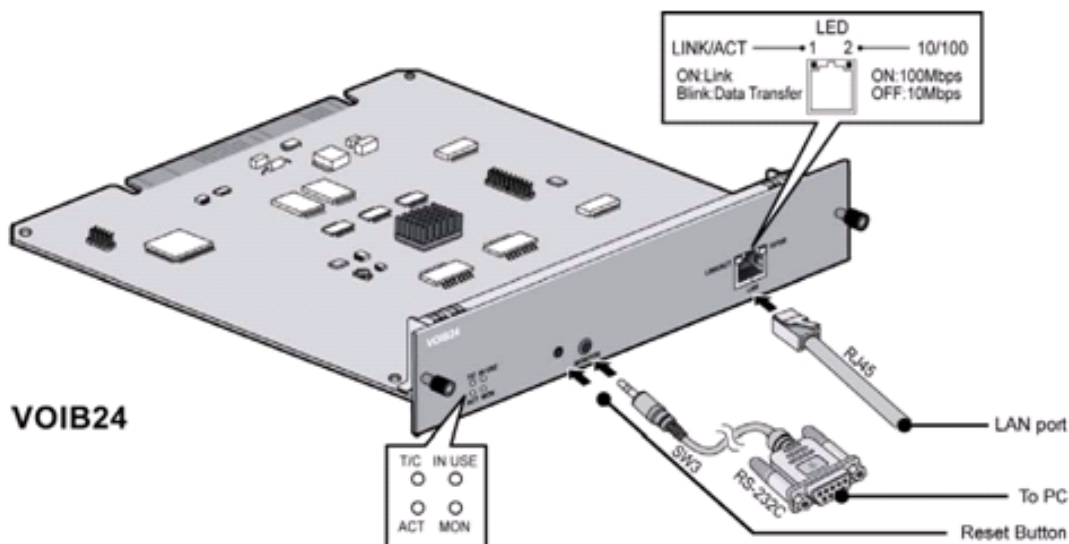
VOIB8/24 (Voice over Internet Protocol Board 8ch./24ch.)

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	-

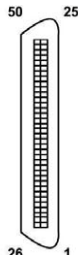
VOIB8/VOIB24 can be installed on universal slot No. 1-6 of any KSU except slot No. 1 of 1st KSU.

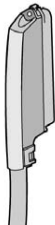
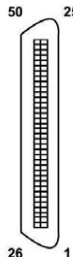


VOIB8/24 (Voice over Internet Protocol Board 8ch./24ch.) con'd**LAN, VoIP Specification**

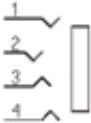
ITEM	SPECIFICATION
LAN Interface	100 Base-T Ethernet (IEEE 802.3)
Speed	100 Mbps (Auto-Negotiation)
Duplex	Half Duplex or Full Duplex (Auto-Negotiation)
VoIP Protocol	H.323 Revision 4, SIP Revision 4
Voice Compression	G.711/G.726/G.729/G.723.1
Voice/Fax Switching	T.38
Echo cancellation	G.165

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 BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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			
		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
		1	Signal Ground
		2	Receive Data
		3	Transmit Data
		4	Signal Ground

Connectors, Switch, and LED Functions

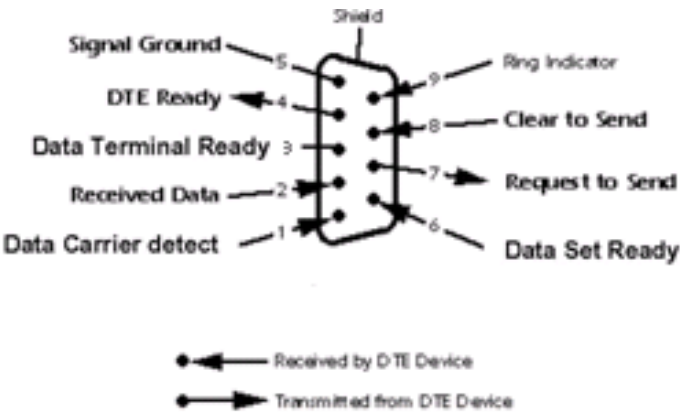
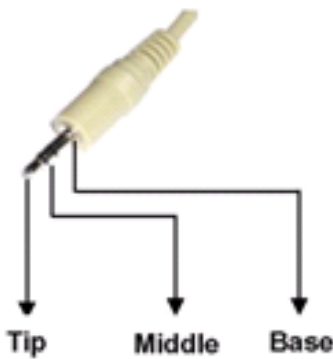
CONNECTOR/SWITCH	FUNCTION	REMARK
SW1	4-POLE Dip Switch (Function : not defined)	Default: Off
SW2	Battery back-up switch	Not Assembled at MP
SW3	Reset switch	--
SW4	Watch-dog Enable/ Disable (OFF:Enable, ON:Disable)	Not Assembled at MP
CN3	JTGA port for CPU emulator	For R&D Test
CN4	JTAG port for FPGA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



THIS PAGE INTENTIONALLY LEFT BLANK.

