# iPECS

# iPECS eMG800

## Hardware Description & Installation Manual

ERICSSON | LG

Please read this manual carefully before operating System.
Retain it for future reference.

# Regulatory Information

Before connecting the iPECS eMG800 to the telephone network, you may be required to notify your local serving telephone company of your intention to use "customer provided equipment". You may further be required to provide any or all of the following information:

**PSTN line Telephone numbers to be connected to the system**

- Model name: iPECS eMG800
- Local regulatory agency registration number: consult local Ericsson-LG Enterprise representative
- Ringer equivalence: 1.1
- Registered jack: RJ-45

This equipment complies with the following regulatory standards, that is, the safety requirements of EN60950-1, and the EMC requirements of EN55032 and EN55024.

If the telephone company determines that customer provided equipment is faulty and may possibly cause harm or interruption in service to the telephone network, it should be disconnected until repair can be affected. If this is not done, the telephone company may temporarily disconnect service.

The local telephone company may make changes in its communications facilities or procedures. If these changes could reasonably be expected to affect the use of the iPECS eMG800 or compatibility with the network, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

The iPECS eMG800 complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

**European Union Declarations of Conformity**

Ericsson-LG Enterprise Co.,Ltd. declare that the equipment specified in this document bearing the " CE" mark conforms to the European Union Radio Equipment Directive(RED, 2014/53/EU), including the Electromagnetic Compatibility Directive(EMCD,2014/30/EU) and Low Voltage Directive(LVD, 2014/35/EU). Copies of these Declarations of Conformity (DoCs) can be obtained by contacting your local sales representative.

**FCC/CSA Interference Statement**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.

This device complies with part 15 /RSS-GEN of the FCC/IC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference; and (2) This device must accept any interference received, including interference that may cause undesired operation.

(1) l'appareil ne doit pas produire de brouillage, et (2)   l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations, CAN ICES-3(A)/NMB-3(A)

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information contact your Local Industry Canada office.

 **CAUTION**

Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

ATTENTION: Tout changement ou modification dans la construction de cet appareil qui ne sont pas expressément approuvé par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser l'équipement.

 WARNING

This is a class A product. In a residential environment, this product may cause radio interference in which case the user may be required to take adequate measures.

 WARNING

This equipment generates and uses R.F. energy, and if not installed and used in accordance with the Instruction Manual, it may cause interference to radio communications. It has been tested and found to comply with the appropriate limits for a telecommunication device. The limits are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area could cause interference, in which case the user, at their expense, will be required to take whatever measures may be required to correct the interference.

**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 2012/19/EC.



- All electric and electronic products should be disposed of only 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 detailed information about disposal of your old appliances, please contact your city office, waste disposal service or the place of product purchase.

# Revision History

| ISSUE | DATE | DESCRIPTION OF CHANGES |
|---|---|---|
| 1.0 | Feb., 2015 | Initial Release |
| 1.1 | June, 2015 | S/W version 1.2.x.<br>- Update Pre-installation guide for power cord<br>- Update the system capacity<br>- Minor error correction |
| 1.2 | Jan., 2016 | S/W version 2.0.x.<br>- Added GDC-480H, LDP-9200 Series, LIP-9071 Phone. |
| 1.3 | Aug., 2016 | S/W version 2.1.x.<br>- Minor error correction |
| 1.4 | Mar., 2019 | S/W version 3.5.x.<br>- General Update (Style, Chart, Fonts) |
| | Apr.,2019 | Updated LIP-9048 DSS Installation |
| 1.5 | Dec., 2019 | S/W version 4.0.x.<br>- General Update (Style, Chart, Fonts) |
| | Feb., 2020 | - Added 1000i Series |
| 1.6 | Sep., 2020 | S/W version 4.1.x.<br>- Applied S/W version 4.1.x |
| 1.7 | Mar., 2021 | S/W version 5.0.x.<br>- Applied S/W version 5.0.x<br>- Added 1080i,1048idss,1048ilss<br>- Added "Short Caution" for DTIB12C/24C |
| 1.8 | Jan., 2022 | S/W version 6.0.x.<br>- Applied S/W version 6.0.x(General Update) |

# Table of Contents

# 1 Introduction

## 1.1 Important Safety Instructions

### 1.1.1 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 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 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 at 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 is a remote risk of electric shock and serious injury from lightning.

- In the event of a gas leak, do not use the telephone near the leak.

## 1.1.2    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 iPECS eMG800 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 Ericsson-LG Enterprise service center.

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

- 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 failure of the system, do not expose this product to rain or any type of moisture.

- To protect the internal components from static electricity, discharge body static before touching connectors and/or components by touching ground or wearing a ground strap.

- To reduce the risk of fire, use only No. 26 AWG or larger (e.g., 24 AWG) UL Listed or CSA Certified Telecommunication Line Cord.

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

- A supplementary equipment earthing conductor is to be installed between the product or system and earth, that is, in addition to the equipment earthing conductor in the power supply cord.

- Disconnect the Telecom connection before disconnecting the power connection prior to relocating the equipment and reconnect the power first.

- This system is equipped with an earthing contact plug. For safety reasons this plug must only be connected to an earthing contact socket which has been installed according to regulations.

⚠ **WARNING**

Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and local disposal requirements.

## 1.2    Manual Use

This document provides general information covering the hardware description and installation of the iPECS eMG800 System. While every effort has been taken to ensure the accuracy of this information Ericsson-LG Enterprise Co., Ltd. makes no warranty of accuracy or interpretations thereof.

### Section 2 System Overview

General information on the iPECS eMG800 System, including system specifications and capacity.

### Section 3.KSU Installation

Instructions for installation of the iPECS eMG800 cabinets.

### Section 4 Board Installation

Detailed instructions for installing and wiring components of the iPECS eMG800 Board.

### Section 5 Terminal connection and Wiring

Description of terminals, wiring distance, and terminal wiring connections.

### Section 6 Start iPECS eMG800 System

Describes procedures to default the iPECS eMG800 system database in preparation for Admin configuration.

### Section 7 Troubleshooting

Explains common troubleshooting issues.

### Section 8 Notice Open source

Provides information on open source software

# 2  System Overview

## 2.1     iPECS eMG800 System Highlights

iPECS eMG800 is an innovative hybrid platform maximizing the cost and communication effectiveness for SME.

With innovated high-performing CPU, VoIP and unified system software, eMG800 provides cost effective telephony features and seamlessly expandable IP and UC as they are required.

eMG800 provides increased capacity up to 1,200 ports, out of the box advanced telephony features, valuable applications with easy to deploy, manage and use.

**Hi performing MPB & High capacity VoIP**
- Expanded system capacity: 1,200 ports
- High density VoIP option: 128 channels
- Single MPB with System port license

**Unified System software**
- Simple and easy to learn and use
- Powerful UCP features and Applications available to hybrid system cost effectively.

**Features of the iPECS eMG800 System include:**
- Seamless expandability with cost-effectiveness
- High-Capacity VoIP with enhanced IP features
- Advanced telephony features
- Embedded UC
- Valuable applications
- New terminals (LIP-9000 series, LDP-9000 series, etc.)
- Software Assurance Policy
- Value-Added features
  - Distinctive and Enhanced Voice Mail Function and Multi Language
  - Basic CID [FSK, DTMF, RUS CID] Function for CO & SLT
  - Basic 6 DKT + 6 SLT ports on MPB
  - Basic 4 AA Function and 4 VoIP channels on MPB can be added by the License
  - Built in PLL Circuit for ISDN Clock Synchronization, No need cabling
  - Built in 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)

## 2.2    System Connection Diagram

The following figure System Connection Diagram shows the components that make up the iPECS eMG800 solution:
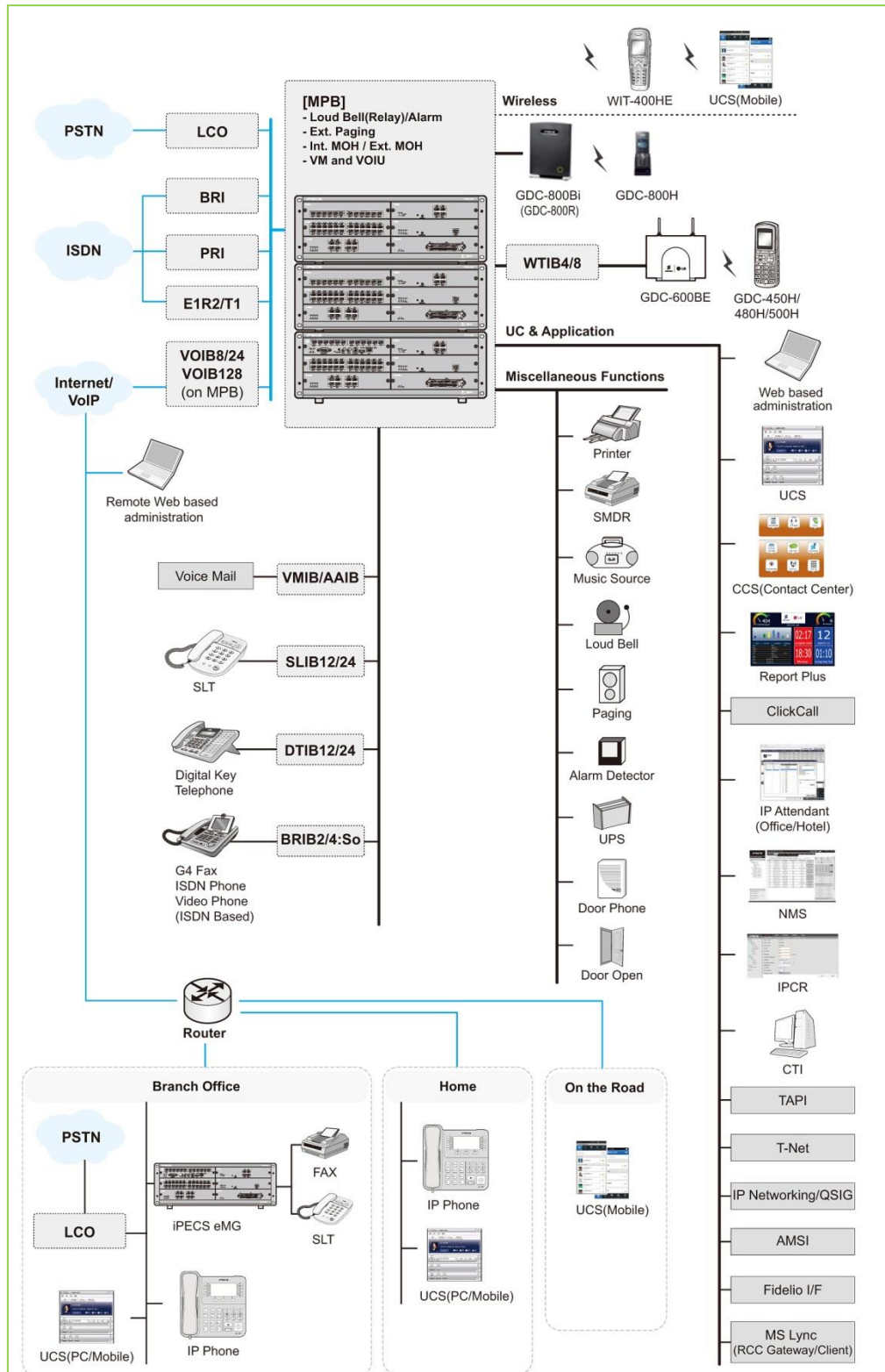


**Figure 2.2-1 System Connection Diagram**

## 2.3      System Components

| ITEM | OPTION BOARD | DESCRIPTION |
|---|---|---|
| BKSU | | Basic KSU |
| EKSU | | Expansion KSU |
| PSU | | Power Supply Unit (350W) |
| Main Board | MPB | Main Processor Board 800 w/6 DKT, 6 SLT |
| | | MODU | Modem Unit |
| | | VOIB128 | 128 channel VoIP Interface Board (Default:32 / Max.:128) |
| Trunk Boards | LCOB4 | 4 LCO Interface Board |
| | | CMU4 | 4 Call Metering Unit (50Hz/12KHz/16KHz) |
| | LCOB8 | 8 LCO Interface Board |
| | | CMU4 | 4 Call Metering Unit (50Hz/12KHz/16KHz) |
| | LCOB12 | 12 LCO Interface Board |
| | | CMU4 | 4 Call Metering Unit (50Hz/12KHz/16KHz) |
| | BRIB2 | 2 So/To Interface Board (4 channels) |
| | BRIB4 | 4 So/To Interface Board (8 channels) |
| | PRIB | DCO Interface Board (1 PRI or 1 E1R2, 30chs / 1 T1, 24chs) |
| Extension Boards | SLIB12 | 12 SLT Interface Board |
| | SLIB12C | 12 SLT Interface Board (RJ21) |
| | SLIB24 | 24 SLT Interface Board |
| | SLIB24C | 24 SLT Interface Board (RJ21) |
| | DTIB12 | 12 DKT Interface Board |
| | DTIB12C | 12 DKT Interface Board (RJ21) |
| | DTIB24 | 24 DKT Interface Board |
| | DTIB24C | 24 DKT Interface Board (RJ21) |
| Function Boards | VMIB | Voice Mail Interface Board (8 channels, 100 hrs) |
| | AAIB | Auto Attendant Interface Board (8 channels) |
| | VOIB8 | 8 channel VoIP Interface Board |
| | VOIB24 | 24 channel VoIP Interface Board |
| DECT | GDC-600BE | DECT Base Station (6 channels per Base) |
| | WTIB4 | 4 channel DECT Wireless Terminal Interface Board |
| | WTIB8 | 8 channel DECT Wireless Terminal Interface Board |
| | WMK | Wall Mount Bracket |

## 2.4      General Specifications

### 2.4.1      Dimension and Weight

| ITEM | HEIGHT (mm) | WIDTH (mm) | DEPTH (mm) | WEIGHT (kg) |
|------|-------------|------------|------------|-------------|
| BKSU | 170.2 | 440 | 325.4 | 6.2 |
| EKSU | 170.2 | 440 | 325.4 | 6.25 |

### 2.4.2      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 | |

### 2.4.3      System Electrical

| ITEM | SPECIFICATION (PSU) |
|------|---------------------|
| **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 |
| **Battery Backup** | |
| • PSU Input Voltage | 24Volt DC |
| • PSU Battery Fuse | 15.0A @250Volt AC |
| • Charging Current | Max. 1A |

### 2.4.4      PSU Fan

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

### 2.4.5      Station Distance from the System

| ITEM | 22 AWG Wire (m/kft) | 24 AWG Wire (m/kft) |
|------|---------------------|---------------------|
| Digital Keyset | 500 / 1.6 | 330 / 1 |
| Single Line Telephone | 7, 500 / 24.6 | 5, 000 / 16.5 |

### 2.4.6    DECT Base Station (GDC-600BE)

| ITEM | SPECIFICATION |
|---|---|
| Power feeding | +30V DC |
| Transmission Max. Power | 250mW |
| Access Method/Duplex | TDMA/TDD |
| Frequency Band | 1,880 ~ 1,900MHz<br>1,920 ~ 1,930MHz (USA) |
| Channel Spacing | 1.728MHz |
| Modulation | GFSK |
| Data rate | 1.152Mbps |
| Max. Base Station distance from the WTIB | 600m (twisted 2–pair cable) |

### 2.4.7    CO Loop

| ITEM | SPECIFICATION |
|---|---|
| Ring Detect Sensitivity | 30Vrms @20–50Hz |
| DTMF Dialing | |
| Frequency Deviation | Less than +/– 1.8 % |
| Signal Rise Time | Max. 5ms |
| Tone Duration, on time | Min. 50ms |
| Inter–digit Time | Min. 30ms |
| Pulse Dialing | |
| Pulse Rate | 10 pps |
| Break/Make Ratio | 60/40%, 66/33% or 50/50% |

### 2.4.8    Wireless DECT Terminal

| ITEM | SPECIFICATION |
|---|---|
| Max. Transmission Power | 250mW |
| Modulation Method | GFSK |
| Frequency Band | 1, 880MHz ~ 1, 900MHz, 1,920 ~ 1,930MHz (USA) |

### 2.4.9    MPB VOIP

| ITEM | SPECIFICATION |
|---|---|
| LAN Interface | 10 / 100 /1000 Base–T Ethernet (IEEE 802.3) |
| Speed | 10 /100 /1000Mbps (Auto–Negotiation) |
| Duplex | Half Duplex or Full Duplex (Auto–Negotiation) |
| VoIP Protocol | SIP and H.323 |
| Voice Compression | G.711/G.729/G.723.1 |
| Voice/Fax Switching | T.38 |
| Echo cancellation | G.168 |

## 2.4.10    VOIP channels (VOIB)

| 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 | SIP and H.323 |
| Voice Compression | G.711/G.729/G.723.1 |
| Voice/Fax Switching | T.38 |
| Echo cancellation | G.168 |

## 2.4.11    Other System Specifications

| ITEM | DESCRIPTION | SPECIFICATION |
|------|-------------|---------------|
| CPU | | M86295G, Cortex A9 (32bit, 900MHz) |
| Switching Device | | ACT2, Custom Mixed–Signal ASIC Device |
| RTC 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 | USB1.1 or 2.0 and USB 3.0 compliant |
| | Mode | Host Mode (Memory stick) only |

## 2.5     System Capacity

| Item | Capacity/Board | Total |
|---|---|---|
| Time Slots | | 144 per KSU, Total Max. 864 |
| Max. Ports | | 1200 |
| CO Line Ports | | 600(TDM) |
| Max. Direct Station (DKT, SLT, DSS, S0) Connections | | 840(TDM) |
| LAN Port | 1/MPB, 1/VOIB8, VOIB24 1/VMIB, AAIB | 1 |
| MODEM Channel | 1/MODU | 1 |
| Intercom Links | Non–Blocking | |
| Internal MOH (13 Music Resources) | 1/MPB | 1 |
| External MOH | 1/MPB | 1 |
| External Paging port | 1/MPB | 1 |
| External Relay Contact | 2/MPB | 2 |
| Alarm Input | 1/MPB | 1 |
| RS–232C Port | 1/MPB, 1/IPP Board | 1 |
| USB Port | 1/MPB, 1/VMIB, AAIB | 1 Host mode (Memory stick) only |
| CPT/CID/ CO DTMF Detection channels | 32 channels (MPB) | 32 channels (MPB) |
| PFT Circuit | 1/LCOB4, LCOB8, LCOB12 | |
| WTIB | | 3 |
| TDM DECT Base | | 24 |
| IP DECT Base | | 128 |
| DECT phones | | 192 |

| Item | Capacity |
|---|---|
| Conference channels | 148 channels/ 13 party per group |
| External Page | 1 port |
| Internal Page | 100 zones |
| System Speed Dial | 8000 numbers, 25 digits each |
| System Speed Dial Zones (Groups) | 10 zones |
| Station Speed Dial | 100 per station, 25 digits each (Max. 12,000 numbers) |
| Last Number Redial | 10 numbers |
| Save Number Redial | 1 number |
| DSS Consoles per Station | 3 |
| Serial DSS - System | 500 |
| Serial DSS – Station (LIP-8000) | 4 |
| Serial DSS – Station (LIP-9000) | 1 |
| SMDR buffer | 10,000 |
| CO Line Groups | 200 |
| Station & Station Groups | 200 |
| Station & Station Group Members | 200 |

| Item | Capacity |
|---|---|
| Pickup Group | 200 |
| Pickup Group Member | 12,000 |
| Conference Groups - System | 160 |
| Conference Groups - Station | 100 per station |
| Executive/Secretary pairs | 100 |
| Authorization Codes | 2,400 (Station: 1,200/System: 1,200) |
| Transparent Networking Table | 32 |
| ICLID Routing table | 250 |
| Tenancy (ICM) Group | 32 |
| Attendant Station | 5 |
| DID Digits Analysis | 4 |
| MSN Table | 1,500 |

## 2.5.1    System Maximum Call Capacity

| iPECS eMG800, MPB | MAXIMUM PORT | | | | | | |
|---|---|---|---|---|---|---|---|
| | EXTENSION | | | TRUNK | | | |
| | SO | DKTU | SLT | PRI | BRI | CO | IP (w/ VOIB128) |
| 1st KSU | 40 | 126*1 | 126*2 | 120 | 40 | 60 | 120 (+128) |
| Total | 132 | | | 120 (248) | | | |
| | 132 | | | | | | |
| 1st KSU + 2nd KSU | 88 | 270 | 270 | 240 | 88 | 132 | 264 (+128) |
| Total | 276 | | | 264 (392) | | | |
| | 276 | | | | | | |
| 1st + 2nd + 3rd KSU | 136 | 414 | 414 | 360 | 136 | 204 | 408 (+128) |
| Total | 420 | | | 408 (536) | | | |
| | 420 (536) | | | | | | |

- BKSU: MPB + 5 Universal Slots, EKSU: 6 Universal Slots
- Each Board Max CH:   SLT/DKT 24, LCO 12, BRI 8, PRI 30, VOIB 24, WTIB 24
- Each Rack: TDM Max 144 CH

**example)**

SLT Max → BKSU : 24 * 5 + 6(DSIU) = 126 ports,

SLT + DKT Max → BKSU: 24 * 5 + 6(DSIU SLT) + 6(DSIU DKT) = 132 ports,

EKSU STA Max: 24 * 6 = 144 (1 Rack)

- • DSIU DKT 6 + (5) DTIB24
- • DSIU SLT 6 + (5) SLIB24
- - Max. WTIB: 3ea
- - Max. WTIB: 3 each, when installing more than one WTIB4/8, install all WTIB4/8 in the same KSU

eMG800 can be consisted of two 1st + 2nd + 3rd KSU and 1st + 2nd + 3rd KSU.

## 2.6      Installation Overview
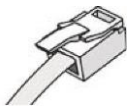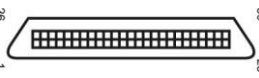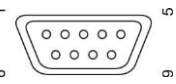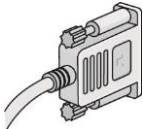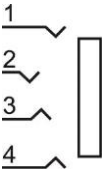
### 2.6.1      General Installation Procedure
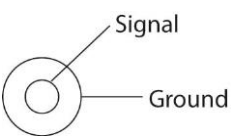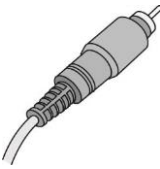
The basic steps to install an iPECS eMG800 are:

1) Locate the area for installing the system

1) Verify all equipment for the installation is on-site

2) Install the Basic and Expansion cabinets

3) Install the various boards in the cabinets

4) Wire the boards to the appropriate termination points

5) Wire and connect terminals

6) Initial power-up to default the database

7) Configure the system, see iPECS Administration & Programming manual

8) Verify the installation.

## 2.7      Types of Connectors

The following chart displays the various types of connectors employed with iPECS eMG800 and the various boards.

| CONNECTOR TYPE | MATING-CONNECTOR | BOARD | PURPOSE |
|---|---|---|---|
| RJ45 | | MPB, VOIB8, VOIB24, VMIB, AAIB, WTIB4, WTIB8, DSIU, DTIB12, DTIB24, SLIB12, SLIB24 LCOB4, LCOB8, LCOB12 PRIB, BRIB4, BRIB8 | LAN Port Telephony Ports DKT Ports SLT Ports LCO Ports ISDN channels Relay and Alarm Port (on MPB) |
| RJ21 (Female) | (Male) | DTIB12C, DTIB24C SLIB12C, SLIB24C | DKT Ports SLT Ports |
| RS–232C | | MPB | Serial Port |
| Serial to Audio Jack | | VOIB8, VOIB24, VMIB, AAIB, PRIB, BRIB2, BRIB4, WTIB4, WTIB8 | Serial Port |

| CONNECTOR TYPE | MATING-CONNECTOR | BOARD | PURPOSE |
|---|---|---|---|
| Audio Jack<br>Signal<br>Ground | | MPB | EXT MOH Port<br>EXT PAGE Port |

## 2.8    Installation and Safety Precautions

Please read the following guidelines concerning installation and wiring before installing the iPECS eMG800 System.    Also, be sure to comply with applicable local regulations.

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.

The iPECS eMG800 System is designed for wall mounting or a freestanding rack.    Avoid installing in the following places:

- In direct sunlight and extremely hot, cold, or humid places (optimal temperature range = 0 to 40C).
- Places where shocks or vibrations are frequent or strong.
- Dusty places or places where the System may encounter water or oil.
- 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 sides of the iPECS eMG800 System.
- Do not stack up the Optional Service Boards.

Be sure to follow these precautions when wiring:

- Do not wire the telephone cable in parallel with an AC power source, computer, fax machine, etc.    If the cables are run near such 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 damaged by foot traffic. Avoid wiring under carpets.
- Do not use the same power supply outlet for computers, fax machine, and other office equipment to avoid inducing RF noise into the iPECS eMG800 system.

- The power and battery switches must be OFF during wiring. After wiring is completed, the power switch may be turned ON.
- 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 unshielded twisted pair cable for connecting CO lines and stations.

**Checking Power cord**

Checking the power cord at least once a year to prevent fire hazard or electric shock.

Be sure to disconnect the power cord from the wall outlet and System′s inlet for the following symptoms:

- Burn marks on the plug.
- The prongs on the plug are deformed.
- The power cord′s inner wires are exposed, broken, etc.
- The power cord′s coating has a crack.
- The power cord is overheating.
- The power cord is damaged.

If the above symptoms find, do not use the power cord and consult your dealer or service representative.

The following is the simple guide to avoid the hazard or disaster:

- Make sure Power cord is properly rated for their intended use, indoor or outdoor, and meet or exceed the power needs of the system being used.
- Inspect cords for damage before use. Check for cracked or frayed sockets, lose or bare wires, and loose connections.
- Never use a cord that feels hot or is damaged in any way.
- Insert plugs fully so that no part of the prongs is exposed when the power cord is in use.

Make sure that the power cord is connected to the system firmly, and then connect the plug to the wall outlet

# 3  KSU Installation

## 3.1    BKSU Unpacking

Open the box and verify the items shown in Figure 3.1-1 BKSU Carton Contents are included:

**Key Service Unit**

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

**Power Cord**          **Backup Battery Cable**
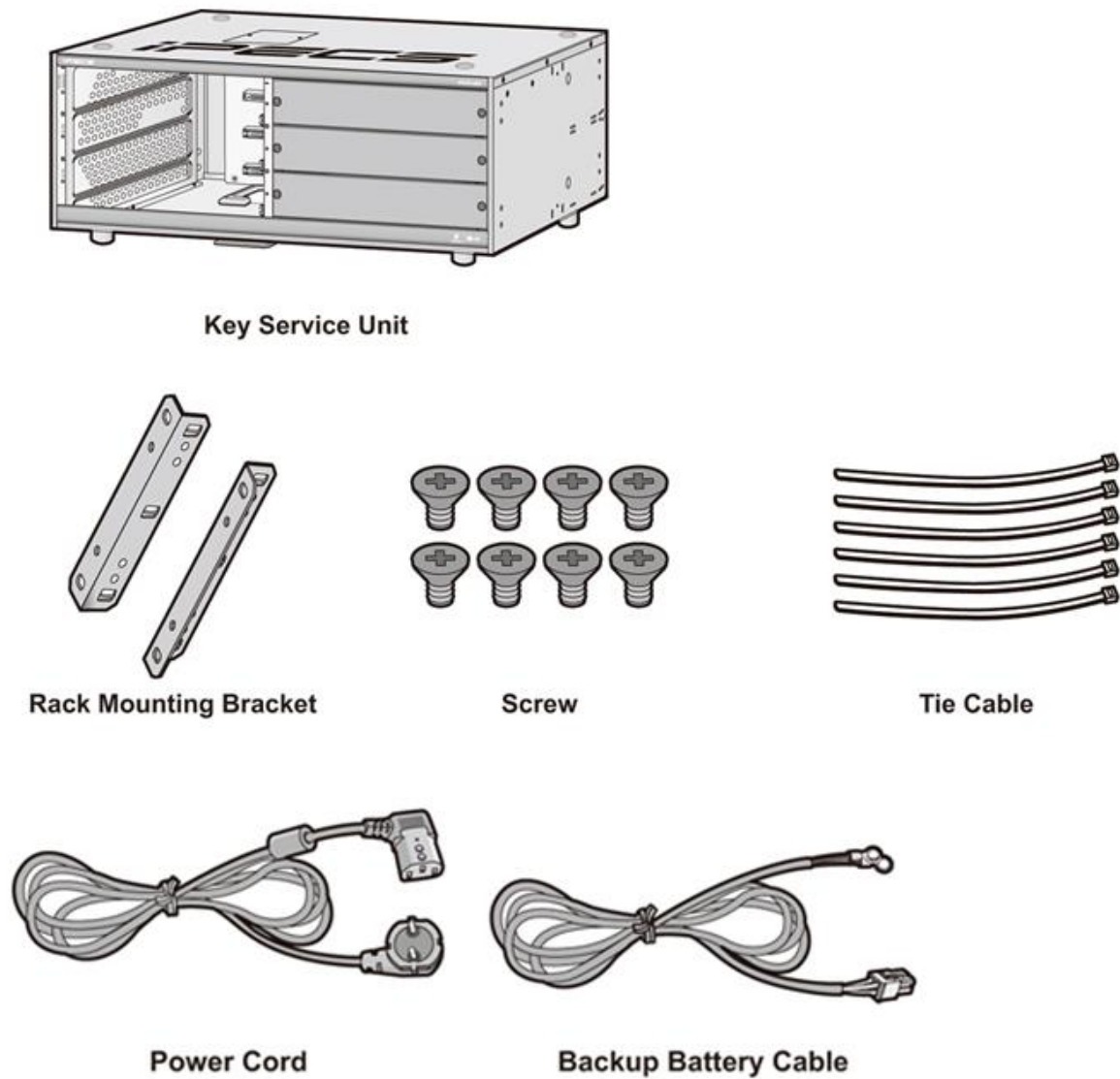
**Figure 3.1-1 BKSU Carton Contents**

## 3.2    EKSU Unpacking

Open the box and verify the items shown in Figure 3.2-1 EKSU Carton Contents are included:

**Key Service Unit**

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

**Expansion Cable**          **Power Cord**          **Backup Battery Cable**

**Fastener**          **Screw**
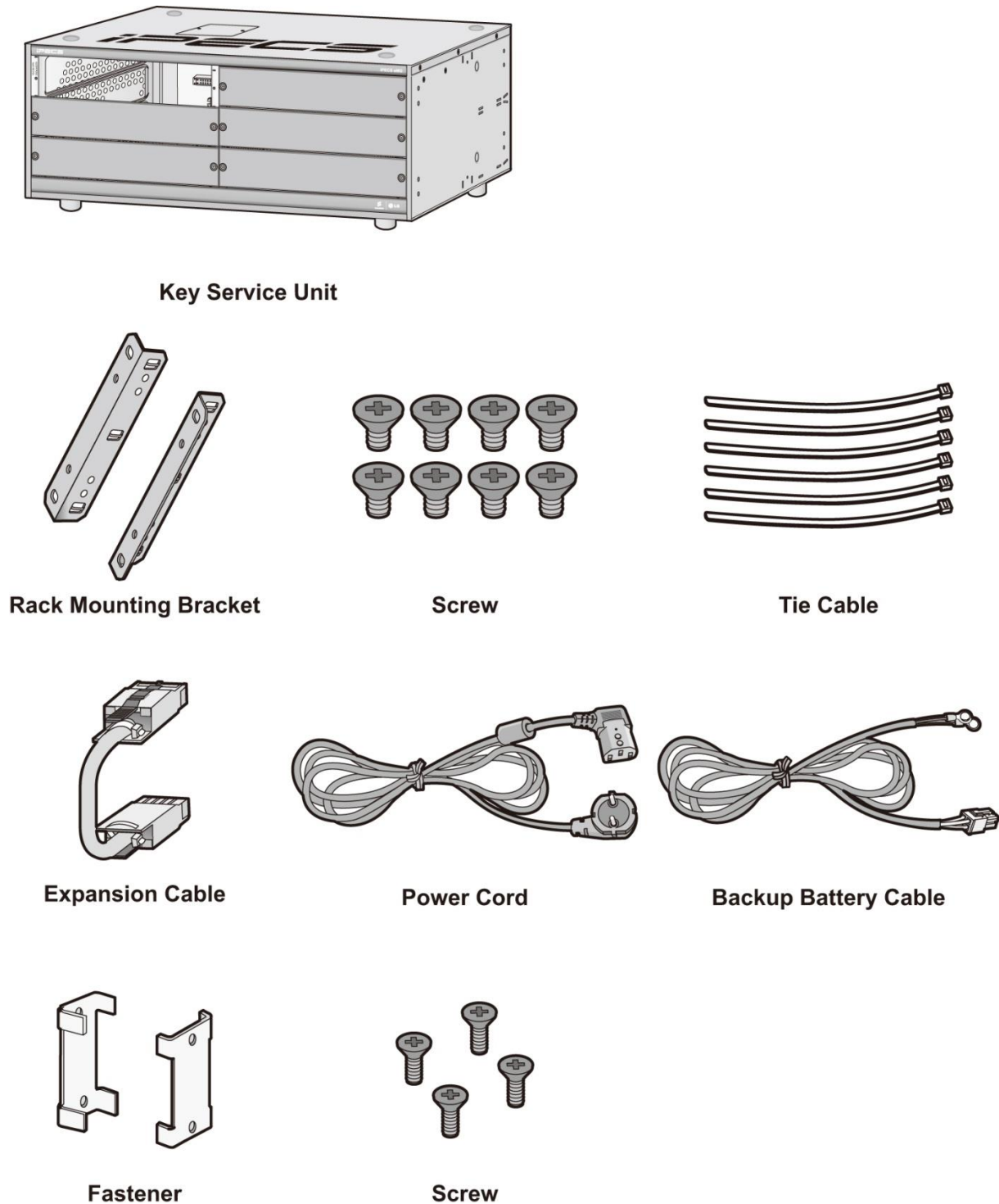
**Figure 3.2-1 EKSU Carton Contents**

## 3.3    KSU Diagram, Exterior and Dimension

For reference purposes, Figure 3.3-1 shows the exterior and dimensions of the KSU.
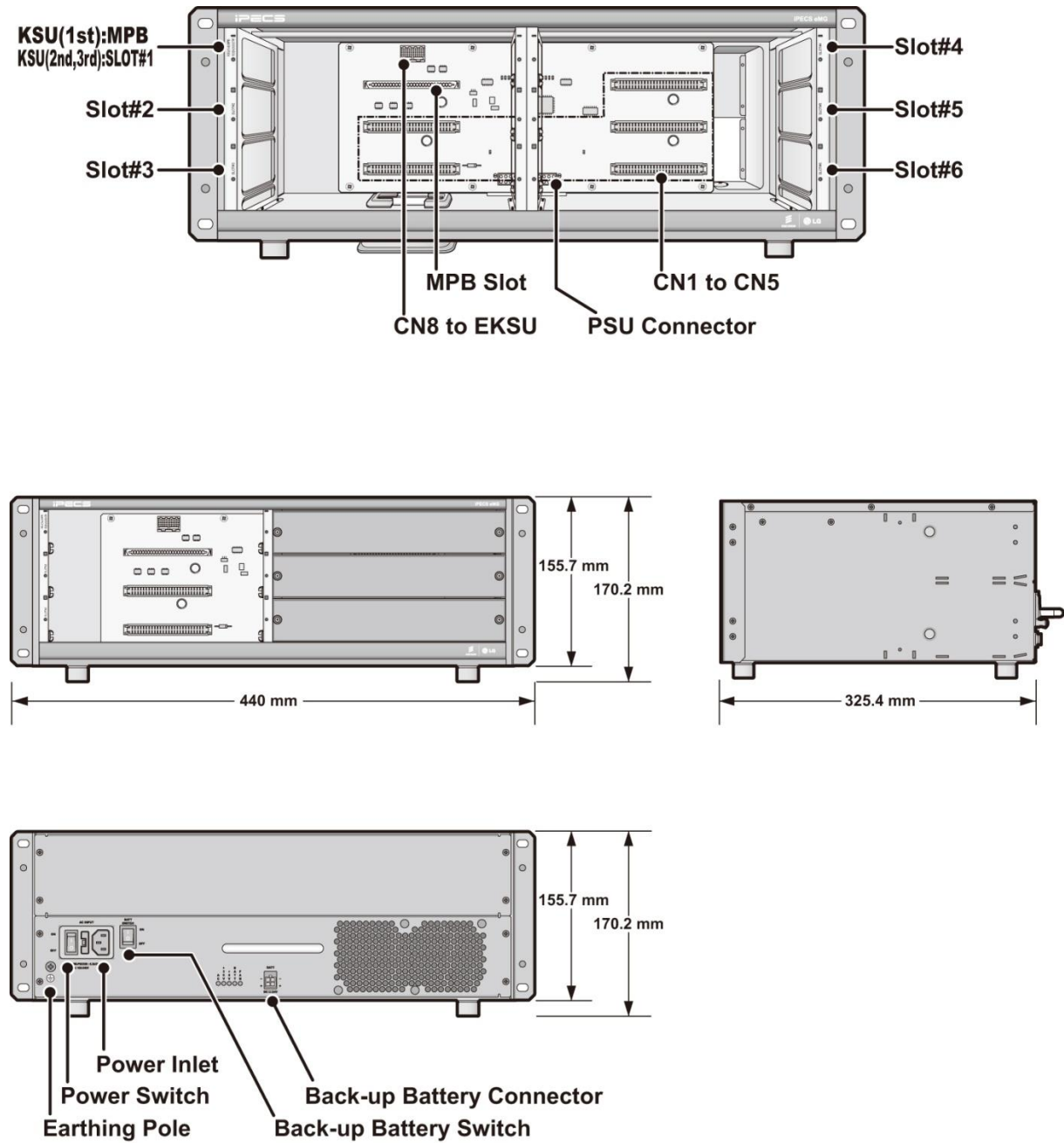


**Figure 3.3-1 KSU Exterior and Dimension**

## 3.4    Basic KSU Mounting

The KSU can be installed on the 19" rack or wall mounted.

### 3.4.1    Rack Mounting

1) Install the Rack Mount brackets to each side of the KSU with the eight (8) screws provided.

2) Insert screws with washers through the Rack Mount bracket flange on each side of the cabinet.

3) As required, thread screws into nuts, or directly into threaded holes in the rack

4) Tighten the screws securely to complete the rack mounting.   These screws are supplied with the rack.
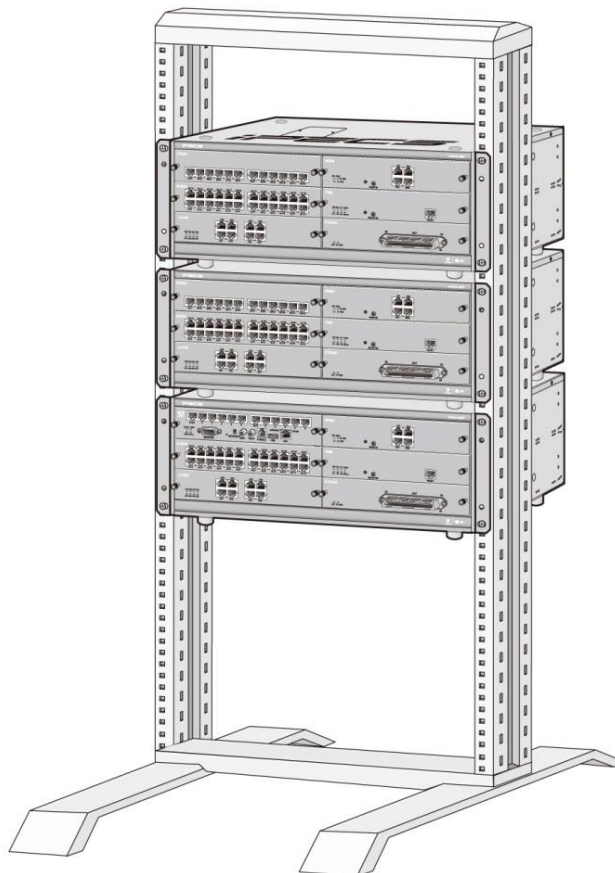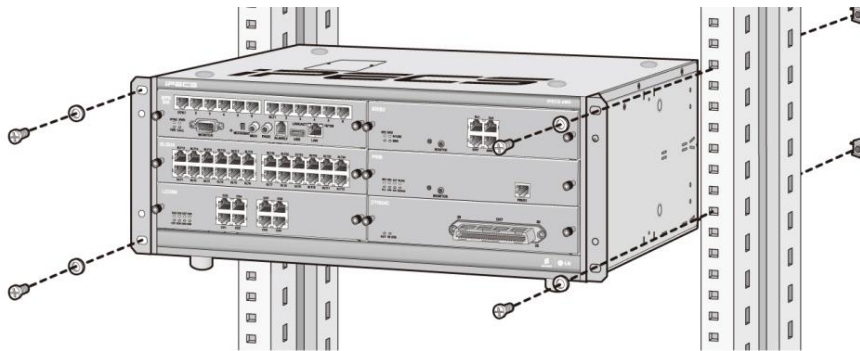
**Figure 3.4.1-1 Rack Mounting**

### 3.4.2    Wall Mounting

1)    Attach the included mounting template for accurate placement to the wall, level, and drill 12 holes.