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 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
STSe - 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

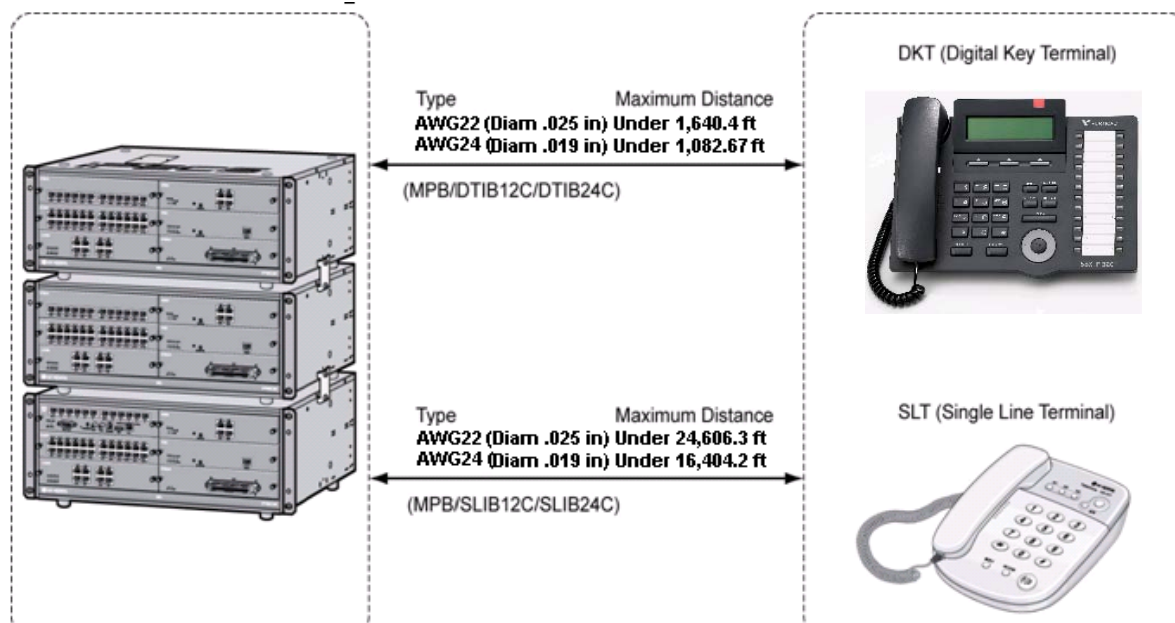


IP 8012



IP 8024

Terminal Cabling Distance

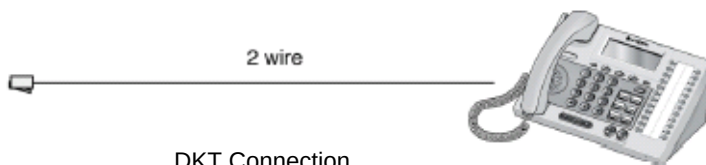


Basic Terminal Connection

DKT

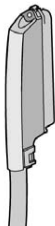
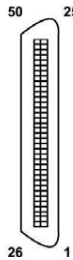
The following illustrates how to connect the DKT to your System:

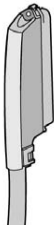
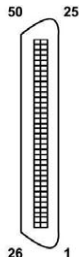
MPB/DTIB12C/DTIB24C



DKT Connection

Terminal DKT Pin Assignment

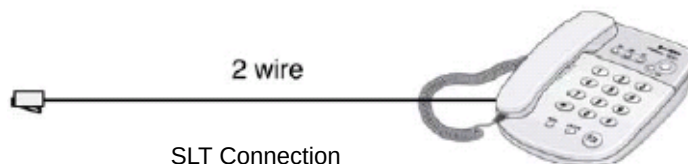
CONNECTOR	PIN NUMBER	RJ21 PIN	DKT CONNECTOR		DKT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21 		1	1	1	VT-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
	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

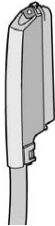
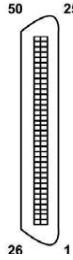
SLT

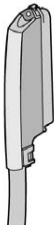
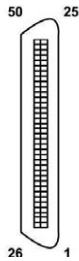
The following illustrates how to connect the SLT to your System:

MPB/SLIB12C/SLIB24C

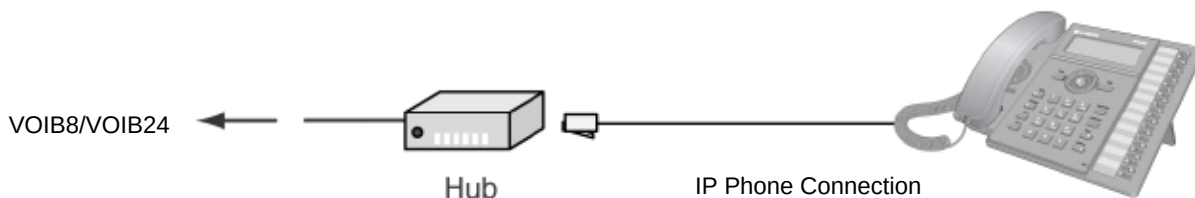


SLT Pin Assignment

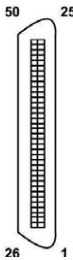
CONNECTOR	PIN NUMBER	RJ21 PIN	SLT CONNECTOR		SLT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21 		1	1	1	VT-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
	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

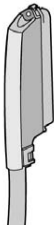
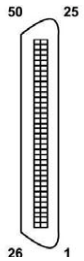
CONNECTOR	PIN NUMBER	RJ21 PIN	SLT CONNECTOR		SLT DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21 		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		
		18	18	18	VT-18	18	
		43		43	VR-18		
		19	19	19	VT-19	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		