2)    Install 12 anchor plugs into the wall using the mounting template (Figure 3.4.2 1 Wall Mounting).

3)    Insert 12 included screws into the 12 anchor plugs.

4)    Tighten the screws leaving about 5 mm (0.2 inches) exposed

5)    Hook the Wall Bracket onto installed screws and tighten screws.

6)    Install the Rack Mount brackets to each side of the KSU with the eight (8) screws provided.

7)    Attach the Wall Shelf brackets to the bottom of KSU and affix using the eight (8) screws provided.

8)    Hook the Wall Shelf brackets onto the Wall Bracket, making sure that the System slides down securely.

9)    Affix the Wall Shelf brackets to the Wall Bracket using the four (4) screws provided.
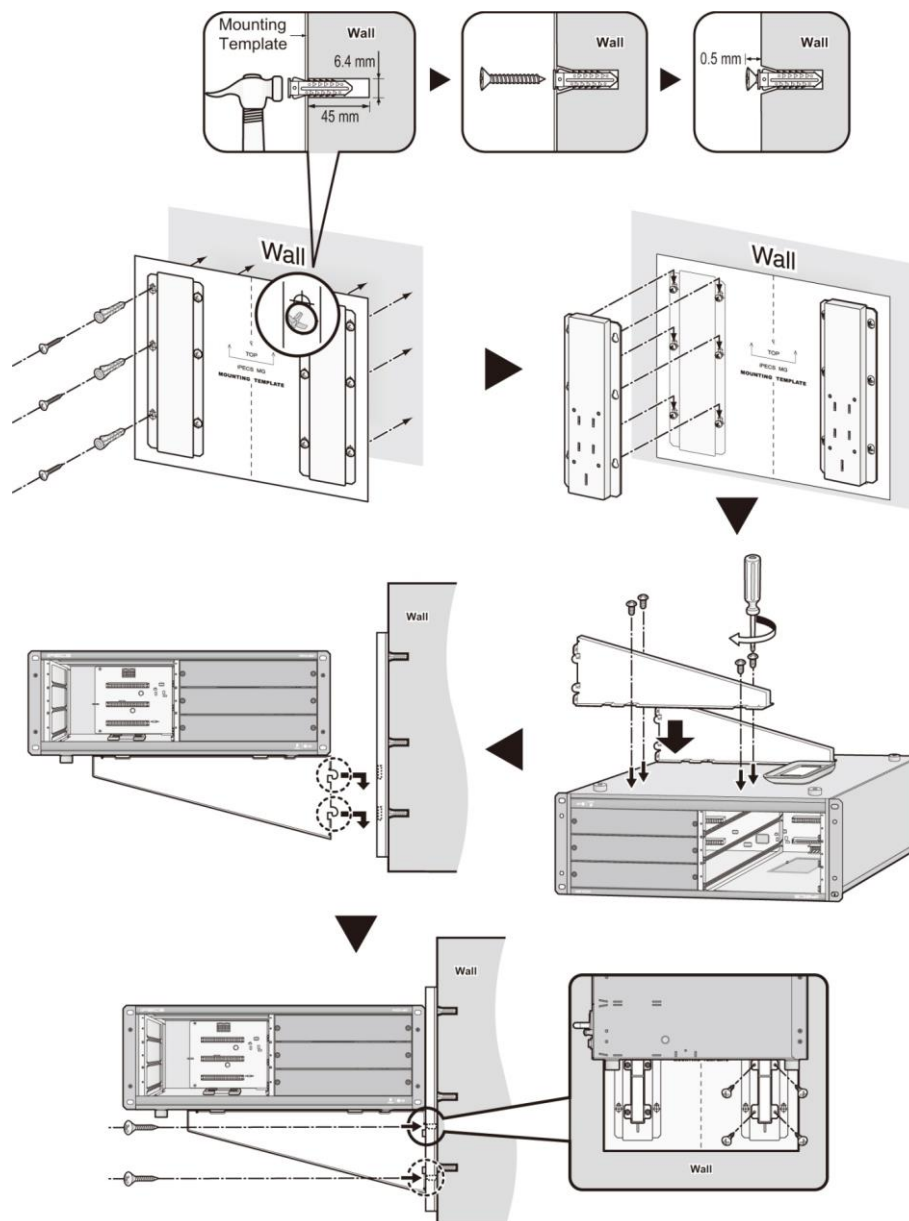


**Figure 3.4.2-1 Wall Mounting**

## 3.5    Expansion KSU Installation

The Expansion KSU is installed on top of the Basic KSU.    Fasteners are installed on each side of the KSUs to maintain a stable mechanical connection.    The Expansion cable is installed to connect the KSU backplane signaling and media (voice) paths.    Use the following instructions and Figure below to install.

1) Remove the Expansion Cable Cover Plates on the top of the BKSU and bottom of the EKSU. Remove the two screws holding the Cover plate and remove the Cover plate.

2) Install the Rack Mounting brackets on the EKSU with the screws provided.

3) For Wall Mounting,
   • Place the EKSU on top of the BKSU, making sure to align the feet of the EKSU with the cavities in the lower KSU.
   • For 19" Rack mounting,
   • Insert screws and washers through the Rack Mounting bracket on each side of the cabinet.
   • If required, thread screws into nuts, or directly into threaded holes in the 19" rack and tighten screws securely.

4) Install the Fasteners on each side of the cabinets using the screws provided with the EKSU.

5) Install the Expansion cable between the two cabinets.    Attach one connector to the C8 mating connector in the lower KSU and the other end to C9 in the upper KSU. It may be necessary to remove the blank Slot cover plates from the front of the KSUs.

⚠ **CAUTION**

Be careful not to bend the pins of Expansion Cable connectors.

If the site requires a second EKSU, install and connect the second EKSU to the first EKSU as described above.
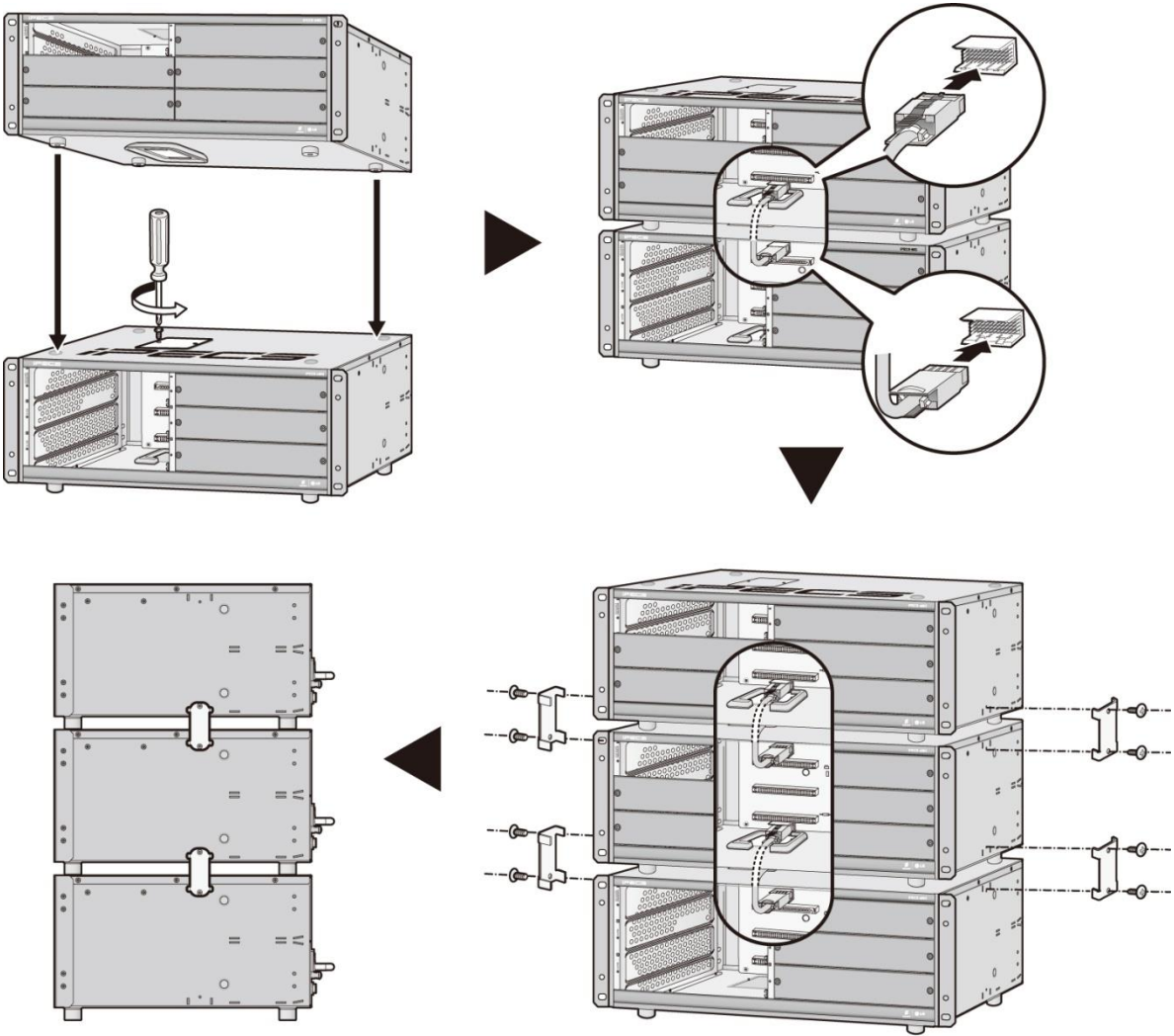
**Figure 3.5-1 Expansion KSU installation**
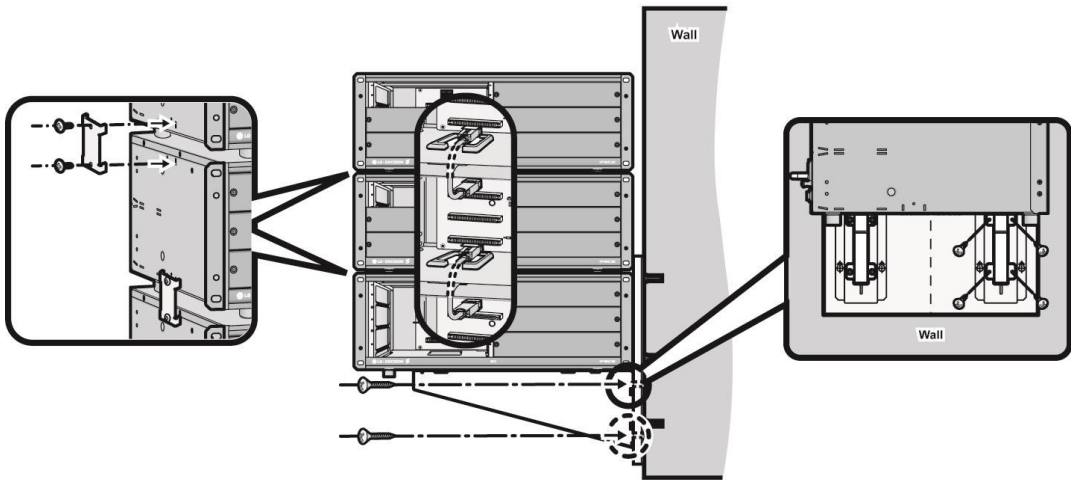


**Figure 3.5-2 Expansion KSU Wall Mounting**
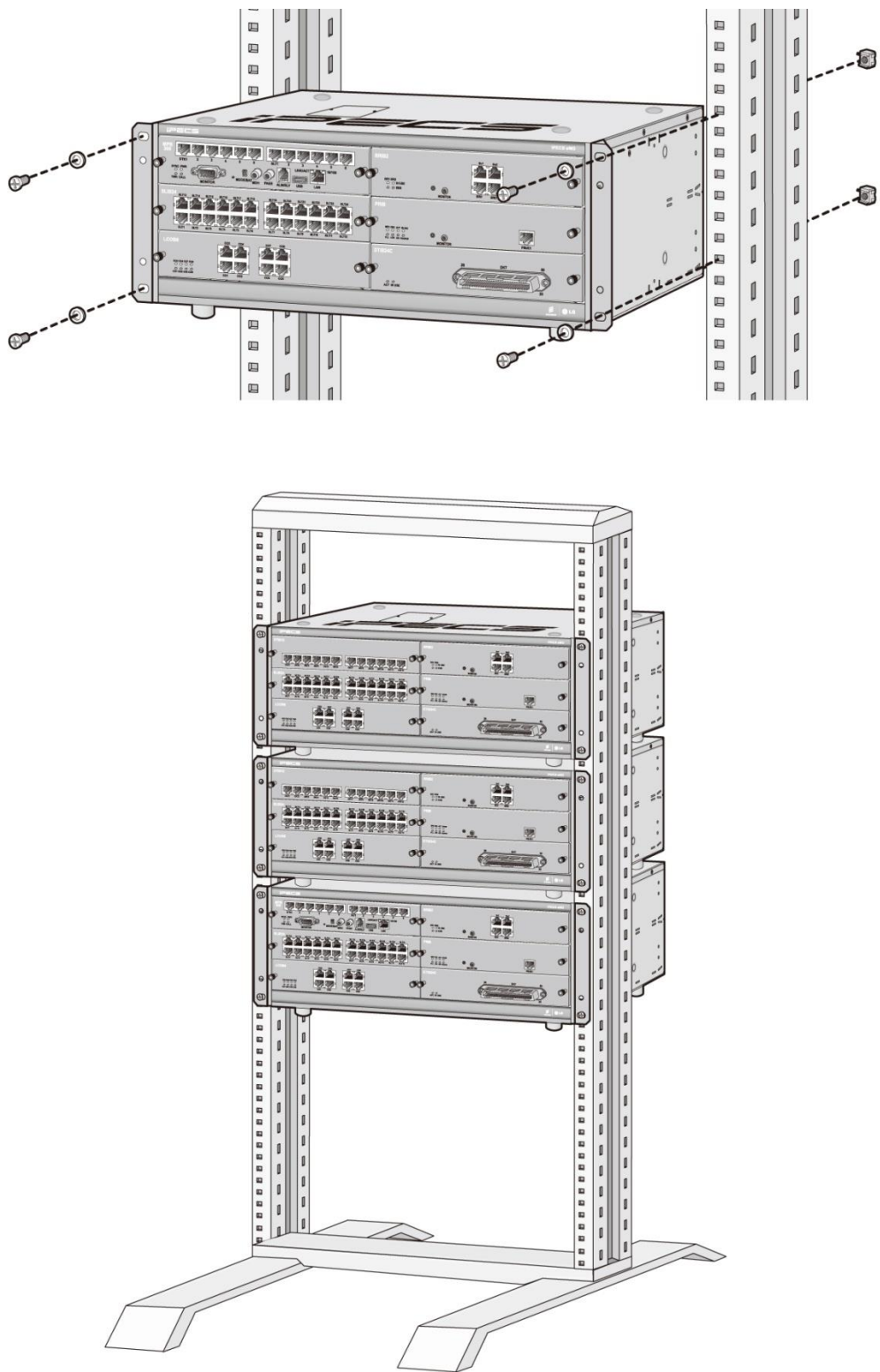
**Figure 3.5-3 Expansion KSU Rack Mounting**

## 3.6      Power Supply Unit Wiring

Each KSU is equipped with a Power Supply Unit (PSU) that converts AC power to the DC voltages required by the system. The DC voltages are distributed to the various boards in the cabinet by the backplane wiring under control of the MPB. For PSU specifications see section 3.6.3.

The PSU in each cabinet should be connected to a common Earth or Frame ground and, if Battery Back-up operation is required, each PSU should be connected to a Battery Back-up circuit. Each PSU also requires a separate connection to AC power.

**NOTE: Proper Power-up and down sequence**
- Turn off the PSU in the EKSU(s) then turn off the PSU in the BKSU. If the PSU in the BKSU is turned off first, the system will automatically remove power from the EKSU.
- The 1st and 2nd KSUs will work independent of the 3rd KSU (power shut-Off).
- The 1st KSU will work independent of the 2nd KSU (powered-Off); however, the 3rd KSU cannot work without the 2nd KSU powered-On.
- It is recommended that the iPECS eMG800 be reset if the PSU in an EKSU is power cycled or turned OFF.

### 3.6.1      Frame Ground Connection

Proper grounding minimizes the affect of power induced and RF noise, and reduces the risk of damage or injury in case of a power cross or lightning strike. Be sure to comply with applicable local regulations regarding grounding of equipment. To ground the system, at each KSU,

1) Assure the system is not connected to AC power.
2) Loosen the Ground lug screw by turning the screw counter-clockwise to loosen, as shown in Figure 3.6.1-1.
3) Strip approximately 15mm (1/2 inch) of insulation from the end of the ground wire.   A UL1015 AWG #18 (1.0mm) green/yellow insulated copper wire should be used with a recommended length of 1 meter (3.28 feet) or less.
4) Insert the grounding wire in the ground lug and tighten the screw.
5) Then connect the grounding wire to an appropriate ground source.   A cold water pipe with no insulated joints is often an acceptable ground.
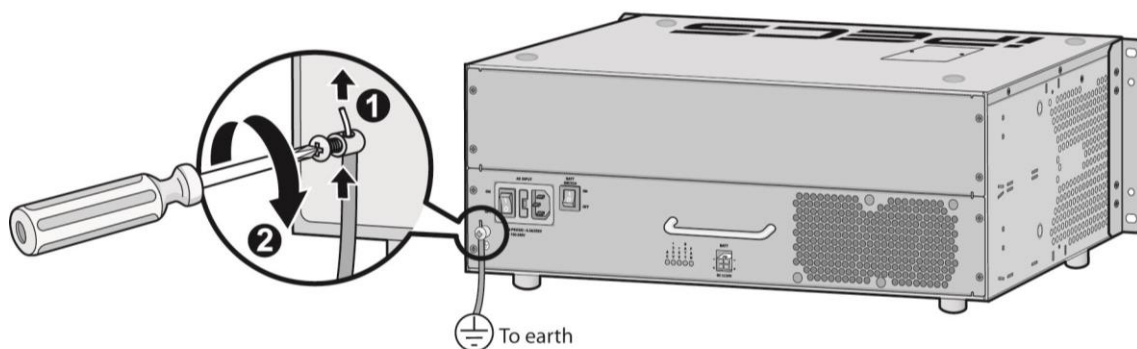


**Figure 3.6.1-1 Grounding the KSU**

## 3.6.2      External Backup Battery Installation

In case of power failure, the external backup batteries automatically maintain uninterrupted power for the iPECS eMG800 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)

2)      Insert a fuse between the batteries as shown.

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

4)      After connecting the external backup battery cable, turn on the battery switch.
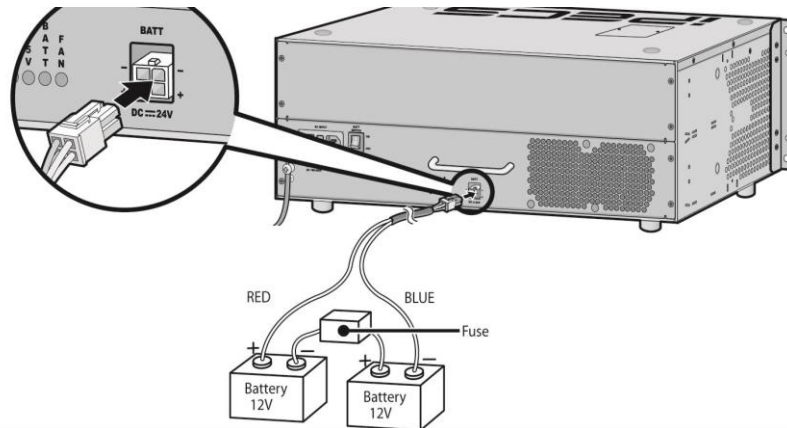
**Figure 3.6.2-1 External Backup Battery Installation**

**NOTE: The cable used to connect the battery is supplied with the KSU**

- 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 1 Amp. PSU battery operation will be halted if the AC power is re-connected or if the battery voltage is too low to maintain full-system operation.

- The length of time that the System will operate on the batteries is dependent on several elements including, battery charge, 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 times for several system sizes and different battery capacities in ampere-hours.

**Table 3.6.2-1 Battery Capacities**

| BATTERY CAPACITY | DKT 24PORTS | 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.
- The battery must supply 24 VDC with a recommended capacity of 20 Amp-hours.
- Carefully check the battery polarity with cable colors (Red and Blue) when connecting the battery to the System.
- 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.

### 3.6.3    Power Supply Unit Replacement

The PSU, which is located at the rear of the KSU, converts AC power to the DC sources required by the system. The PSU includes a replaceable fuse, 6.3 A @ 250V and cooling fans. Each KSU comes equipped with a PSU that is field replaceable.