IP 8000 Series Keyset

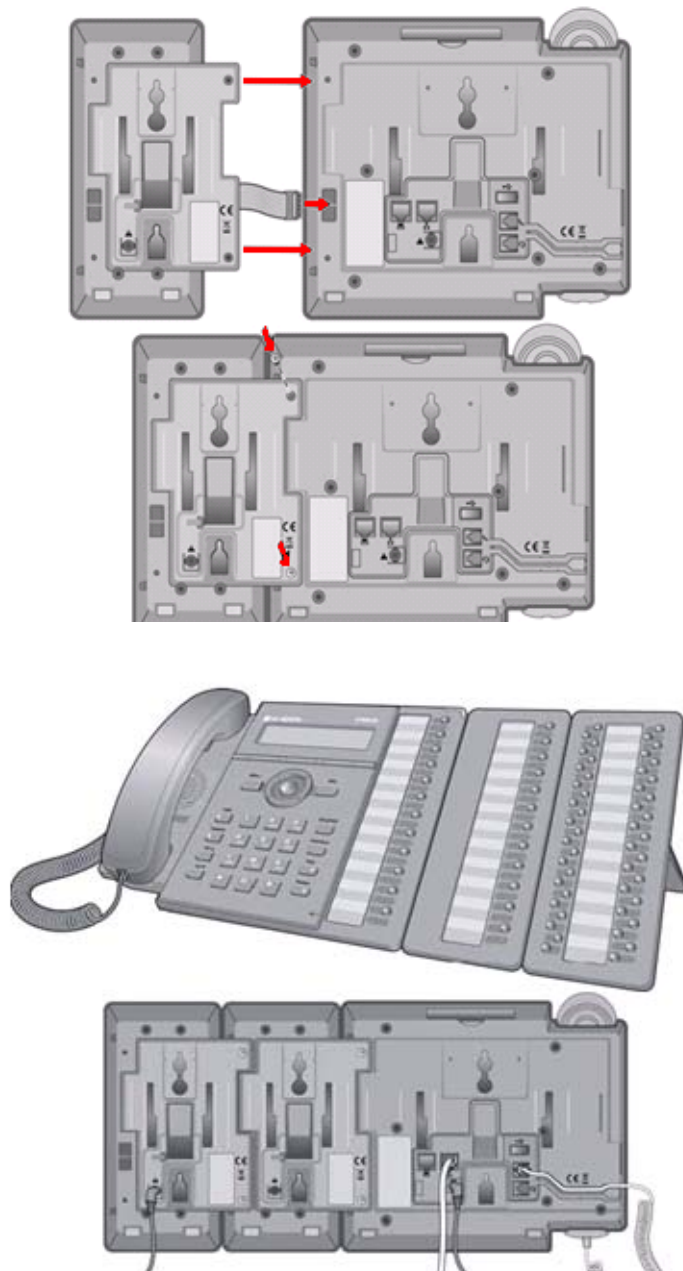


IP Phone Pin Assignmet

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

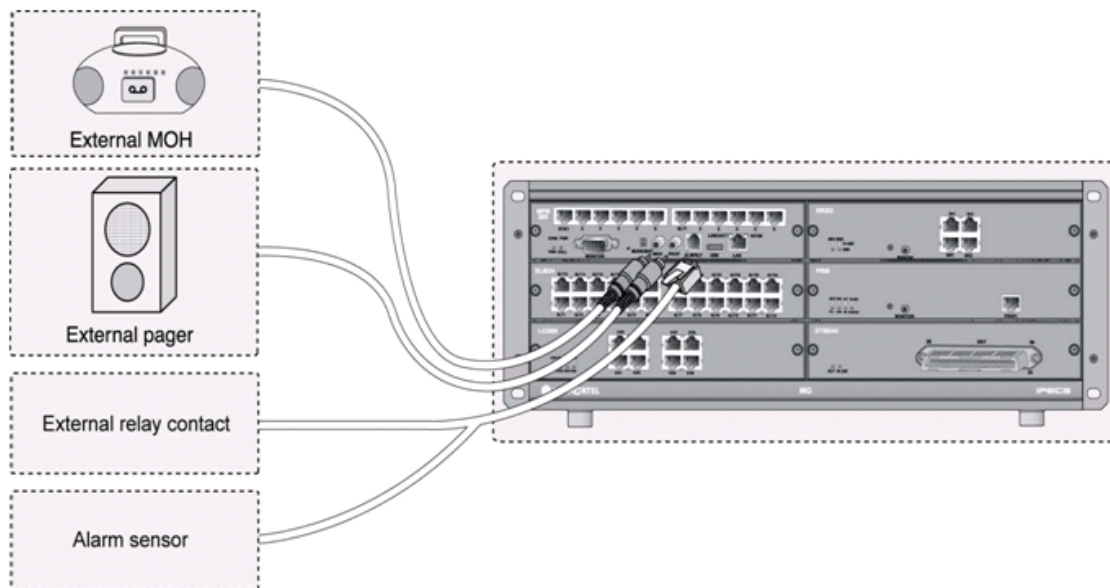
CONNECTOR	PIN NUMBER	RJ21 PIN	IP Phone CONNECTOR		IP Phone DESIGNATION	PORT NO	REMARK
			PAIR	PIN			
RJ21 		14	14	14	VT-14	14	
		39		39	VR-14		
		15	15	15	VT-15	15	
		40		40	VR-15		
		16	16	16	VT-16	16	
		41		41	VR-16		
		17	17	17	VT-17	17	
		42		42	VR-17		
		18	18	18	VT-18	18	
		43		43	VR-18		
		19	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		

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

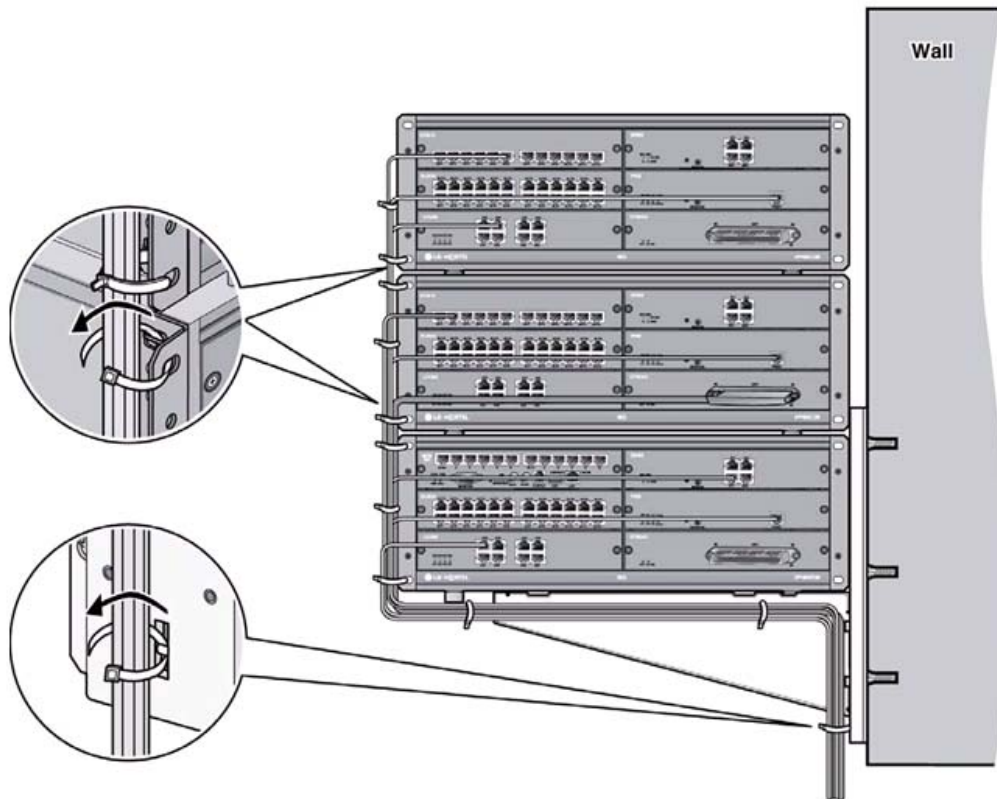
The MPB100/MPB300 provides 1 relay contact that is used for loud bell or general purpose through pin No. 4-5 of MJ3.

Cable Wiring

Wall Mount Wiring

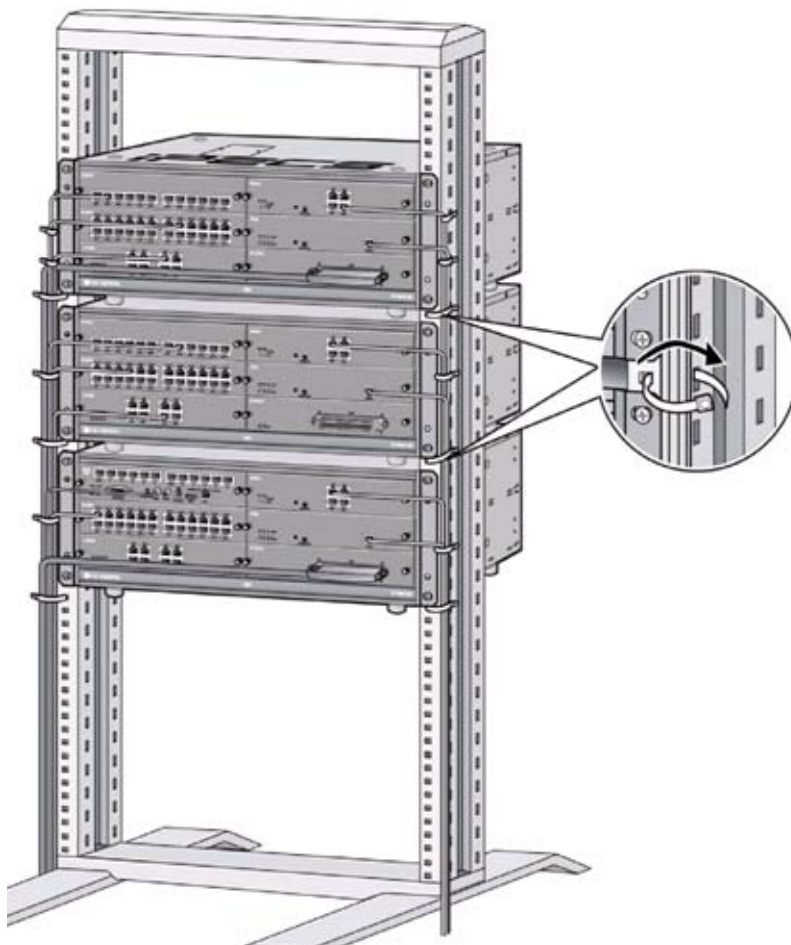
To install wall mount wiring, perform the following steps:

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 6 tie cables provided.



Rack Mount Wiring

1. Ensure the BKSU and EKSU have been installed correctly.
2. Connect cables to the CO/STA port and the MOH/LAN/RS-232 C 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 6 tie cables provided.
5. Finally tie all cables to the Rack.