**Table 3.6.3-1 PSU Capacity**

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

*To remove the existing PSU*

1)    Remove four (4) screws that hold the PSU to the KSU by turning the screws counter-clockwise.

2)    Using the PSU handle pull the PSU from the KSU.

*To install the new PSU*

1)    Insert the PSU along the guide rails on the rear side of iPECS eMG800.

2)    Slide PSU into the KSU to firmly seat the PSU in the backplane connector

3)    To affix securely, insert and tighten four (4) screws as shown below.
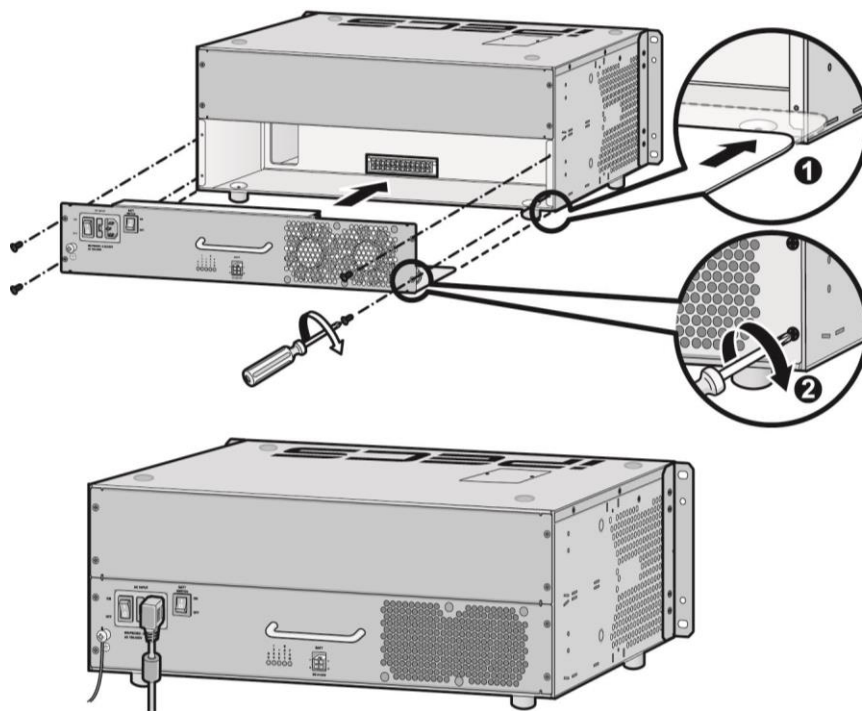


**Figure 3.6.3-1 PSU Installation**

**NOTE**
- Turn OFF the PSU in the EKSU(s) then turn OFF the PSU in the BKSU. If the PSU in the BKSU is turned OFF first, the system will automatically remove power from the EKSU.
- The 1st and 2nd KSUs will work independent of the 3rd KSU (power shut OFF).
- The 1st KSU will work independent of the 2nd KSU (powered OFF); however, the 3rd KSU cannot work without the 2nd KSU powered on.
- It is recommended that the iPECS eMG800 be reset if the PSU to an EKSU is power cycled or turned OFF.

# 4  BOARD INSTALLATION

## 4.1    General Board Install Procedure

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

### ⚠ CAUTION

- Verify the electrical Power is turned OFF before installation of boards.
- 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,*

1)    If required, install any option modules on the board and set any switches.

2)    Slide the board along the guide rails into the KSU until the Board is securely seated in the backplane connector.

3)    Press the thumbscrews in and turn clockwise to affix the Board securely.

4)    Wire the Board connectors as required.
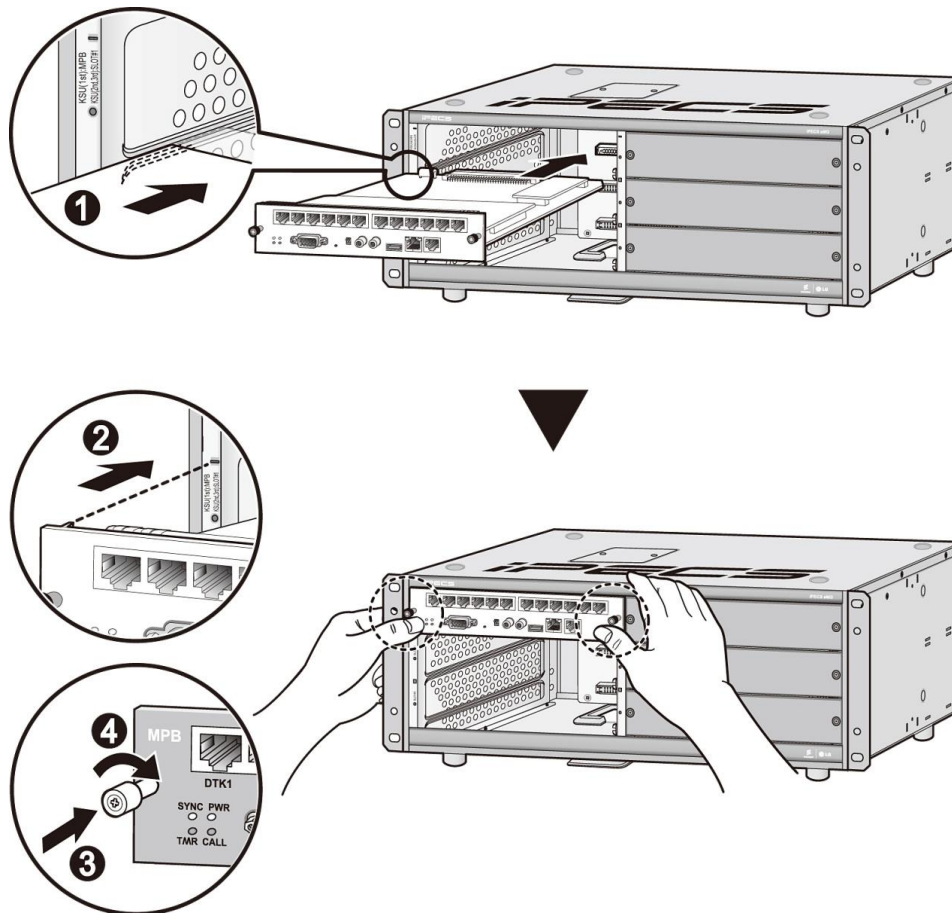


**Figure 4.1-1 Board Installation**

## 4.2 Main Processing Board

The Main Processor Board controls communication between the peripheral boards, supervises all resources in the system, controls the gain adjustment of the PCM signal, generates the System tones, maintains System audio prompts and manages System call processing.

The MPB (Figure 4.2 1) is the main control for the System, and is composed of the microprocessor and memory, the PCM management and miscellaneous functional circuits.

The MPB must be installed in the MPB slot, the upper left (1st) slot of the BKSU.
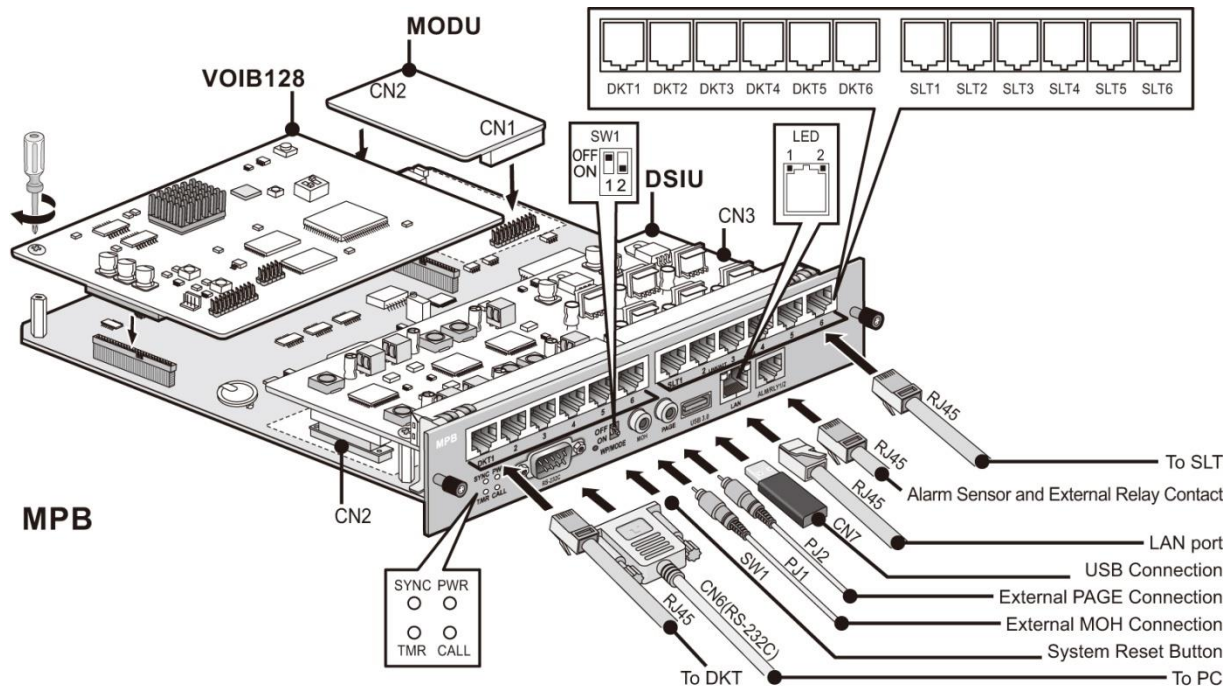


**Figure 4.2-1 MPB**

If an MPB is not installed, DC Power (+5V, +30V) will not feed to the backplane and other boards or EKSUs.

The following devices and functions are included on the MPB:

- Main Processor: MINDSPEED Cortex A9, M86295G, 900MHz
- PCM Voice Processing circuit (ACT2) - PCM voice switching, System Tone/Gain Control
- Tone (DTMF/CPT) Detection/CID Signal (FSK/DTMF/RCID) Detection/CID Generation
- 1 Coin Battery for Real Time Clock Function store of System Time/Date
- System Memory [DDR3 SDRAM/ Flash ROM/NAND Flash]
- PLL Circuit for an external ISDN Line Clock Synchronization
- 1 Internal MOH - 13 Music resources
- System Prompt storage, All country languages
- Basic 4 AA Function and 4 VoIP channels on MPB can be added by License
- Basic DSIU Included 6 DKTs and 6 SLTs
- 4 Status Indication LEDs
- 1 RS-232C serial port
- 1 Reset Button

- 1 Switch for Admin Database back up

- 1 External MOH port

- 1 External Paging port

- 1 Alarm Detection port

- 2 Relay Contact for general purpose

- 1 USB1.1 or USB2.0 and USB3.0 compliant port for DB upload and download, SW upgrade with Memory stick

- 1 Ethernet port – System maintenance, SW upgrade, and basic VoIP channel

- MODU (Option) Interface

- VOIB128 (Option) Interface

There is a coin battery to protect the system date/time from a system power loss.

**NOTE**

If needed, replace the battery with the same or equivalent type recommended by the manufacturer. The System Date/Time will not function normally if the battery is incorrectly replaced. Be sure to dispose of used batteries according to manufacturer instructions and/or local government regulations.


## 4.2.1    Switch, Connector and LED Functions

The MPB has various switches and LEDs (refer to the following table).

**Table 4.2.1-1 Connector, Jack and Switch Functions**

| SWITCH & CONNECTOR | FUNCTIONS | DESIGNATION |
|---|---|---|
| SW2 | System Reset | |
| PJ1 (Red) | External MOH Connection | MOH |
| PJ2 (Blue) | External PAGE Connection | PAGE |
| CN2, CN3 | DSIU Installation | Default from Factory |
| CN4, CN5 | MODU Installation | |
| CN11, CN12 | VOIB128 Installation | |
| CN7 | USB port | USB |
| MJ1 (RJ45, with LED) | LAN Port | LAN |
| MJ3 (RJ45, Black) | Alarm Sensor and External Relay Contact 1&2 | ALM/RLY1/2 |


**Table SW1 – 2-pole Dip switch**

| Pole | Function | Switch State | | Remarks |
|---|---|---|---|---|
| | | ON | OFF | |
| 1 | WP (Write Protection) | Protect database, no admin allowed | Unprotect | Default = OFF |
| 2 | MODE (Database Protection) | Initialize Database on reset | Use stored Database | Default = ON |

After all the boards are installed and wiring complete and before programming the System, Switch 1-2 should be ON and the system power turned ON to initialize the default System database. Once the database has been initialized, Switch 1-2 should be placed in the OFF position to maintain the database and features programmed during Admin.

**Table 4.2.1-2 LED Indications**

| LED | DESCRIPTION |
|---|---|
| LD1 (Blue), TMR | Timer, Periodic Toggle — ON, 100msec; OFF, 100msec. |
| LD2 (Blue), CALL | Call Task Status<br>• ON: Call task activated<br>• OFF: Call Task idle |
| LD3 (Blue), SYNC | External ISDN board (PRI or BRI) Clock synchronization<br>• ON: PLL circuit activation by External Clock from ISDN Board, iPECS eMG800 will be operated based on external ISDN clock (refer to "NOTE").<br>• OFF: PLL activation by Internal Clock, iPECS eMG800 will be operated based on internal clock. |
| LD4 (Blue), PWR | System DC Power ON Indication – ON, Power ON; OFF, Power OFF |

**NOTE**

When several PRIB/BRIBs are installed, the default clock priority will be as follows unless modified by the Admin (PGM207):

- Boards – PRIB > BRIB2 or BRIB4 > Internal Clock
- KSUs – 1'st KSU > 2'nd KSU > 3'rd KSU
- Slot – Slot 1 > Slot 2 >…> Slot 18

**Table 4.2.1-3 LAN Connector LED Indication**

| LED | DESCRIPTION |
|---|---|
| 1 (Green) | Link Status LED – ON: Link OK, OFF: No Link |
| 2 (Orange / Green) | Speed Status LED<br>• ON: 1000Mbps (Orange)<br>• ON: 100Mbps (Green)<br>• OFF: 10Mbps |

## 4.2.2    Modem Unit Installation

Before installing the MPB, if required, the optional Modem Unit (MODU) must be installed. The MODU is an analog modem supporting Bell, ITU-T, V.34, V.32BIS, V.90 Protocol at a baud rate of 300bps to 33Kbps with automatic rate negotiation.

The MODU provides a modem for connection to the web admin or system database and maintenance functions. The MODU can be accessed remotely over an analog CO line by calling the Modem CO line or Station. For additional information on MODU set-up, see the iPECS eMG800 Administration & Programming Manual.

The MODU is installed on connectors CN4 and CN5 of the MPB as shown in Figure 5.2-1. Use care to align pins of the CN4 and CN 5 connector with the CN1 and CN2 connectors on the MODU and press firmly in place.

### 4.2.3 MPB Installation

Before installing the MPB, mount the optional MODU as described above. The MPB must be installed in the MPB slot, the upper left slot of the BKSU.

1) Assure Power is OFF.
2) Slide the MPB in the guide rails of the first slot (upper left) of the Basic KSU.
3) Tighten thumbscrews to hold the board firmly in place.

### 4.2.4 LAN Port Wiring

The LAN connector accesses the System Ethernet port (10/100/1000 Base-T) for Web access to the System database and maintenance functions as well as the basic VoIP channel, if installed.

The LAN connector pin-outs are shown in the chart below and should be wired to an appropriate Ethernet switch port.

Note that by reversing the TX and RX pins, the LAN connector can be directly connected to a PC for Admin and maintenance purposes.

**Table 4.2.4-1 LAN Port Connector**

| CONNECTOR | PIN | SIGNAL | FUNCTION |
|---|---|---|---|
| RJ45 | 4,5,7,8 | Not used | |
| | 1 | TX+ | Transmit Data |
| | 2 | TX- | Transmit Data |
| | 3 | RX- | Receive Data |
| | 6 | RX+ | Receive Data |

### 4.2.5 Connecting Miscellaneous Devices

The MPB provides connections for an external music source, an external page port, a relay contact, and an alarm detection input monitor.
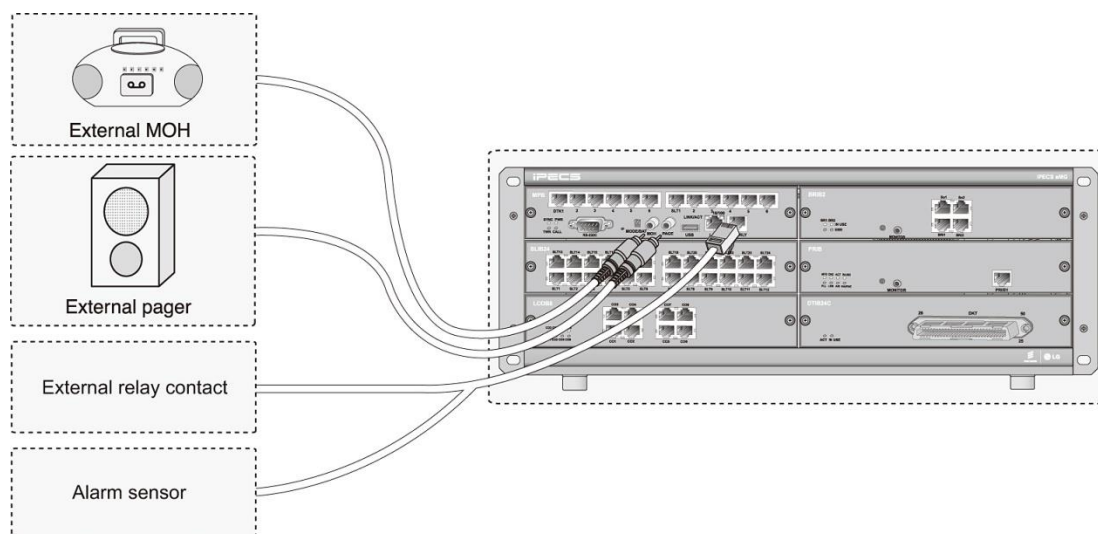


**Figure 4.2.5-1 Miscellaneous Connections**

### 4.2.5.1     Alarm/Relay Wiring
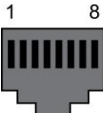
The RJ-45 Alarm/Relay connector provides access to the Remote Contact Monitoring circuitry and an External Control Contact.

The Contact Monitoring circuitry can be used to monitor an external alarm or doorbell contact. The External Control Contact activates as a Loud Bell, a Door Open control, or control for External paging equipment when External Paging is access.

Refer to Figure 4.2.5-1 and the pin-out chart below.

- Wire the Alarm Tip and Alarm Ring located on pins 1 & 2 of the RJ45 to the Alarm contact termination point using UTP cable
- Wire the External Control Contact 1 / 2 located at pins 5 & 6 / pins 7 & 8of the RJ45 to the external device using UTP cable
- Tag or number wiring for maintenance

**Table 4.2.5.1-1 Alarm and Relay Contact Connector**

| CONNECTION | PIN | SIGNAL NAME |
|---|---|---|
| RJ45 | 1 | ALARM-T |
| | 2 | ALARM-R |
| | 3 | Not used |
| | 4 | Not used |
| | 5 | Relay1-T |
| | 6 | Relay1-R |
| | 7 | Relay2-T |
| | 8 | Relay2-R |

### 4.2.5.2     Page Audio Connector Wiring

The Page connector allows paging audio to be sent to External Paging equipment. The system will deliver audio as a 0-dBm signal into a 600-ohm load.

Refer to Figure 4.2.5-1,

- Wire the Page Audio connector to the termination point of the audio input of the External Page equipment.
- Tag or number wiring for maintenance.

### 4.2.5.3     MOH Connector Wiring

When a call is placed on hold, MOH (Music on Hold) is presented to the caller. MOH can be provided from an internal source or from an external audio source connected to the MOH connector.

Refer to Figure 4.2.5-1,

- Wire the MOH connector to the termination point of the audio output of the external MOH source.
- Tag or number wiring for maintenance.

## 4.2.6    USB Connector

The USB connector is provided to allow a USB1.1 / USB2.0 memory stick or USB3.0 memory stick to connect to the system for upload and download of the System database.

No wiring of the USB connector is required. For further information on operation of the USB port, refer to the iPECS eMG800 Administration & Programming manual.
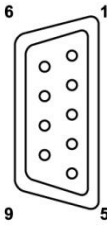
**Table 4.2.6-1 USB Connector**

| CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|
| USB Connector | 1 | GND |
| | 2 | D+ |
| | 3 | D- |
| | 4 | VBUS (+5V) |
| | 5 | SSRX- |
| | 6 | SSRX+ |
| | 7 | GND |
| | 8 | SSTX- |
| | 9 | SSTX+ |

## 4.2.7    RS-232 Monitor Wiring

The RS-232 female connector, which is a DCE (Data Communication Equipment), is used for various output functions (SMDR, Traffic Reports, etc.) and can be used to access the System database and maintenance functions through connection to a local PC.

**Table 4.2.7-1 RS-232 Monitor Connector**

| CONNECTOR | PIN | SIGNAL | FUNCTION |
|---|---|---|---|
| RS-232C | 1 | Not used | |
| | 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 | Not used | |

**NOTE**
The RS-232C port on the MPB does not support hardware flow control.

Referring to the pin-out chart above and the wiring diagram below,

- wire the RS-232 port to an appropriate DTE (Data Terminal Equipment),
- tag or number wiring for maintenance

**iPECS eMG800
DB-9 RS-232**

**TYPICAL TERMINAL
DB-9 RS-232
TERMINATIONS**
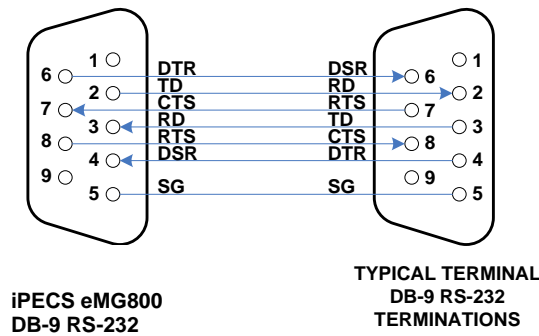
## 4.2.8    DSIU (Digital and Single Line Interface Unit) Wiring

The DSIU is included on the MPB and provides six (6) Digital Terminal (DKT-1 to 6) ports and six (6) Single Line (SLT 1 to 6) ports.

The DSIU SLT ports support FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID to the SLT.

The SLT ports provide the -48 VDC source, current limited to 20 mA, to operate the SLT, and support Message Wait Indication, DTMF or Pulse Dial, Polarity reversal, sinusoidal ring generator.

The SLT and DKT ports of the DSIU are terminated in RJ45 connectors located in the front panel of the board. Note the DSIU is NOT field replaceable.

**Table 4.2.8-1 RJ45 Pin Assignment, DKT 1 to 6 Connectors**
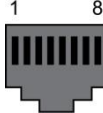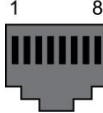
| CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|
| RJ45 | 1,2,3 | Not used |
| | 4 | DKT-T |
| | 5 | DKT-R |
| | 6,7,8 | Not used |

**Table 4.2.8-2 RJ45 Pin Assignment, SLT 1 to 6 Connectors**

| CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|
| RJ45 | 1,2,3 | Not used |
| | 4 | SLT-T |
| | 5 | SLT-R |
| | 6,7,8 | Not used |

Refer to the pin-out charts above,

- Wire the DKT and SLT ports of the DSIU to the termination point of the appropriate DKT or SLT. For information on terminal wiring.
- Tag or number wiring for maintenance

## 4.3 CO Line Boards

### 4.3.1 LCOB (Loop Start CO Line Interface Board)

LCOB (Loop Start CO Interface Board) is employed to interface standard analog PSTN CO lines to iPECS eMG800 system. LCOB is available in three models, the LCOB4 with 4 analog CO ports, LCOB8 with 8 ports, and the LCOB12 with 12 ports. LCOB supports Caller Identification (CID) detection, Polarity Reversal (PR) detection and Call Progress Tone (CPT) detection. An optional CMU4 board, which supports four (4) LCOB ports each, is required to support call-metering service (50Hz, 12 kHz, and 16 kHz). In addition, the first port of LCOB has a Power Failure Transfer (PFT) circuit that can be wired to an SLIB port for PFT service.

The below figure shows LCOB8, which other than the added interface circuits is identical to LCOB 4 and 12.
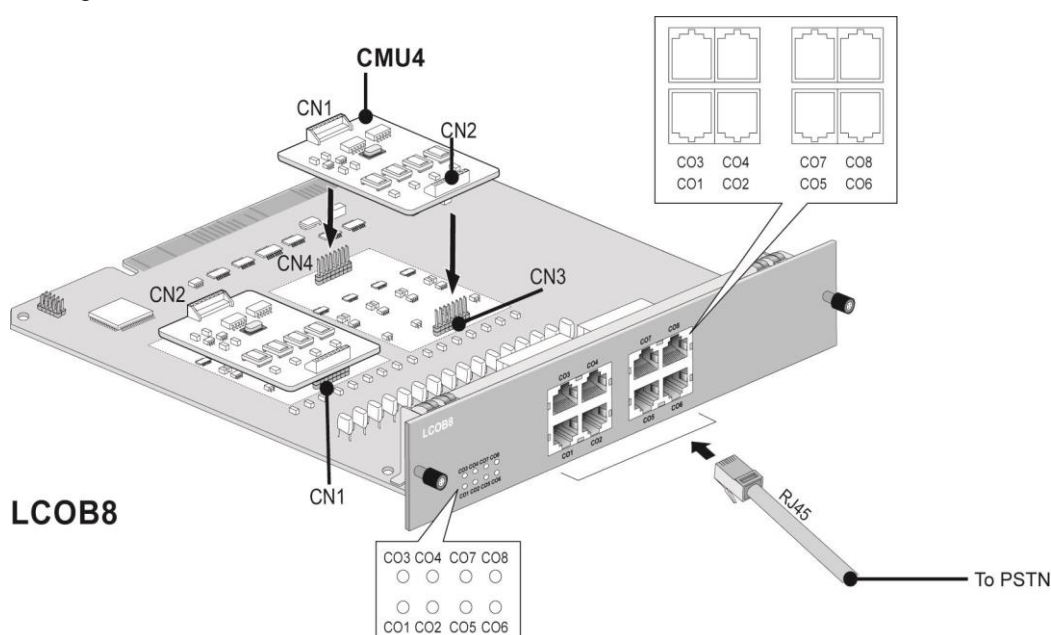


**Figure 4.3.1-1 LCOB8**

**Table 4.3.1-1 Connector Functions**

| CONNECTOR | FUNCTION |
|---|---|
| CN1 and CN2 | CMU4 connection for $1^{st}$ ~ $4^{th}$ ports |
| CN3 and CN4 | CMU4 connection for $5^{th}$ ~ $8^{th}$ ports |
| CN5 and CN6 | CMU4 connection for $9^{th}$ ~ $12^{th}$ ports |

**Table 4.3.1-2 LED Indications**

| LED | DESCRIPTION | LED | DESCRIPTION |
|---|---|---|---|
| LD1 | $1^{st}$ port - ON, In use ; OFF, Idle | LD7 | $7^{th}$ port - ON, In use ; OFF, Idle |
| LD2 | $2^{nd}$ port - ON, In use ; OFF, Idle | LD8 | $8^{th}$ port - ON, In use ; OFF, Idle |
| LD3 | $3^{rd}$ port - ON, In use ; OFF, Idle | LD9 | $9^{th}$ port - ON, In use ; OFF, Idle |
| LD4 | $4^{th}$ port - ON, In use ; OFF, Idle | LD10 | $10^{th}$ port - ON, In use ; OFF, Idle |
| LD5 | $5^{th}$ port - ON, In use ; OFF, Idle | LD11 | $11^{th}$ port - ON, In use ; OFF, Idle |
| LD6 | $6^{th}$ port - ON, In use ; OFF, Idle | LD12 | $12^{th}$ port - ON, In use ; OFF, Idle |

### 4.3.1.1    CMU (Call Metering Unit) Installation

An optional CMU4 board, which supports four (4) LCOB ports each, is required to support call-metering service (50Hz, 12 kHz, and 16 kHz). For additional information on CMU, see the iPECS eMG800 Feature & Operation manual.

Install a CMU4 on connector pairs CN1 and 2, CN3 and 4, and CN5 and 6 on the LCOB to support CO Line ports 1 and 12, as shown in Figure 4.3.1 1. Use care to align pins of the connector with the CN1 and CN2 connectors on the CMU and press firmly in place.

### 4.3.1.2    LCOB Installation

Before installation of the LCOB, make sure CMU4s are installed, if required. The LCOB board can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.

1)    Assure Power is OFF.
2)    Slide the LCOB in the guide rails of the desired slot.
3)    Tighten thumbscrews to hold the board firmly in place.
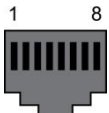
### 4.3.1.3    LCOB Wiring

The CO Line Tip and Ring terminations are located on the center pair of each RJ45 connector. A separate RJ45 is provided for each analog CO Line supported by the LCOB (4, 8, or 12).

Refer to the pin-out chart below,

- Wire the CO Tip and Ring pins to PSTN CO Line termination point using UTP cable.
- Tag or number wiring for maintenance.
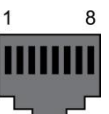
**Table 4.3.1.3-1 LCOB Ports**

| CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|
| RJ45  1  8 | 1,2,3 | Not used |
|  | 4,5 | CO-T, CO-R |
|  | 6,7,8 | Not used |

The first LCOB CO Line port supports PFT (Power Fail Transfer), when power is lost the CO Line is connected to an SLT port of an SLIB. To support PFT, referring to the pin-out chart below,

- Wire pins 1 and 2 of the 1st LCOB port RJ45 to the appropriate SLIB port. For SLIB wiring, refer to section 4.4.1 and 4.4.2.
- Tag or number wiring for maintenance.

**Table 4.3.1.3-2 PFT Port 1st Port**

| CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|
| RJ45  1  8 | 1,2 | PFT-T, PFT-R |
|  | 3 | Not used |
|  | 4,5 | CO-T, CO-R |
|  | 6,7,8 | Not used |

## 4.3.2      BRIB (Basic Rate Interface Board) w/Selectable S/T Interface

There are two kinds of BRIB2/BRIB4 according to CPU, but they have the same functions.

The BRIB is available in two models, the BRIB2 with two (2) BRI lines (4 channels) and the BRIB4 with four (4) BRI lines (8 channels). The BRIB is compatible with ETSI 300.012 and ITU-T recommendations I.430 supporting S (Subscriber) or T (Trunk) interfaces. As shown in Figure 4.3.2-1, the S interface of the BRIB acts as the NT (Network Termination) connecting to TEs (Terminal Equipments) and can provide power feed (-40VDC) to the attached TEs (maximum eight TEs). A 100-ohm Terminating Resistor can be inserted across the TX and/or RX pair. When used, a 100-Ohm terminating resistor should be connected across the TX and RX pair at one of the TEs.
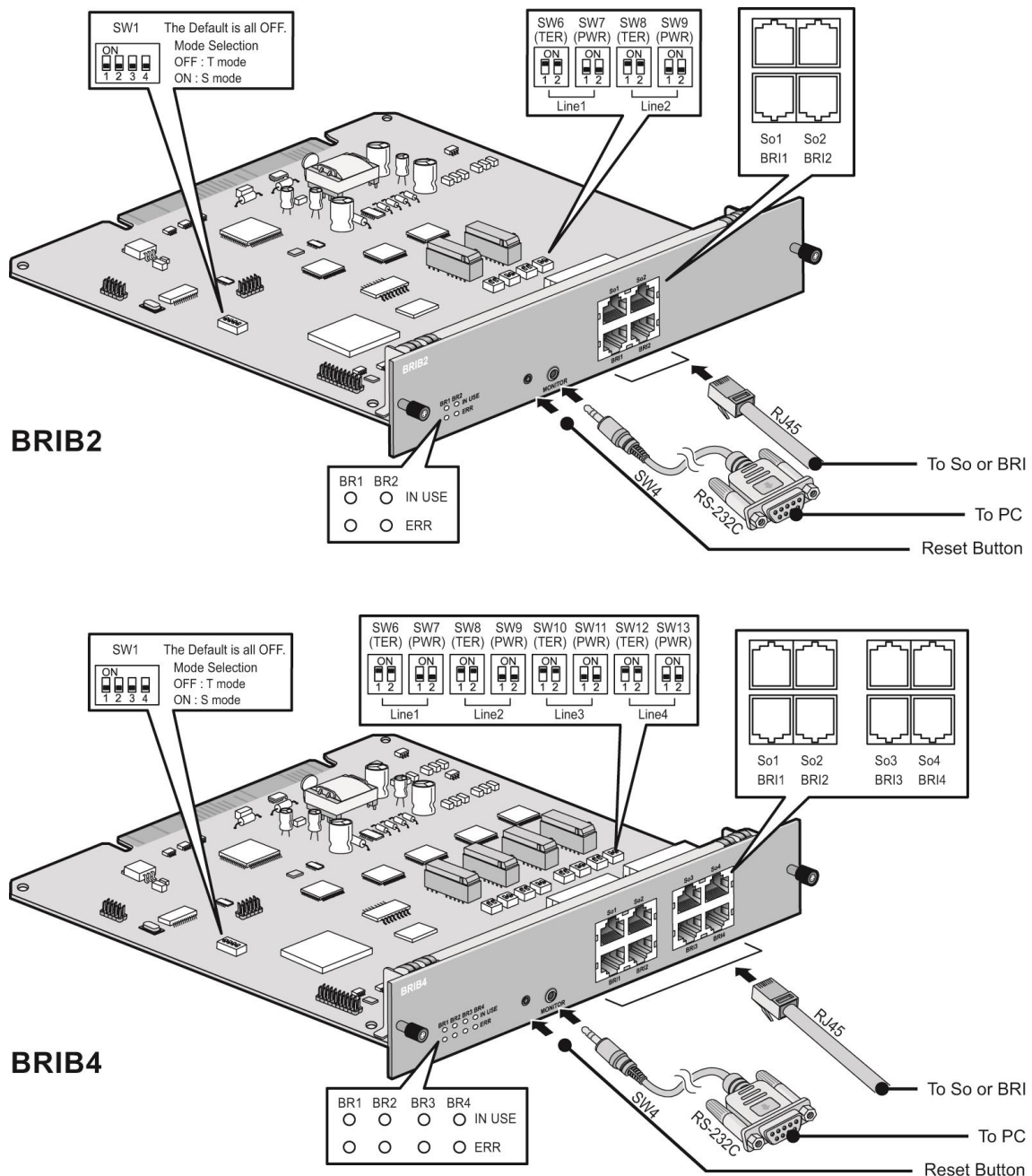


**Figure 4.3.2-1 BRIB2 and BRIB4**

**Note**

iPECS eMG800 does not support daisy chained clocking for digital lines. The clock priority and synchronization is controlled by Admin. For details, refer to PGM 301 of iPECS eMG800 Admin Manual.

The default clock is assigned based on the board type, KSU, and slot as below.

- Board – PRIB > BRIB2/BRIB4 > Internal Clock
- KSU – 1'st KSU > 2'nd KSU > 3'rd KSU
- Slot – Slot 1 > Slot 2 >…> Slot 18

### 4.3.2.1    Switch and LED Functions

**Table 4.3.2.1-1 BRIB Line Mode Switch SW1**

| SWICTH | FUNCTION | ON | OFF |
|--------|----------|-----|-----|
| SW1-1 | Line #1 mode | S-mode | T-mode |
| SW1-2 | Line #2 mode | S-mode | T-mode |
| SW1-3 | Line #3 mode | S-mode | T-mode |
| SW1-4 | Line #4 mode | S-mode | T-mode |

**Note**

The default setting is T Mode for all switches. SW1-3 and SW1-4 are for BRIB4 only.

**Table 4.3.2.1-2 BRIB Terminating Resister (100-Ohm)**

| SWITCH | FUNCTION | ON | OFF |
|--------|----------|-----|-----|
| SW6-1 | Line 1 TX resistor | Terminate | Open |
| SW6-2 | Line 1 RX resistor | Terminate | Open |
| SW8-1 | Line 2 TX resistor | Terminate | Open |
| SW8-2 | Line 2 RX resistor | Terminate | Open |
| SW10-1 | Line 3 TX resistor | Terminate | Open |
| SW10- 2 | Line 3 RX resistor | Terminate | Open |
| SW12-1 | Line 4 TX resistor | Terminate | Open |
| SW12-2 | Line 5 RX resistor | Terminate | Open |

**Table 4.3.2.1-3 BRIB Power Feed**

| SWITCH | FUNCTION | ON | OFF |
|--------|----------|-----|-----|
| SW7-1 | Line 1 Power Feed (-40V) | Feed | Open |
| SW7-2 | Line 1 Power Feed (Ground) | Feed | Open |
| SW9-1 | Line 2 Power Feed (-40V) | Feed | Open |
| SW9-2 | Line 2 Power Feed (Ground) | Feed | Open |
| SW11-1 | Line 3 Power Feed (-40V) | Feed | Open |
| SW11- 2 | Line 3 Power Feed (Ground) | Feed | Open |
| SW13-1 | Line 4 Power Feed (-40V) | Feed | Open |
| SW13-2 | Line 4 Power Feed (Ground) | Feed | Open |

**Table 4.3.2.1-4 LED Indication, BRIB2**

| NO | FUNCTION | STATUS |
|---|---|---|
| LD1<br>LD3 | Line 1 status | Red: ON = Error<br>Blue: ON = In-use, OFF = Idle |
| LD2<br>LD4 | Line 2 status | Red: ON = Error<br>Blue: ON = In-use, OFF: = Idle |

**Table 4.3.2.1-5 LED Indication, BRIB4**

| NO | FUNCTION | STATUS |
|---|---|---|
| LD1<br>LD5 | Line 1 status | Red: ON = Error<br>Blue: ON = In-use, OFF = Idle |
| LD2<br>LD6 | Line 2 status | Red: ON = Error<br>Blue: ON = In-use, OFF = Idle |
| LD3<br>LD7 | Line 3 status | Red: ON = Error<br>Blue: ON = In-use, OFF = Idle |
| LD4<br>LD8 | Line 4 status | Red: Error<br>Blue: ON = In-use, OFF = Idle |

### 4.3.2.2    BRIB Installation

Before installation of the BRIB, set the Mode, Terminating Resistor, and Power Feed Switches for each BRIB Line. Note that the BRIB cannot simultaneously support both the T and S mode, all ports on the BRIB must be set in the same mode, T or S.

The BRIB board can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.

- Assure Power is OFF
- Slide the BRIB in the guide rails of the desired slot.
- Tighten thumbscrews to hold the board firmly in place.

### 4.3.2.3    BRIB Wiring

A separate RJ45 connector is provided for each BRI line supported by the BRIB. Referring to the pin-out chart and Figure 4.3.2.3 1 below,

- Wire the TX and RX pins of each RJ-45 connector to the BRI digital line termination point using UTP cable.
- Tag or number wiring for maintenance.

**Table 4.3.2.3-1 RJ45**

| CONECTOR | PIN | NAME(T-mode) | FUNCTION | NAME(S-mode) | FUNCTION |
|---|---|---|---|---|---|
| RJ45 | 1,2,7,8 | Reserved | | | |
| | 3 | TX+ | Transmit Data | RX+ | Receive Data |
| | 4 | RX+ | Receive Data | TX+ | Transmit Data |
| | 5 | RX- | Receive Data | TX- | Transmit Data |
| | 6 | TX- | Transmit Data | RX- | Receive Data |
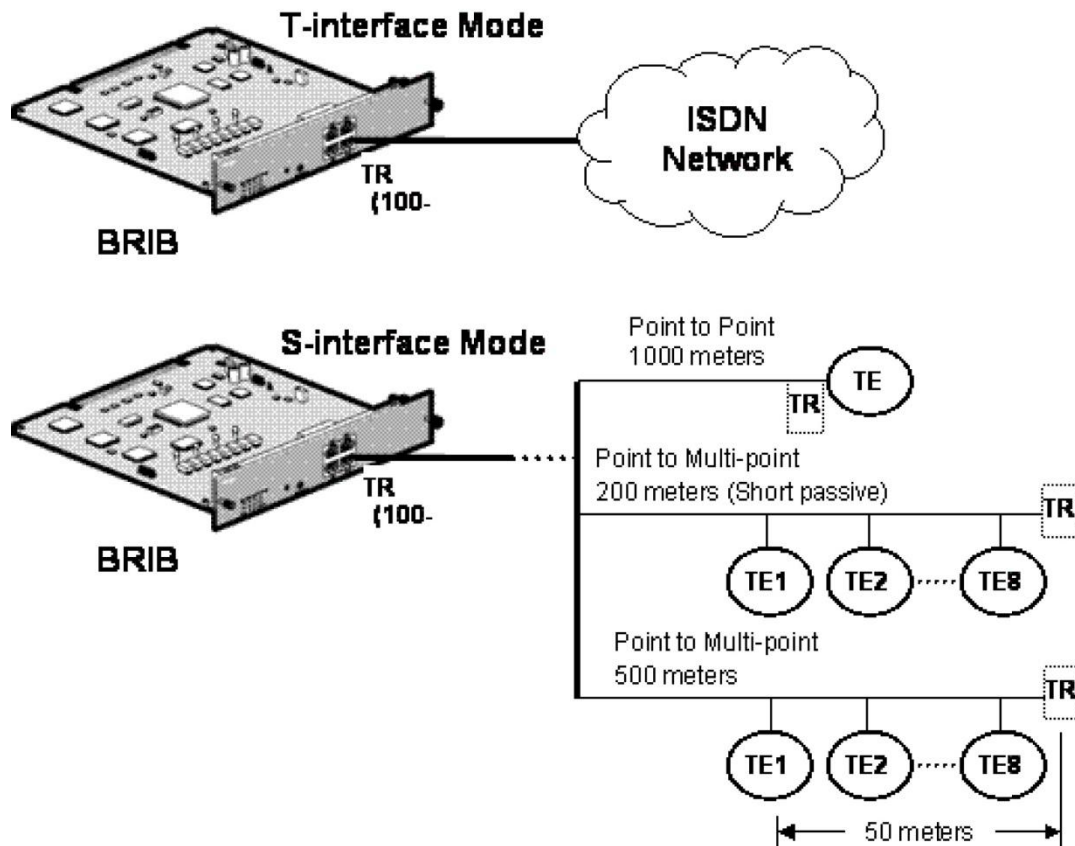
**Figure 4.3.2.3-1 ISDN Connections (Basic Rate)**

### 4.3.2.4    Serial Port

The PRIB includes an Audio jack connected to a Serial port. The serial port is used for diagnostic purposes. For wiring information, refer to section 4.6.