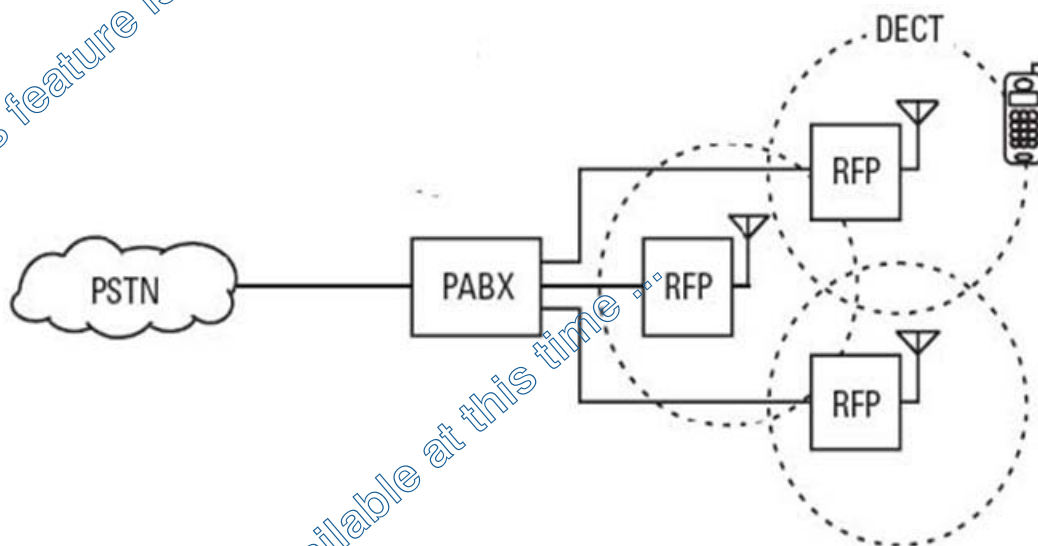


Chapter 6

DECT Installation

Introduction

The MBX IP system coordinates with the System DECT solution which is comprised of WTIB4/8, Base Station (RFP), 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	1.2MHz
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

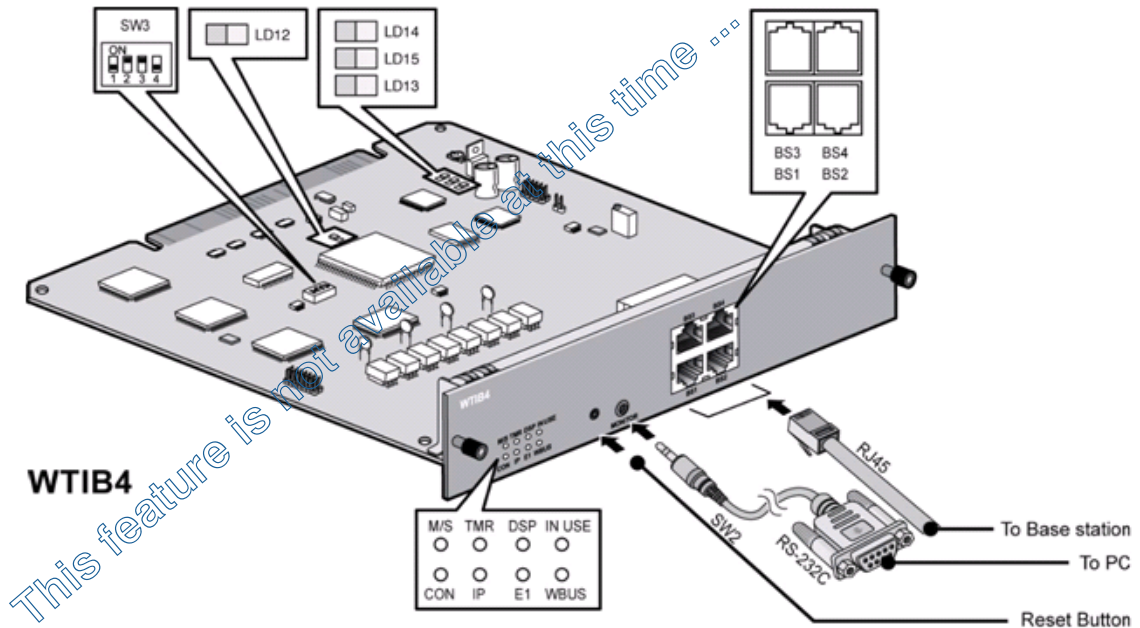
In the MBX IP system, WTIB4 and WTIB8 are both Base Station interface boards. The MBX IP System can have up to two (with MPB100) or three (with MPB300) WTIB4 (up to 4 ports) or WTIB8 (up to 8 ports).

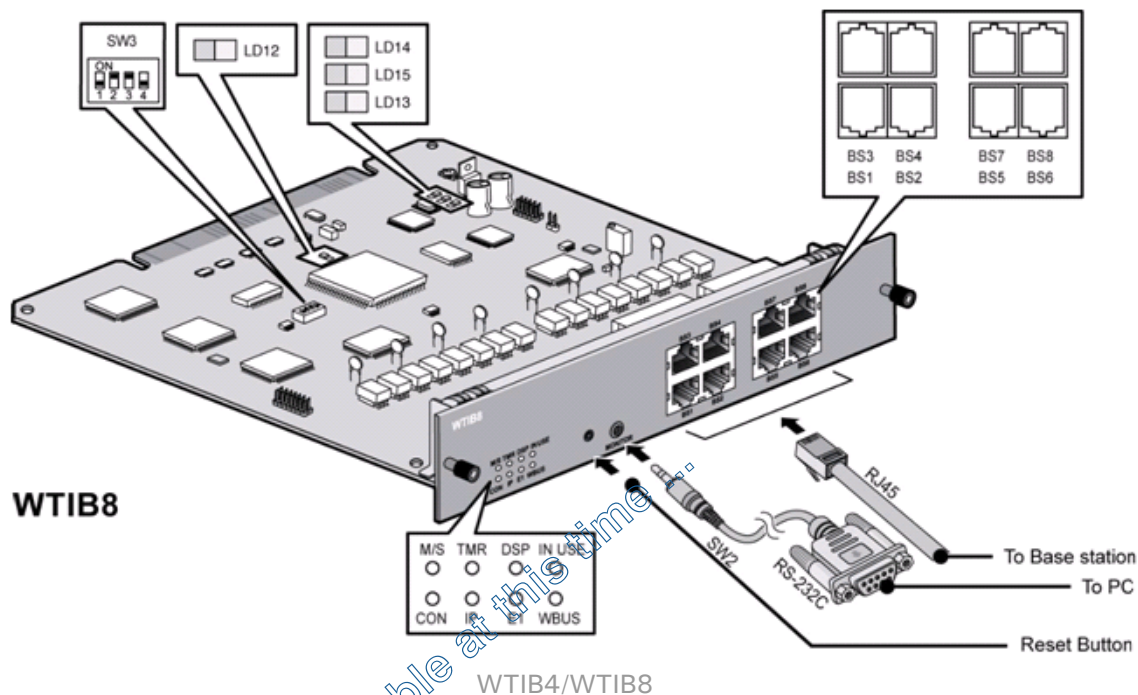
WTIB4/WTIB8

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.