### 4.3.3    E1R2-PRIB (Primary Rate Interface Board)

There are two kinds of PRIB according to CPU, but they have the same functions.

The Primary Rate Interface Board (PRIB) provides one (1) PRI interface, or one (1) E1R2 interface. The PRI interface supports 30 PCM bearer and 2 signaling channels for PRI or E1R2. The PRIB is based on the interface described in ITU-T Recommendations G.704, G.703, and G.823.

It covers CEPT frame format that consist of 32 8-bit timeslots, a data rate of 2.048MHz. From the 32 timeslots in a frame, 30 timeslots are defined as information channels, timeslots 1-15 and 17-31 that correspond to telephone channels 1-30.

The frame has duration of 125ұsec and contains 32 Time Slots (TS). Time Slot 0 is allocated to frame alignment sync, and Time Slot 16 is allocated to the signaling channel; the other time slots are available for allocation to the B channel.

The CEPT frame has four signaling bits, A, B, C and D. Signaling bits for all 30 media channels are transmitted in timeslot 16. The PRIB supports pulse dialing, DTMF dialing, and MFC-R2 register signaling (based on ITU-T Recommendation Q.440-480).
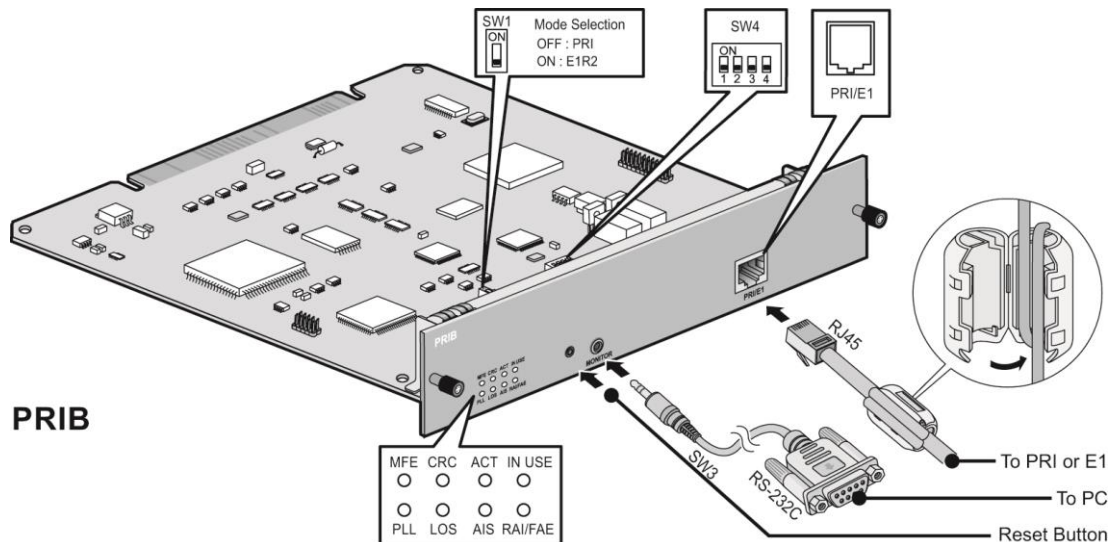


**Figure 4.3.3-1 E1-PRIB**

⚠ **CAUTION**

For QSIG operation, check the mode setting and the pin assignments of RJ45 type connector according to the mode of line, TE or NT.

**NOTE**

iPECS eMG800 does not support daisy chained clocking for digital lines. The clock priority and synchronization is controlled by Admin. For details, refer to PGM207/PGM131 of the iPECS eMG800 Administration & Programming manual.

The default clock is assigned based on the board type, KSU, and slot as below.

- Board – PRIB > BRIB2/BRIB4 > Internal Clock
- KSU – 1'st KSU > 2'nd KSU > 3'rd KSU
- Slot – Slot 1 > Slot 2 >…> Slot 18

### 4.3.3.1    Switch and LED Functions

**Table 4.3.3.1-1 Switch-Functions**

| SWITCH | FUNCTION | REMARK |
|--------|----------|--------|
| SW1 | Mode Selection (OFF = PRI, ON = E1R2) | Default: PRI mode |
| SW3 | Reset switch | |
| SW4-1 | Not used | |
| SW4-2 | Not used | |
| SW4-3 | Not used | |
| SW4-4 | Not used | |

**Table 4.3.3.2-2 LED-Indication**

| LED | PRI MODE | E1R2 MODE | REMARK |
|-----|----------|-----------|--------|
| LD1 | PLL Synchronization | | RED LED ON: Error OFF: Normal operation |
| LD2 | Loss of Signal from the Line | | |
| LD3 | Alarm Indication Signal | | |
| LD4 | Remote Alarm Indication | Frame Alignment Error | |
| LD5 | Multi Frame Error | | |
| LD6 | CRC Error | CRC (ON: Enable, OFF: Disable) | |
| LD7 | Normal operation indication (Activity Indication) | | Blue (Blink) |
| LD8 | Channel status | | Blue LED ON: Channels in use OFF: All channels Idle) |

### 4.3.3.2    E1-PRIB Installation

Before inserting the PRIB, set SW1 and SW4 Dip switches to match the Telco provided service.

The PRIB board can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.
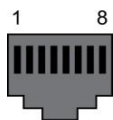
1)    Assure Power is OFF
2)    Slide the PRIB in the guide rails of the desired slot.
3)    Tighten thumbscrews to hold the board firmly in place.

### 4.3.3.3    E1-PRIB Wiring

The E1-PRIB Transmit and Receive pairs are terminated in the PRI/E1 RJ45 connector. A single RJ45 is provided for the digital line interface.

Before wiring the PRIB, the Ferrite core provided with the E1-PRIB must be installed to reduce EMI (Electro-Magnetic Interference).

*To install the Ferrite core,*

1)    Open the core,
2)    Insert and loop the RJ45 terminated cable for the E1-PRIB through the core as shown in Figure 4.3.3.3-1.
3)    Close the Ferrite core over the cable.

Refer to the pin-out chart and Figure 4.3.3.3-1 E1-PRIB Connector Wiring Diagram below,

- Wire the TX and RX pins of the RJ45 connector to the digital line termination point using UTP cable.
- Tag or number wiring for maintenance.

**Table 4.3.3.3-1 PRI Port**

| CONNECTOR | PIN | SIGNAL |
|---|---|---|
| RJ45 | 1 | RX+ |
|  | 2 | RX- |
|  | 4 | TX+ |
|  | 5 | TX- |
|  | 3,6,7,8 | Not used |



**Figure 4.3.3.3-1 E1-PRIB Connector Wiring Diagram**

### 4.3.3.4    Serial Port

The PRIB includes an Audio jack connected to a Serial port. The serial port is used for diagnostic purposes. For wiring information, refer to section 4.6.

### 4.3.4 T1-PRIB (Primary Rate Interface Board)

There are two kinds of PRIB according to CPU, but they have the same functions.

The T1 and Primary Rate Interface (PRI) board interfaces to North American standards based digital networks. Standard alarms are provided by on-board LEDs (refer to chart below). The PRIB includes the T1-PRI interface, control and synchronous clock circuitry as well as standard alarm indications using front panel LEDs (refer to LED Indications chart below.

The board is switch-selectable (SW1) for T1 or PRI operation both operating with a 125 usec frame at 1.544Mb/s. In T1 operation, the standards EIA/TIA-464-A and TR 41458 24-channel interface supporting DID, TIE Line, and Loop or Ground Start are implemented. The DID and TIE Line operation support Immediate, Delayed and Wink start signaling protocols. The Telco interface must provide BZ8S line coding and Extended Super Frame (ESF) framing.

In PRI operation, the ISDN standard NII2 (National ISDN Interface 2) 23 Bearer and one (1) Data channel interface is supported. The PRI operation employs ANSI T1.403, T1.601, T1.605, and TR62411 standards.

Connection is made via a RJ45 from the PRIB to a CSU (Channel Service Unit).
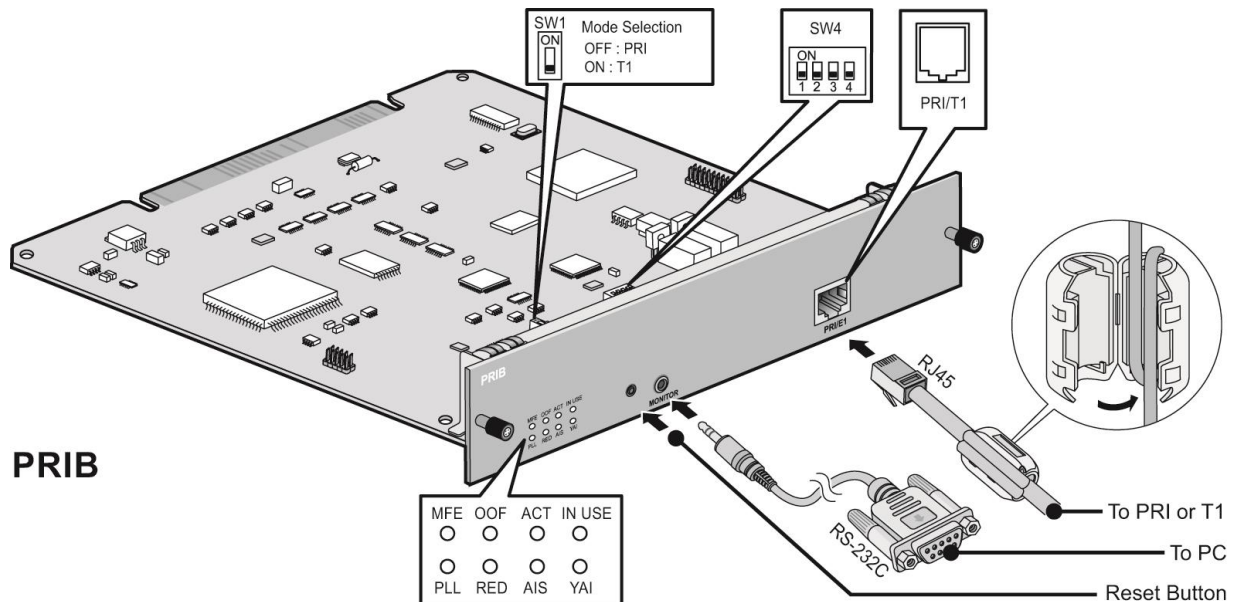


**Figure 4.3.4-1 T1 PRIB**

**NOTE**
iPECS eMG800 does not support daisy chained clocking for digital lines. The clock priority and synchronization is controlled by Admin. For details, refer to PGM207/

PGM131 of iPECS eMG800 Administration & Programming manual.

The default clock is assigned based on the board type, KSU, and slot as below.

- Board – PRIB > BRIB2/BRIB4 > Internal Clock
- KSU – 1'st KSU > 2'nd KSU > 3'rd KSU
- Slot – Slot 1 > Slot 2 >…> Slot 18

### 4.3.4.1    Switch and LED Functions

**Table 4.3.4.1-1 Switch Functions**

| SWITCH | FUNCTION | REMARK |
|--------|----------|--------|
| SW1 | Mode select (OFF = PRI, ON = T1) | Default: PRI mode |
| SW3 | Reset switch | |
| SW4-1 | Not used | |
| SW4-2 | Not used | |
| SW4-3 | Not used | |
| SW4-4 | Not used | |

**Table 4.3.4.1-2 LED Indication**

| LED | FUNCTION | REMARK |
|-----|----------|--------|
| PLL | PLL Synchronization | Red LED<br>ON = Error<br>OFF = Normal) |
| RDE | Red Alarm Indication) | |
| AIS | Alarm Indication Signal/Blue Alarm | |
| YAI | Yellow Alarm Indication | |
| MFE | Multi-frame Establish Alarm | |
| OOF | Out of Frame | |
| ACT | Activity Indication | Blue (Blink) |
| IN USE | Indication of channel use | Blue LED<br>ON: Channels in use,<br>OFF: All channels idle |

### 4.3.4.2    T1-PRIB Installation

Before inserting the T1-PRIB, set SW1 and SW4 Dip switches to match the Telco provided service.

Note that the PRIB supports ESF (Extended Super Frame) framing and B8ZS (Binary 8 Zero Substitution) line coding only.

The T1-PRIB board can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.

1)    Assure Power is OFF.
2)    Slide the PRIB in the guide rails of the desired slot.
3)    Tighten thumbscrews to hold the board firmly in place.

### 4.3.4.3    T1-PRIB Wiring

The T1-PRIB Transmit and Receive pairs are terminated in the PRI/T1 RJ45 connector. A single RJ45 is provided for the digital line interface.

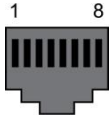Before wiring the PRIB, the Ferrite core provided with the T1-PRIB must be installed to reduce EMI (Elector-Magnetic Interference). To install the Ferrite core,
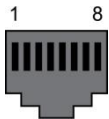
1)    Open the core.

2)    Insert and loop the RJ45 terminated cable for the T1-PRIB through the core as shown in Figure
4.3.4.3-1.

3)    Close the Ferrite core over the cable.

Refer to the pin-out chart and Figure 4.3.4.3-1 E1-PRIB Connector Wiring Diagram below,

- Wire the TX and RX pins of the RJ45 connector to the digital line termination point at the CSU using
UTP cable.
- Tag or number wiring for maintenance.

**Table 4.3.4.3-1 T1 PRI Port**

| CONNECTOR | PIN | SIGNAL |
|---|---|---|
| RJ45 | 1 | RX+ |
| | 2 | RX- |
| | 4 | TX+ |
| | 5 | TX- |
| | 3,6,7,8 | Not used |



**Figure 4.3.4.3-1 T1-PRIB Connector Wiring Diagram**

### 4.3.4.4    Serial Port

The PRIB includes an Audio jack connected to a Serial port. The serial port is used for diagnostic purposes.
For wiring information, refer to section 4.6.

## 4.4　　　Extension Boards

### 4.4.1　　　SLIB (Single Line Interface Board w/RJ45)

There are two kinds of SLIB12/SLIB24 according to CPU, but they have the same functions.

The SLIB is available in two (2) models, the SLIB 12 with 12 analog Single Line Telephone ports and the SLIB24 with 24 SLT ports. In both cases, the SLT ports are each terminated in an RJ45 connector.

The SLIB provides FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID function to the SLT.

The SLT ports provide the -48 VDC source, current limited to 20 mA, to operate the SLT and support the Message Wait Indication, DTMF, or Pulse Dial signaling, Polarity reversal, sinusoidal Ring generator, and GR-909 Line Testing.



**Figure 4.4.1-1 SLIB12/24**

### 4.4.1.1      LED Functions

| LED | FUNCTION | REMARK |
|-----|----------|--------|
| LD1 | ACT, Activation or Normal Operating | Blink (Blue Color) |
| LD2 | IN USE | ON: one or ports in use<br>OFF: All channels, Idle |

### 4.4.1.2      SLIB Installation

The SLIB has no switches or connectors that are field useable. The SLIB can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.

1)    Assure Power is OFF.
2)    Slide the SLIB in the guide rails of the desired slot.
3)    Tighten thumbscrews to hold the board firmly in place.
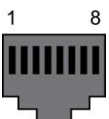
### 4.4.1.3      SLIB Wiring

The SLT is terminated to the center pair of each RJ45 connector. A separate RJ45 is provided for each SLT port on the SLIB (12 or 24 connectors).

Refer to the pin-out chart below,

- Wire pins 4 and 5 of the RJ45 connector to the SLT termination point using UTP cable. The maximum total wire length is 7500M/24Kft of 22 AWG wire or 5000M/16Kft of 24 AWG wire. For information on wiring the SLT, refer to section 5.1.2.2.
- Tag or number wiring for maintenance.

**Table 4.4.1.3.1 SLIB 12/24**

| CONNECTOR | PIN | SIGNAL NAME | FUNCTION |
|-----------|-----|-------------|----------|
| RJ45 <br> 1    8 | 1,2,3 | Not used | |
| | 4 | SLT_RX | Receive Data |
| | 5 | SLT_TX | Transmit Data |
| | 6,7,8 | Not used | |

## 4.4.2    SLIBC (Single Line Interface Board w/RJ21)

There are two kinds of SLIB12C/SLIB24C according to CPU, but they have the same functions.