CAUTION: The Base Station is connected to the WTIB4/8 by an unshielded twisted pair cable (at least CAT3).

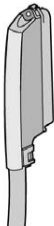
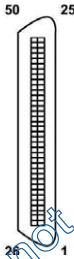
NOTE: - The unshielded twisted pair cable (at least CAT3) should be used to connect WTIB4/8 with a Base Station.

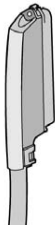
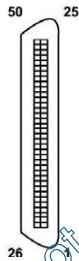
Shielded cable can be used if it can withstand interference from noise sources such as an AC power cable with high voltage. A shorter cable length and/or clear line-of-view between the WTIB4/8 and Base Station will decrease the possibility of data degradation.

- 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.

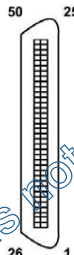
Pin Assignment

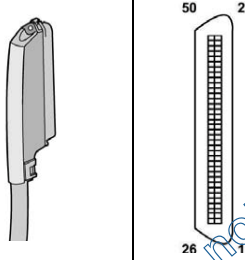
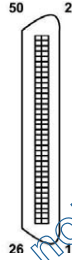
WTIB4/8

CONNECTOR	PIN NUMBER	RJ21 PIN	DTIB12/24C CONNECTOR		DTIB12/24C DESIGNATION	PORT NO	REMARK
			PAIR	LINE			
RJ21 		1	1	1	VT-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2		2	VT-2	2	
		27		27	VR-2		
		3	3	3	VT-3	3	
				28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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	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	PK			
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	1	1	VT-1	1	BL:BLUE BK:BLACK BN:BROWN OR:ORANGE WH:WHITE GN:GREEN SL: SILVER VI:VIOLET RD:RED YL:YELLOW
		26		26	VR-1		
		2	2	2	VT-2	2	
				27	VR-2		
		3	3	3	VT-3	3	
		28		28	VR-3		
		4	4	4	VT-4	4	
		29		29	VR-4		
		5	5	5	VT-5	5	
		30		30	VR-5		
		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	PAIR			
		18	18	18	VT-18	18	-
		43	43	43	VR-18		
		19	19	19	VT-19	19	
		44	44	44	VR-19		
		20	20	20	VT-20	20	
		45	45	45	VR-20		
		21	21	21	VT-21	21	
		46	46	46	VR-21		
		22	22	22	VT-22	22	
		47	47	47	VR-22		
		23	23	23	VT-23	23	
		48	48	48	VR-23		
		24	24	24	VT-24	24	
		49	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

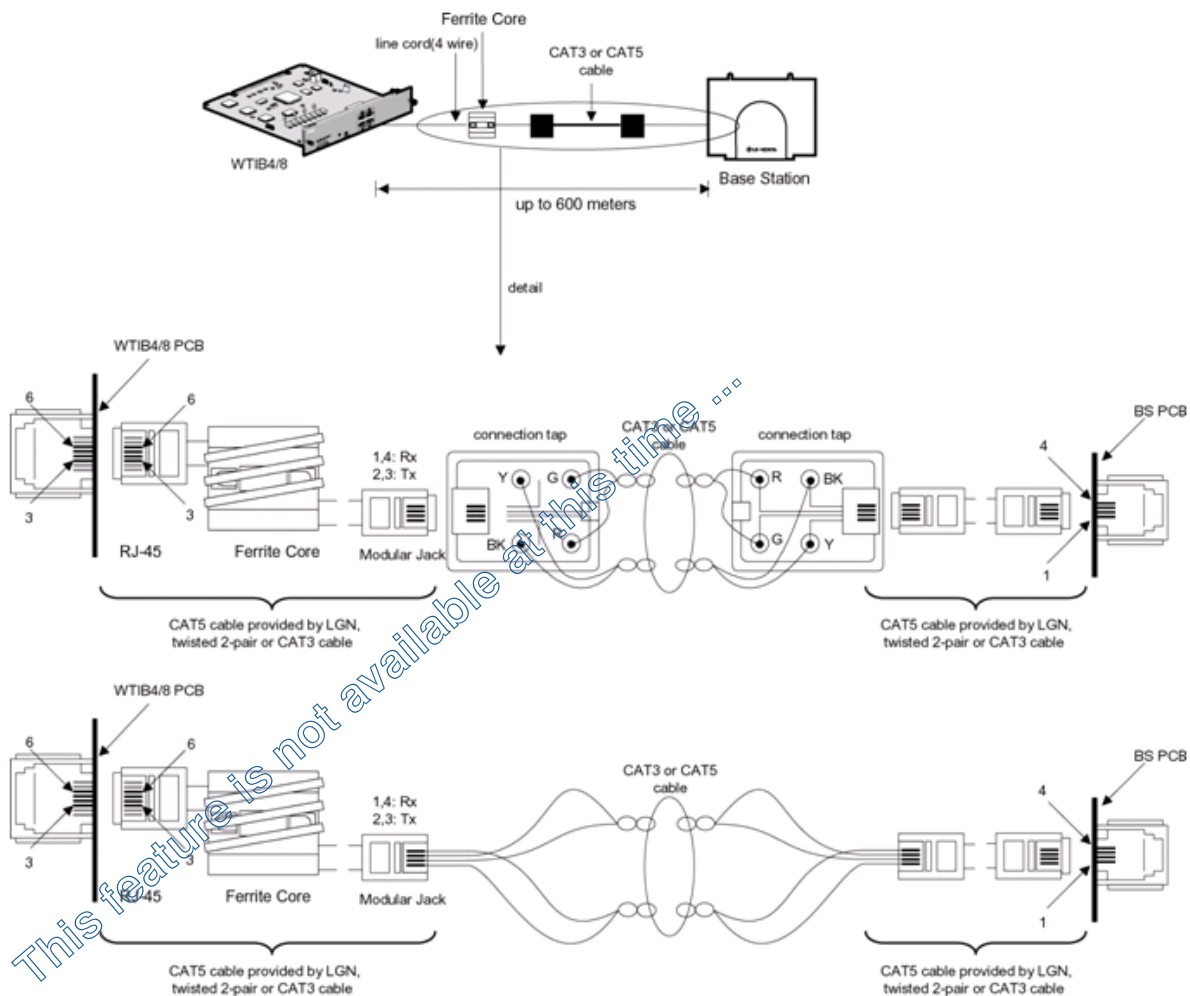
NOTE: TBR6 test mode needs not to be set for normal operation because TBR6 test mode is used only for DECT confirmation test.

LED Indications

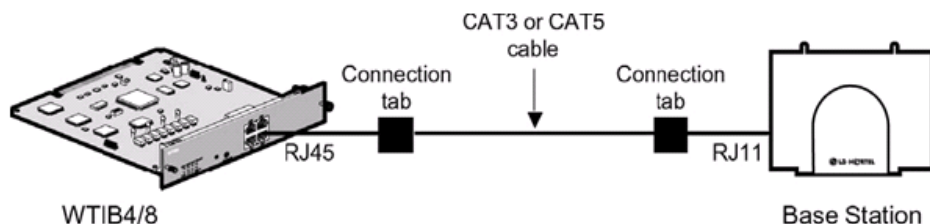
LED	NORMAL	LABEL
1	ON: Master WTIB, Toggle: Slave 1 WTIB, OFF: Slave 2 WTIB	M/S
2	When Nios CPU is normal, TMR LED toggles every 100msec.	TMR
3	ON: DSP Echo cancellation enabled, OFF: DSP Echo cancellation disabled	DSP
4	When more than one DECT channel is used, LED8 is ON.	IN USE
5	When WTIB is connected 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

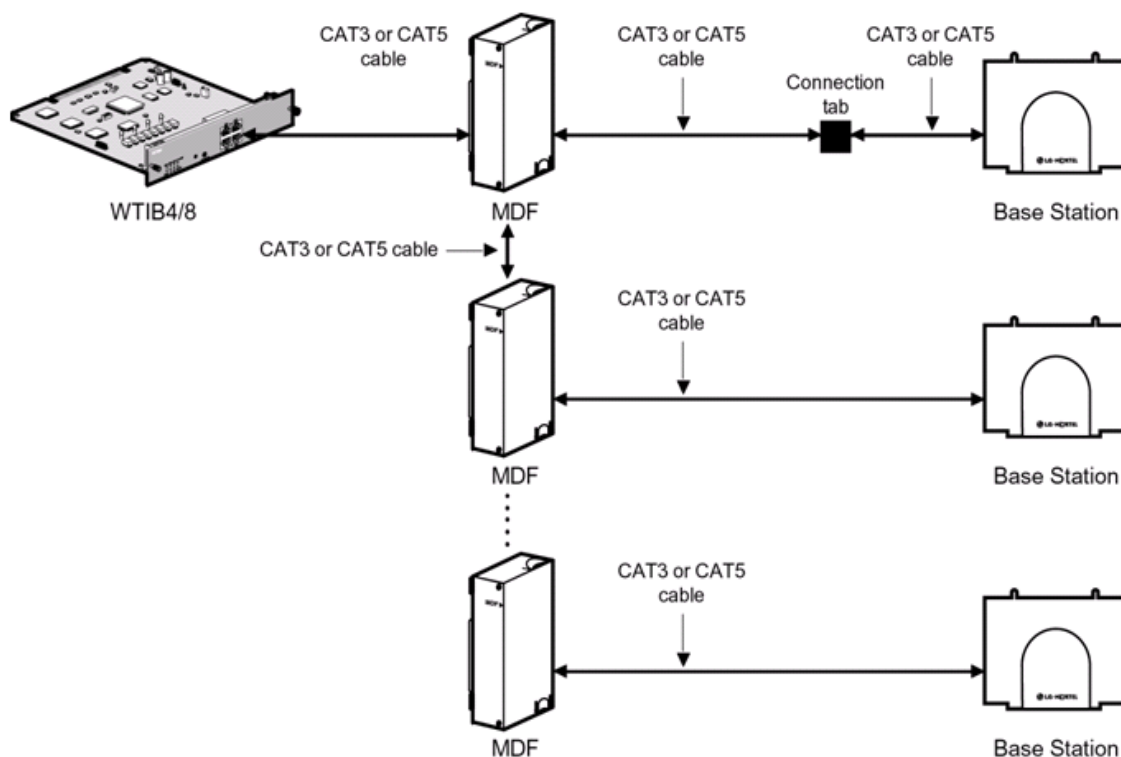
Ferrite core is provided in the packaging of the Base Station for EMI. The Ferrite core should be installed when the WTIB4/8 is installed in the MBX IP system. One Ferrite core is to be used with the line cord between the Base Station and each port of WTIB4/8 (as shown).



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 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.).