The SLIBC is available in two (2) models, the SLIB12C with 12 SLT ports and the SLIB24C with 24 SLT ports. The SLIBC is identical to the SLIB except the SLT ports of the SLIBC are terminated in a 25-pair RJ21 female connector. The SLIBC provides FSK (ITU-T V.23 or Bell 202) or DTMF (ITU-T Q.23) Caller ID function to the SLT. The SLT ports provide the -48 VDC source, current limited to 20 mA, to operate the SLT and support the Message Wait Indication, DTMF, or Pulse Dial signaling, Polarity reversal, sinusoidal Ring generator, and GR-909 Line Testing.
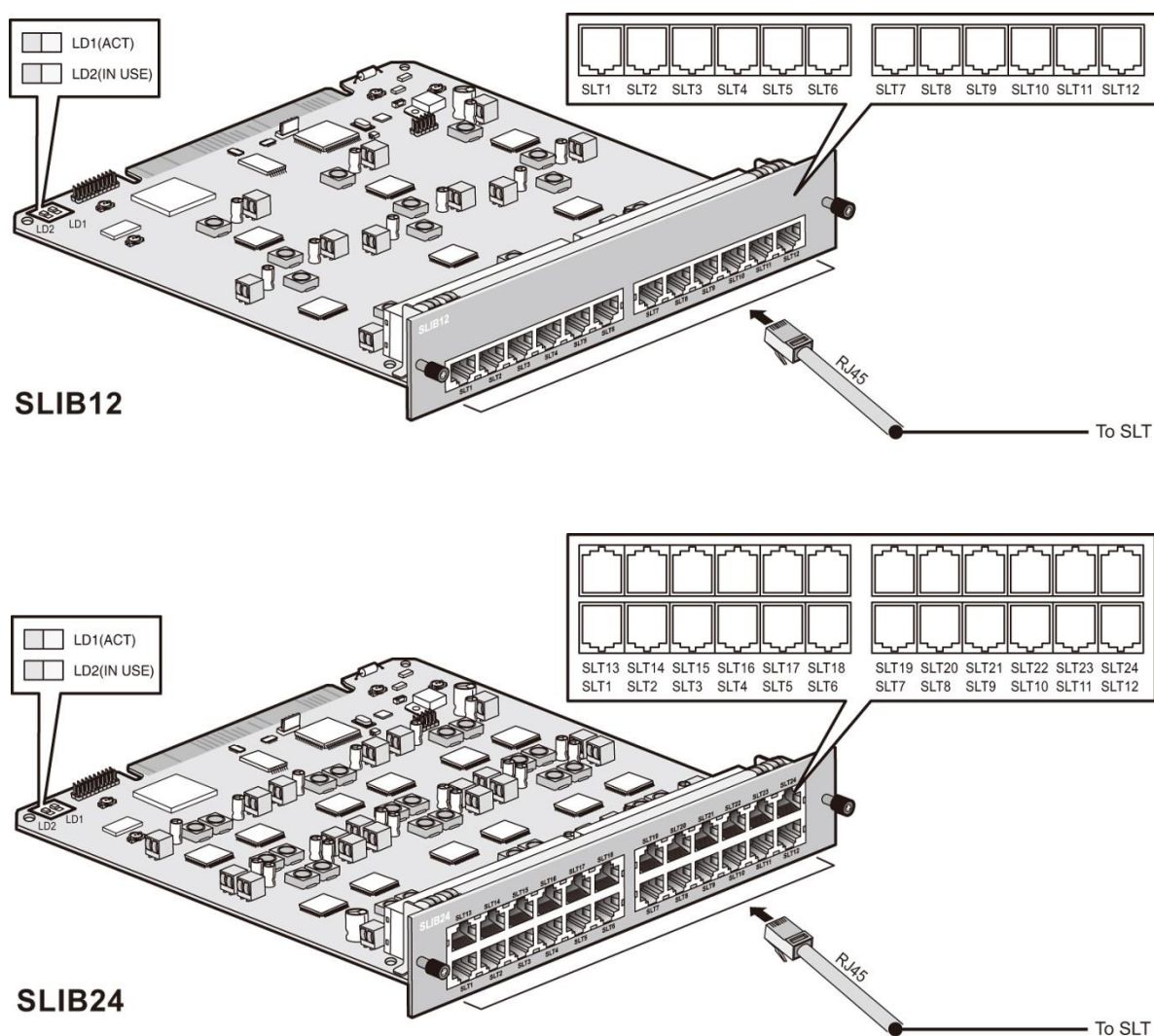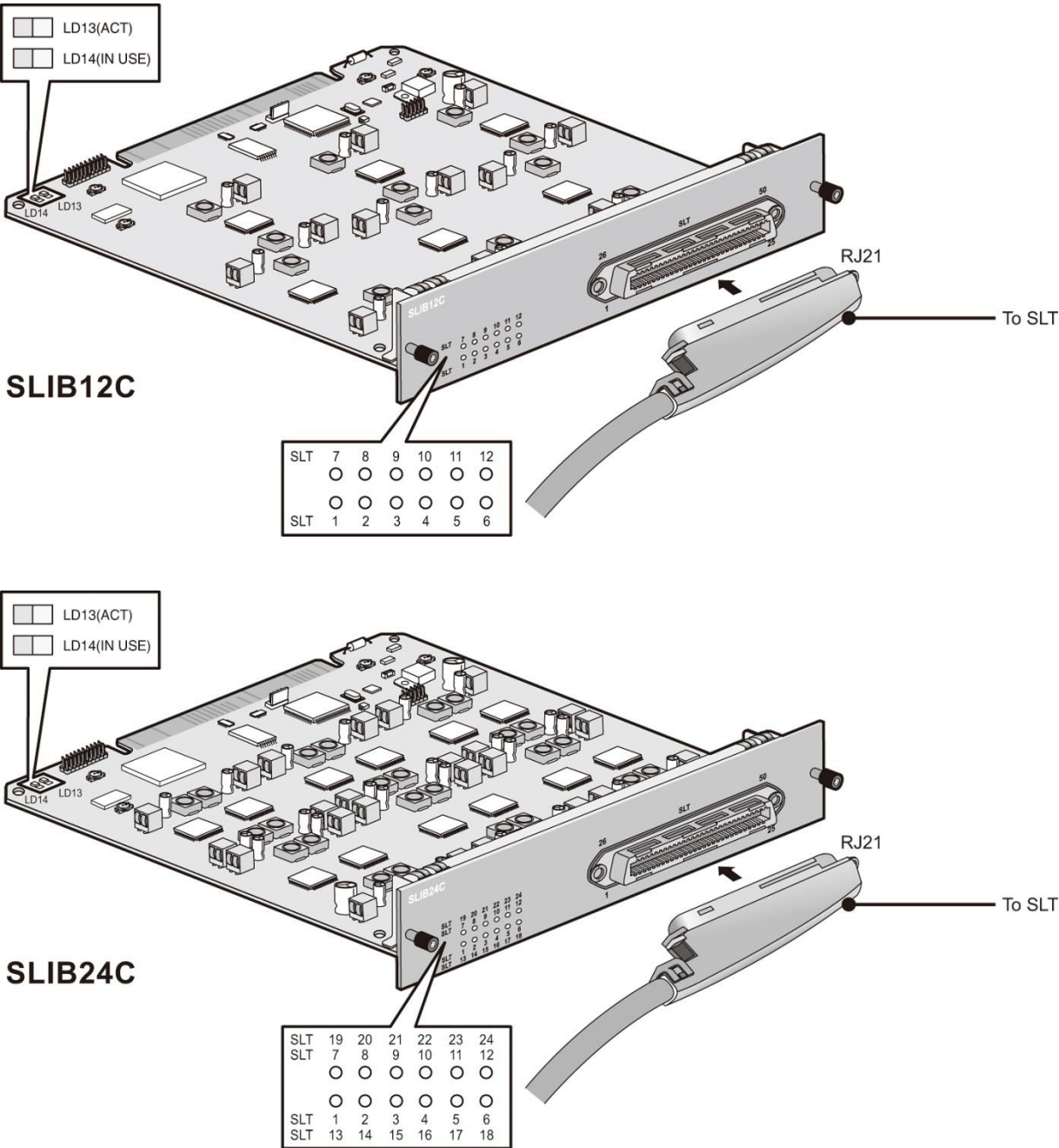


**Figure 4.4.2-1 SLIB12/24C**

#### 4.4.2.1          LED Functions

**Table 4.4.2.1-1 LED Indications**

| LED | FUNCTION | REMARK |
|-----|----------|--------|
| LD1 | The status of 1$^{st}$ port or 13$^{th}$ port | ON (Blue) : 1$^{st}$ port in use<br>ON (Yellow Green) : 13$^{th}$ port in use<br>ON (Blush white) : 1$^{st}$ and 13$^{th}$ port in use<br>OFF: Idle |
| LD2 | The status of 2$^{nd}$ port or 14$^{th}$ port | ON (Blue) : 2$^{nd}$ port in use<br>ON (Yellow Green) : 14$^{th}$ port in use<br>ON (Blush white) : 2$^{nd}$ and 14$^{th}$ port in use<br>OFF: Idle |
| LD3 | The status of 3$^{rd}$ port or 15$^{th}$ port | ON (Blue) : 3$^{rd}$ port in use<br>ON (Yellow Green) : 15$^{th}$ port in use<br>ON (Blush white) : 3$^{rd}$ and 15$^{th}$ port in use<br>OFF: Idle |
| LD4 | The status of 4$^{th}$ port or 16$^{th}$ port | ON (Blue) : 4$^{th}$ port in use<br>ON (Yellow Green) : 16$^{th}$ port in use<br>ON (Blush white) : 4$^{th}$ and 16$^{th}$ port in use<br>OFF: Idle |
| LD5 | The status of 5$^{th}$ port or 17$^{th}$ port | ON (Blue) : 5$^{th}$ port in use<br>ON (Yellow Green) : 17$^{th}$ port in use<br>ON (Blush white) : 5$^{th}$ and 17$^{th}$ port in use<br>OFF: Idle |
| LD6 | The status of 6$^{th}$ port or 18$^{th}$ port | ON (Blue) : 6$^{th}$ port in use<br>ON (Yellow Green) : 18$^{th}$ port in use<br>ON (Blush white) : 6$^{th}$ and 18$^{th}$ port in use<br>OFF: Idle |
| LD7 | The status of 7$^{th}$ port or 19$^{th}$ port | ON (Blue) : 7$^{th}$ port in use<br>ON (Yellow Green) : 19$^{th}$ port in use<br>ON (Blush white) : 7$^{th}$ and 19$^{th}$ port in use<br>OFF: Idle |
| LD8 | The status of 8$^{th}$ port or 20$^{th}$ port | ON (Blue) : 8$^{th}$ port in use<br>ON (Yellow Green) : 20$^{th}$ port in use<br>ON (Blush white) : 8$^{th}$ and 20$^{th}$ port in use<br>OFF: Idle |
| LD9 | The status of 9$^{th}$ port or 21$^{st}$ port | ON (Blue) : 9$^{th}$ port in use<br>ON (Yellow Green) : 21$^{st}$ port in use<br>ON (Blush white) : 9$^{th}$ and 21$^{st}$ port in use<br>OFF: Idle |
| LD10 | The status of 10$^{th}$ port or 22$^{nd}$ port | ON (Blue) : 10$^{th}$ port in use<br>ON (Yellow Green) : 22$^{nd}$ port in use<br>ON (Blush white) : 10$^{th}$ and 22$^{nd}$ port in use<br>OFF: Idle |

| LD11 | The status of 11<sup>th</sup> port or 23<sup>rd</sup> port | ON (Blue) : 11<sup>th</sup> port Use<br>ON (Yellow Green) : 23<sup>rd</sup> port in use<br>ON (Blush white) : 11<sup>th</sup> and 23<sup>rd</sup> port in use<br>OFF: Idle |
|------|----------------------------------------------|-----------------------------------------------------------|
| LD12 | The status of 12<sup>th</sup> port or 24<sup>th</sup> port | ON (Blue) : 12<sup>th</sup> port in use<br>ON (Yellow Green) : 24<sup>th</sup> port in use<br>ON (Blush white) : 12<sup>th</sup> and 24<sup>th</sup> port in use<br>OFF: Idle |
| LD13 | ACT, Activation or Normal Operating | Blink (Blue Color) |
| LD14 | In use | ON: Ch. Use,<br>OFF: All channels Idle |

### 4.4.2.2    SLIBC Installation

The SLIB has no switches or connectors that are field useable. The SLIB can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.

1) Assure Power is OFF
2) Slide the SLIBC in the guide rails of the desired slot.
3) Tighten thumbscrews to hold the board firmly in place.
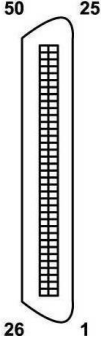
### 4.4.2.3    SLIBC Wiring

Each SLT port is terminated to a pair in the RJ21 connector. SLT 1 is terminated at pair 1, SLT 2 is terminated on pair 2, etc. to the number of ports (12 or 24) on the SLIBC.

Refer to the pin-out chart below,

- Wire each SLT pair on the RJ21 connector to the SLT termination point using UTP cable. The maximum total wire length is 7500M/24Kft of 22 AWG wire or 5000M/16Kft of 24 AWG wire. For information on wiring the SLT, refer to section 5.1.2.2.
- Tag or number wiring for maintenance.

**Table 4.4.2.1-2 SLIBC Pin-Out Chart**

| CONNECTOR | PIN(VT) | PIN(VR) | COLOR CODE | SLIB PORT |
|-----------|---------|---------|------------|-----------|
| RJ21      | 1       | 26      |            | 1         |
|           | 2       | 27      |            | 2         |
| 50      25 | 3      | 28      |            | 3         |
|           | 4       | 29      |            | 4         |
|           | 5       | 30      |            | 5         |
|           | 6       | 31      |            | 6         |
|           | 7       | 32      |            | 7         |
|           | 8       | 33      |            | 8         |
|           | 9       | 34      |            | 9         |
|           | 10      | 35      |            | 10        |
| 26      1 | 11      | 36      |            | 11        |

| | | | | | |
|---|---|---|---|---|---|
| | 12 | 37 | | 12 |
| | 13 | 38 | | 13 |
| | 14 | 39 | | 14 |
| | 15 | 40 | | 15 |
| | 16 | 41 | | 16 |
| | 17 | 42 | | 17 |
| | 18 | 43 | | 18 |
| | 19 | 44 | | 19 |
| | 20 | 45 | | 20 |
| | 21 | 46 | | 21 |
| | 22 | 47 | | 22 |
| | 23 | 48 | | 23 |
| | 24 | 49 | | 24 |
| | 25 | 50 | | |

### 4.4.3 DTIB (Digital Terminal Interface Board w/RJ-45)

The DTIB is available in two (2) models, the DTIB12 with 12 Digital Key Telephone Interface ports and the DTIB24 with 24 DKT ports.

Each port provides power and signaling to the DKT over a single wire pair.

Each DKT port of the DTIB is terminated in an RJ45 connector on the front panel of the DTIB.
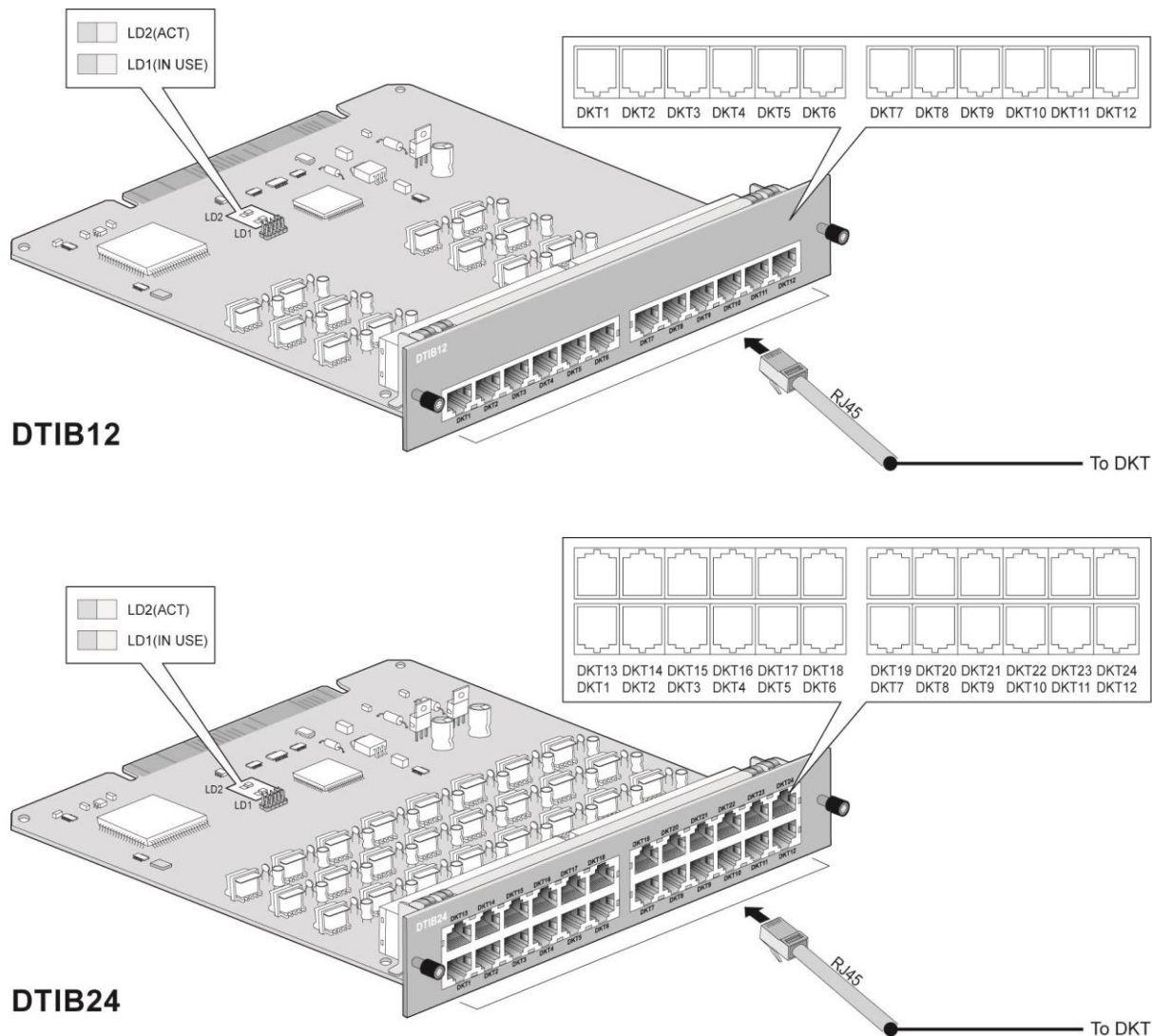


**Figure 4.4.3-1 DTIB (Digital Telephone Interface Board**

#### 4.4.3.1 LED Functions

**Table 4.4.3.1-1 LED Indication**

| LED | FUNCTIONS | REMARK |
|---|---|---|
| LD1 | IN USE | ON: Channel in use, OFF: All channels Idle |
| LD2 | ACT, Activation or Normal Operating | Blink (Blue Color) |

#### 4.4.3.2 DTIB Installation

The DTIB has no switches or connectors that are field useable. The DTIB can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.

1) Assure Power is OFF.
2) Slide the DTIB in the guide rails of the desired slot.
3) Tighten thumbscrews to hold the board firmly in place.
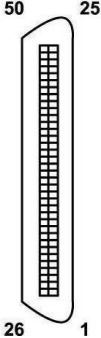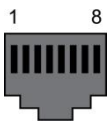
#### 4.4.3.3 DTIB Wiring

A separate RJ45 is provided for each DKT port on the DTIB (12 or 24 connectors). DKT ports terminate on the center pair of the RJ45 connectors.

Refer to the pin-out chart below,

- Wire pins 4 and 5 of the RJ45 connector to the DKT termination point using UTP cable. The maximum total wire length is 500M/1.6Kft of 22 AWG or 330M/1Kft of 24 AWG wire. For information on wiring the Digital Key Telephone, refer to section 5.1.2.1.
- Tag or number wiring for maintenance.

**Table 4.4.3.3-1 DTIB RJ45 Pin-Out Chart**

| CONNECTOR | PIN | SIGNAL NAME | FUNCTION |
|---|---|---|---|
| RJ45  | 1,2,3 | Not used | |
| | 4 | DKT_RX | Receive Data |
| | 5 | DKT_TX | Transmit Data |
| | 6,7,8 | Not used | |

### 4.4.4      DTIBC (Digital Telephone Interface Board w/RJ21 connector)

The DTIBC is available in two (2) models, the DTIB12 with 12 Digital Key Telephone Interface ports and the DTIB24 with 24 DKT ports.

The DTIBC is identical to the DTIB except the DKT ports of the DTIBC are terminated to an RJ21 connector.

Each port provides power and signaling to the DKT over a single wire pair.



**Figure 4.4.4-1 DTIB Digital Telephone Interface Board**

⚠ **CAUTION**

Be careful not to short each other on both ends of the wires. Also be careful not to short on the ground and chassis.