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)

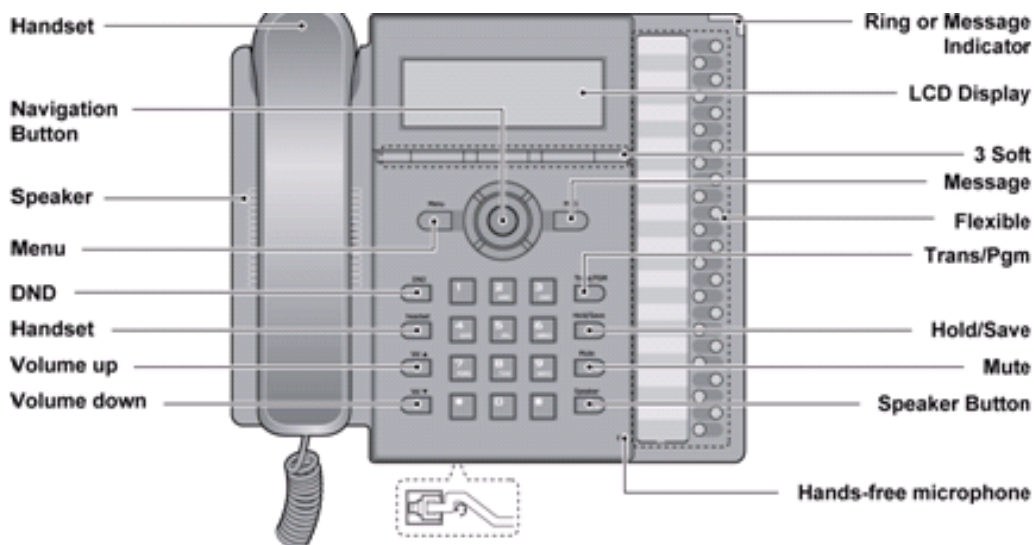
DKTU (Station 100) Admin. Programming

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	
Argentina	54
Australia	61
Azerbaijan	994
Bahrain	973
Bangladesh	880
Belarus	375
Belgium	32
Bolivia	591
Brazil	55
Brunei	673
Cameroon	237
Chile	56
China (P.R.C)	86
Colombia	57
Costa Rica	506
Cyprus	357
Czech (Slovak)	42
Denmark	45
Ecuador	593
Egypt	20
El Salvador	503
Ethiopia	251
Fiji	679
Finland	358
France	33

Nation/Code	
Gabon	241
Georgia	995
German	49
Ghana	233
Greece	30
Guam	671
Guatemala	502
Guyana	592
Haiti	509
Honduras	504
Hong Kong	852
India	91
Indonesia	62
Iran	98
Iraq	964
Ireland	353
Israel	972
Italy	39
Japan	81
Jordan	962
Kenya	254
Korea	82
Kuwait	965
Kyrgyzstan	996
Liberia	231

Nation/Code	
Libya	218
Luxembourg	352
Malaysia	60
Moldova	373
Malta	356
Mexico	52
Monaco	377
Morocco	212
Myanmar (Burma)	95
Netherlands	31
New Zealand	64
Nigeria	234
Norway	47
Oman	968
Pakistan	92
Panama	507
P.N.G	675
Paraguay	595
Peru	51
Philippines	63
Poland	48
Portugal	351
Qatar	974
Rumania	40
Russia	7

Nation/Code	
Saudi Arabia	966
Senegal	221
Singapore	65
South Africa	27
Spain	34
Sri Lanka	94
Swaziland	268
Sweden	46
Switzerland	41
Tajikistan	992
Telkom	*27
Telstra	*61
Thailand	66
Tunisia	216
Turkey	90
Turkmenistan	993
U.A.E.	971
Ukraine	380
United Kingdom	44
Uruguay	598
U.S.A	1
Uzbekistan	998
Venezuela	58
Vietnam	84
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

BUTTON	ITEM	DEFAULT VALUE (Numbering Plan Type 1)
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
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

BUTTON	ITEM	DEFAULT VALUE (Numbering Plan Type 1)
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
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

BUTTON	ITEM	DEFAULT VALUE (Numbering Plan Type 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.

THIS PAGE INTENTIONALLY LEFT BLANK.

Chapter 8

Troubleshooting

Symptoms & Solutions

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

PROBLEM	CAUSE/SYMPTOM	SOLUTION
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 extraction the board 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

PROBLEM	CAUSE/SYMPTOM	SOLUTION
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 max. 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.
SLT does not operate	Bad DSIU/SLIB12/SLIB24/SLIB12C/SLIB24C	- Exchange the board by 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.
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.
	2 nd KSU, 3 rd KSU PSU OFF	- Check 1st KSU for Power OFF
Noise on External MOH 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.

Index

B

BKSU Unpacking, 3-3

C

CO Line Boards, 4-14

D

DECT Installation, 6-3

DTIB12C/24C, 4-30

E

EKSU Unpacking, 3-4

Entering Programming Mode, 7-3

Extension Boards, 4-25

External Backup Battery, 3-11

F

Ferrite Core Installation and Wiring, 6-11

Frame Ground Connection, 3-10

I

Important Safety Instructions, 1-1

Initializing Databases, 7-1

K

KSU Diagram, 3-5

KSU Mounting, 3-13

L

LCOB4/LCOB8/LCOB12, 4-14

M

Main Processing Board, 4-2

MB and MBE Diagrams, 3-6, 3-7

P

Power Supply Unit, 3-8

Pre-Installation, 3-1

PRIB, 4-21

R

Rack Mount Wiring, 5-12

Resetting the System, 7-3

S

Safety Requirements, 1-1

Serial to Audio Jack Cable Specification, 4-44

SLIB12/24C, 4-25

Specifications, 2-4

System Components, 2-3

System Connection Diagram, 2-2

T

Terminal Cabling Distance, 5-2

Troubleshooting, 8-1

Types of Connectors, 3-12

U

Using Expansion Cable, 3-16

V

VMIB, 4-35

VOIB8/24, 4-40

W

Wall Mount Wiring, 5-11

Wiring Precautions, 3-2