#### 4.4.4.1        LED Functions

**Table 4.4.4.1-1 LED Indication**

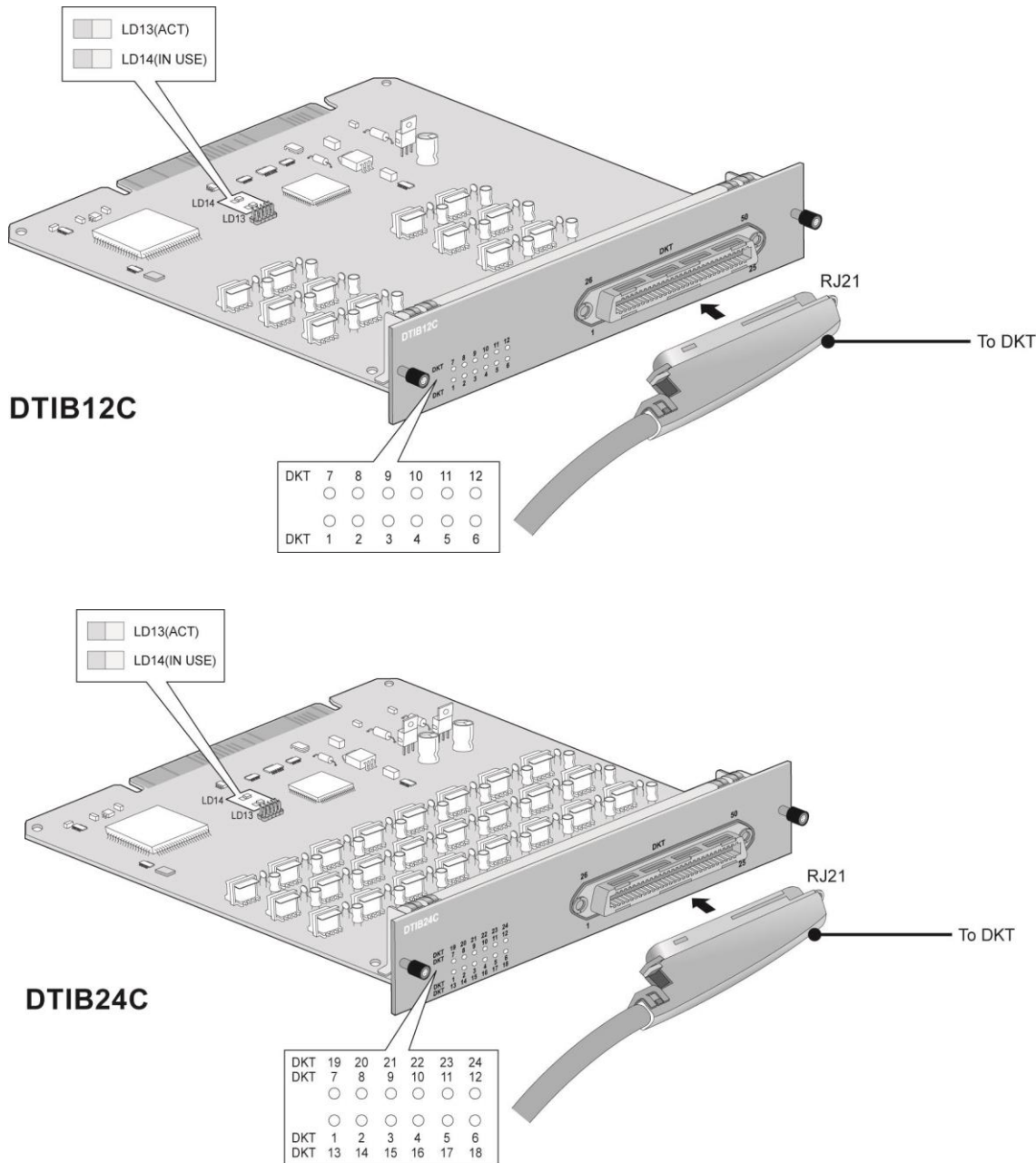| LED | FUNCTION | REMARK |
|-----|----------|--------|
| LD1 | The status of $1^{st}$ port or $13^{th}$ port | ON (Blue) : $1^{st}$ port Use<br>ON (Yellow Green) : $13^{th}$ port Use<br>ON (Blush white) : $1^{st}$ and $13^{th}$ port Use<br>OFF: Idle |
| LD2 | The status of $2^{nd}$ port or $14^{th}$ port | ON (Blue) : $2^{nd}$ port Use<br>ON (Yellow Green) : $14^{th}$ port Use<br>ON (Blush white) : $2^{nd}$ and $14^{th}$ port Use<br>OFF: Idle |
| LD3 | The status of $3^{rd}$ port or $15^{th}$ port | ON (Blue) : $3^{rd}$ port Use<br>ON (Yellow Green) : $15^{th}$ port Use<br>ON (Blush white) : $3^{rd}$ and $15^{th}$ port Use<br>OFF: Idle |
| LD4 | The status of $4^{th}$ port or $16^{th}$ port | ON (Blue) : $4^{th}$ port Use<br>ON (Yellow Green) : $16^{th}$ port Use<br>ON (Blush white) : $4^{th}$ and $16^{th}$ port Use<br>OFF: Idle |
| LD5 | The status of $5^{th}$ port or $17^{th}$ port | ON (Blue) : $5^{th}$ port Use<br>ON (Yellow Green) : $17^{th}$ port Use<br>ON (Blush white) : $5^{th}$ and $17^{th}$ port Use<br>OFF: Idle |
| LD6 | The status of $6^{th}$ port or $18^{th}$ port | ON (Blue) : $6^{th}$ port Use<br>ON (Yellow Green) : $18^{th}$ port Use<br>ON (Blush white) : $6^{th}$ and $18^{th}$ port Use<br>OFF: Idle |
| LD7 | The status of $7^{th}$ port or $19^{th}$ port | ON (Blue) : $7^{th}$ port Use<br>ON (Yellow Green) : $19^{th}$ port Use<br>ON (Blush white) : $7^{th}$ and $19^{th}$ port Use<br>OFF: Idle |
| LD8 | The status of $8^{th}$ port or $20^{th}$ port | ON (Blue) : $8^{th}$ port Use<br>ON (Yellow Green) : $20^{th}$ port Use<br>ON (Blush white) : $8^{th}$ and $20^{th}$ port Use<br>OFF: Idle |
| LD9 | The status of $9^{th}$ port or $21^{st}$ port | ON (Blue) : $9^{th}$ port Use<br>ON (Yellow Green) : $21^{st}$ port Use<br>ON (Blush white) : $9^{th}$ and $21^{st}$ port Use<br>OFF: Idle |
| LD10 | The status of $10^{th}$ port or $22^{nd}$ port | ON (Blue) : $10^{th}$ port Use<br>ON (Yellow Green) : $22^{nd}$ port Use<br>ON (Blush white) : $10^{th}$ and $22^{nd}$ port Use<br>OFF: Idle |

| LD11 | The status of 11<sup>th</sup> port or 23<sup>rd</sup> port | ON (Blue) : 11th port Use<br>ON (Yellow Green) : 23rd port Use<br>ON (Blush white) : 11th and 23rd port Use<br>OFF: Idle |
|------|------|------|
| LD12 | The status of 12<sup>th</sup> port or 24<sup>th</sup> port | ON (Blue) : 12th port Use<br>ON (Yellow Green) : 24th port Use<br>ON (Blush white) : 12th and 24th port Use<br>OFF: Idle |
| LD13 | ACT, Activation or Normal Operating | Blink (Blue Color) |
| LD14 | In use | ON: Ch. Use,<br>OFF: All channels Idle |

### 4.4.4.2    DTIBC Installation

The DTIBC has no switches or connectors that are field useable. The DTIBC can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only.

1) Assure Power is OFF
2) Slide the DTIBC in the guide rails of the desired slot.
3) Tighten thumbscrews to hold the board firmly in place.
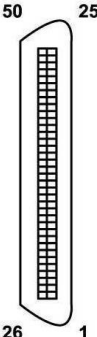
### 4.4.4.3    DTIBC Wiring
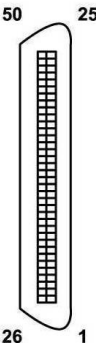
Each DKT port is terminated to a pair in the RJ21 connector. DKT 1 is terminated at pair 1, DKT 2 is terminated on pair 2, etc. to the number of ports (12 or 24) on the DTIBC.

Referring to the pin-out chart below,

- Wire each DKT pair on the RJ21 connector to the DKT termination point using UTP cable. The maximum total wire length is 500M/1.6Kft of 22 AWG or 330M/1Kft of 24 AWG wire. For information on wiring the DKT, refer to section 5.1.2.1.
- Tag or number wiring for maintenance.

**Table 4.4.4.4-1 DTIBC Pin-out Chart**

| CONNECTOR | PIN(VT) | PIN(VR) | COLOR CODE | SLIB PORT |
|-----------|---------|---------|------------|-----------|
| RJ21 | 1 | 26 | | 1 |
| | 2 | 27 | | 2 |
| | 3 | 28 | | 3 |
| | 4 | 29 | | 4 |
| | 5 | 30 | | 5 |
| | 6 | 31 | | 6 |
| | 7 | 32 | | 7 |
| | 8 | 33 | | 8 |
| | 9 | 34 | | 9 |
| | 10 | 35 | | 10 |
| | 11 | 36 | | 11 |

| | | | | |
|---|---|---|---|---|
| | 12 | 37 | | 12 |
| | 13 | 38 | | 13 |
| | 14 | 39 | | 14 |
| | 15 | 40 | | 15 |
| | 16 | 41 | | 16 |
| | 17 | 42 | | 17 |
| | 18 | 43 | | 18 |
| | 19 | 44 | | 19 |
| | 20 | 45 | | 20 |
| | 21 | 46 | | 21 |
| | 22 | 47 | | 22 |
| | 23 | 48 | | 23 |
| | 24 | 49 | | 24 |
| | 25 | 50 | | |

### 4.4.5    WTIB (Wireless Telephone Interface Board) for DECT

WTIB is the iPECS eMG800 interface to the System DECT solution for in-building mobility with transparent handover. The WTIB supports European DECT and is not intended for use in other regions. The System DECT solution is comprised of the 4 or 8 port Wireless Telephone Interface Boards (WTIB4/8), System DECT Base Stations providing the fixed radio receivers (cells), and DECT handsets. The figure below is a reference model of the iPECS eMG800 System DECT solution.
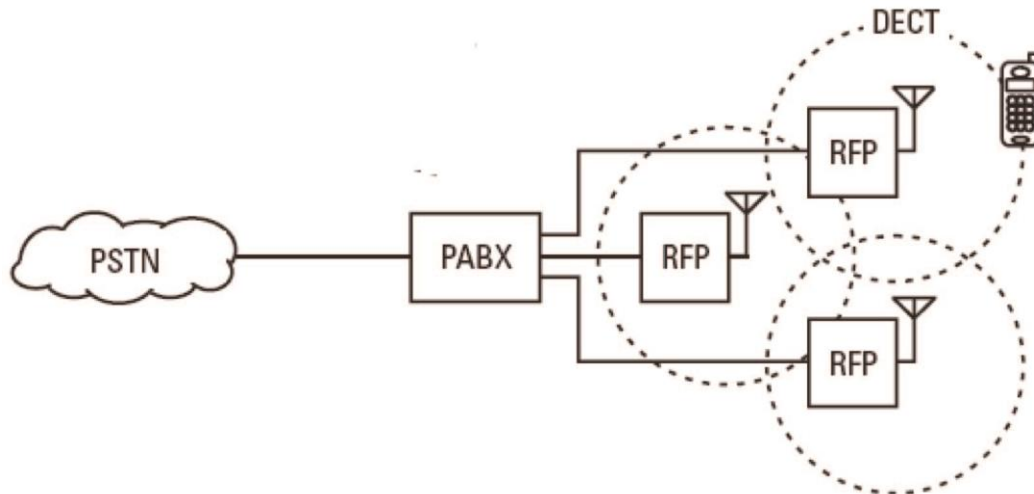


**Figure 4.4.5-1 iPECS eMG800 DECT Reference Model**

The following components make up the System DECT solution:

- WTIB4, WTIB8 board – Up to three WTIB4s or WTIB8s can be installed in the iPECS eMG800. The WTIB4 and WTIB8 have 4 or 8 Base Station ports, respectively.
- Base Station (GDC-600BE) – The System DECT Base Station can process up to six simultaneous calls. The Base Station is intended for indoor use only.
- Wireless Terminal (GDC-450H/480H/500H) – Up to 192 wireless terminals can be registered (refer to the DECT Wireless Terminal User Guide). Older versions may be compatible, check with your local representative.

**Table 4.4.5-1 System DECT Base Station Specifications**

| ITEM | SPECIFICATION |
|---|---|
| Power Feed required | +30 VDC |
| Transmission Max Power | 250 mW |
| Access Method/Duplex | TDMA/TDD |
| Frequency Band | 1,880 ~ 1,900MHz<br>1,920 ~ 1,930MHz (USA) |
| Channel Spacing | 1.728MHz |
| Modulation | GFSK |
| Data Rate | 1.152Mbps |
| Max. Base Station distance from the WTIB4/8 | 600m (twisted 2-pair cable) |

The WTIB provides power to the System DECT Base Stations and is the interface between Base Stations and other resources and features of iPECS eMG800.

iPECS eMG800 supports three (3) WTIBs. Each port on the WTIB terminates to an RJ45 connector on the front panel of the board.
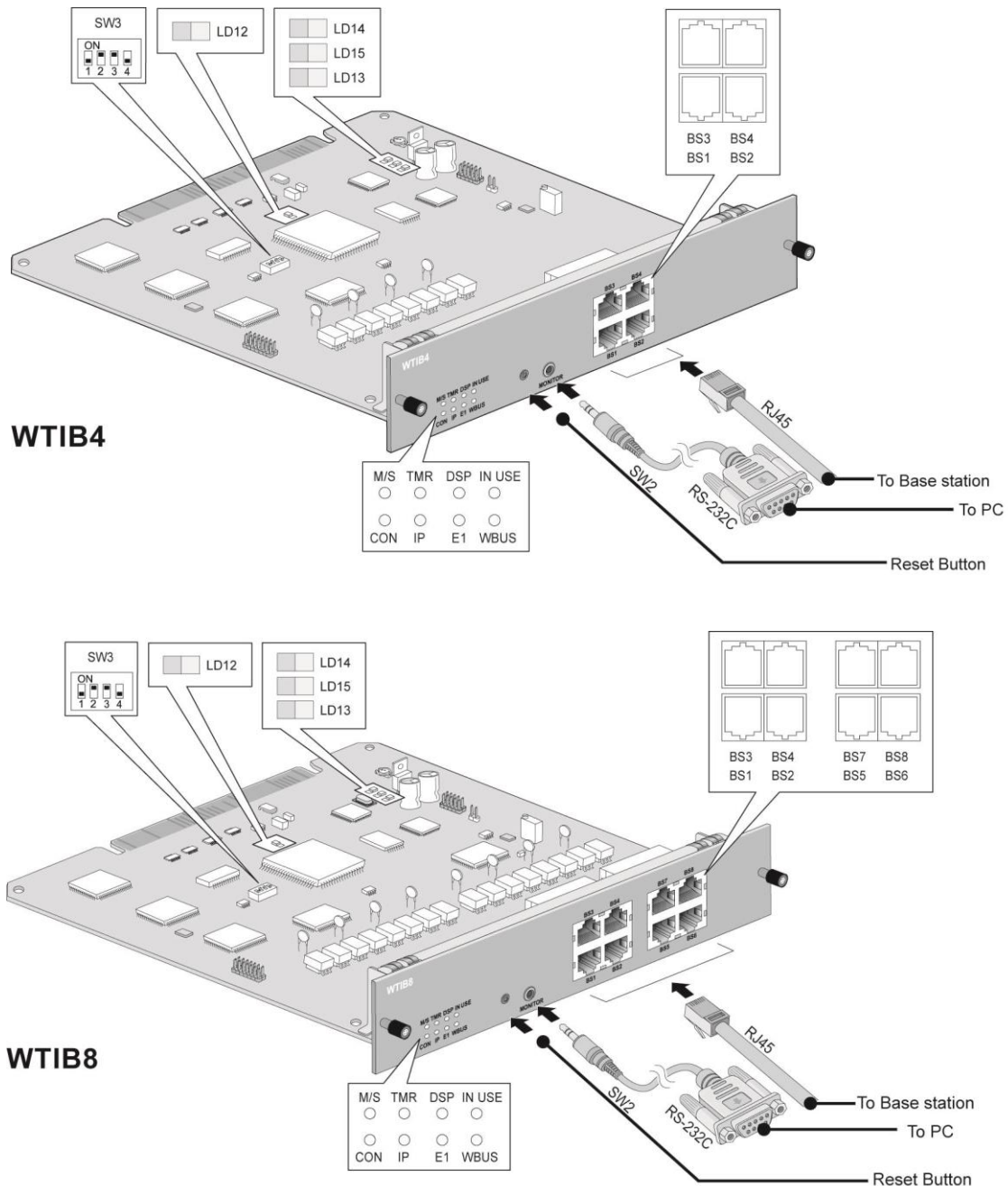


**Figure 4.4.5-2 WTIB (Wireless Telephone Interface Board)**

### 4.4.5.1    Connectors, Switch and LED Functions

The following Table shows the relation between the front panel RJ45 connectors and associated Base Station (cell) numbers.

**Table 4.4.5.1-1 WTIB RJ45 Connector Functions**

| CONNECTOR | CELL NUMBER |
|---|---|
| BS1 | Cell 1 |
| BS2 | Cell 2 |
| BS3 | Cell 3 |
| BS4 | Cell 4 |
| BS5, WTIB8 only | Cell 5 |
| BS6, WTIB8 only | Cell 6 |
| BS7, WTIB8 only | Cell 7 |
| BS8, WTIB8 only | Cell 8 |

**Table 4.4.5.1-2 Switch Functions**

| SWITCH | ON | OFF | DESCRIPTION | DEFAULT |
|---|---|---|---|---|
| SW3-1 | Test mode | Normal | TRB6 Test Mode | OFF |
| SW3-2 | Enable Echo-can. | Disable Echo-can. | Echo-canceller control | ON |
| SW3-3 | | | Not used | ON |
| SW3-4 | All base reset | Only new base reset | On: All base reset<br>Off: One base reset | OFF |

The eight (8) LEDs mounted on the WTIB indicate the status of the board as explained in the chart below.

**Table 4.4.5.1-3 WTIB 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 to 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 |

### 4.4.5.2    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 for iPECS eMG800.

### 4.4.5.3    WTIB Installation

Prior to installation, assure the Dipswitch settings are in the default position, section 4.4.5.1. The WTIB can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for the MPB only. Note when installing more than one WTIB, all WTIBs should be installed in the same KSU.

1) Assure Power is OFF.

2) Slide the WTIB in the guide rails of the desired slot.

3) Tighten thumbscrews to hold the board firmly in place.

### 4.4.5.4    Ferrite Core Installation

A ferrite core is provided in the packaging of the System DECT Base Station. When properly installed, the ferrite core reduces Electro-Magnetic Interference from the Base Station. The Ferrite core should be installed on each cable that is connected to the WTIB as close to the WTIB connector as possible. Using RJ45 terminate CAT3 cable, wrap the Ferrite core as shown in Figure 4.4.5.4-1.
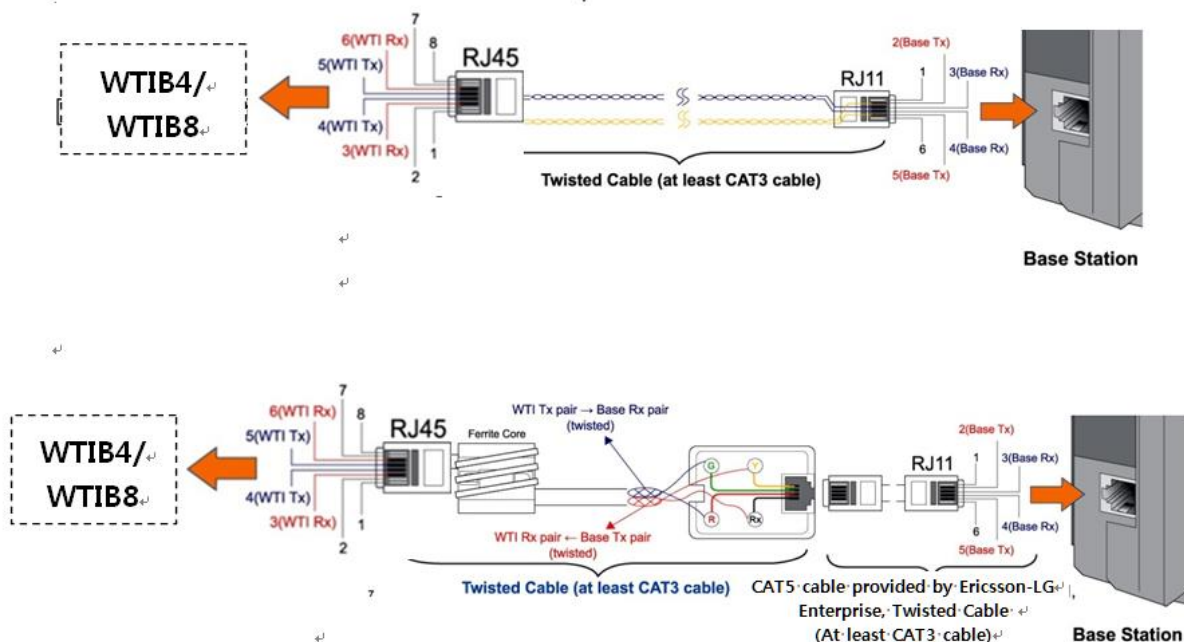


**Figure 4.4.5.4-1 WTIB Ferrite Code and Base Station**

### 4.4.5.5    WTIB Wiring

Each Base Station port on the WTIB is terminated to an RJ45 connector wired as shown in the pin-out chart below. Separate wiring is required for the TX and RX pairs. Power is delivered from the WTIB to the Base Station over the simplex circuit formed by the TX and RX pairs.

Refer to the pin-out charts and Figure 4.4.5.5-1 below and Figure 4.4.5.4-1,

- Plug RJ45 terminated cable with the Ferrite core into the appropriate WTIB connector.
- Wire each WTIB RJ45 TX and RX pair to the System DECT Base Station termination point using CAT3 or better wiring. The maximum total wire length is 600M/1.9Kft of 22 AWG.
- Tag or number wiring for maintenance.

**NOTE**

A shorter cable length between the WTIB and System DECT Base Stations will decrease the possibility of data degradation.

For best operation, all wiring from the WTIB to the Base Stations should use unshielded twisted pair wiring (at least Cat 3) of a consistent gauge and kept at the shortest length possible.
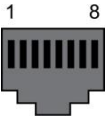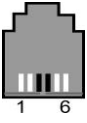
**Table 4.4.5.5-1 WTIB Pin-out Chart**

| CONNECTOR | PIN | SIGNAL NAME | FUNCTION |
|---|---|---|---|
| RJ45 | 1, 2, 7, 8 | Not used | |
| | 4 | TX- & (+30V) | Transmit Data & +30VDC power |
| | 5 | TX+ & (+30v) | |
| | 3 | RX+(GND) | Receive Data & Gnd Power feed |
| | 6 | RX-(GND) | |

**Table 4.4.5.5-2 Base Station**

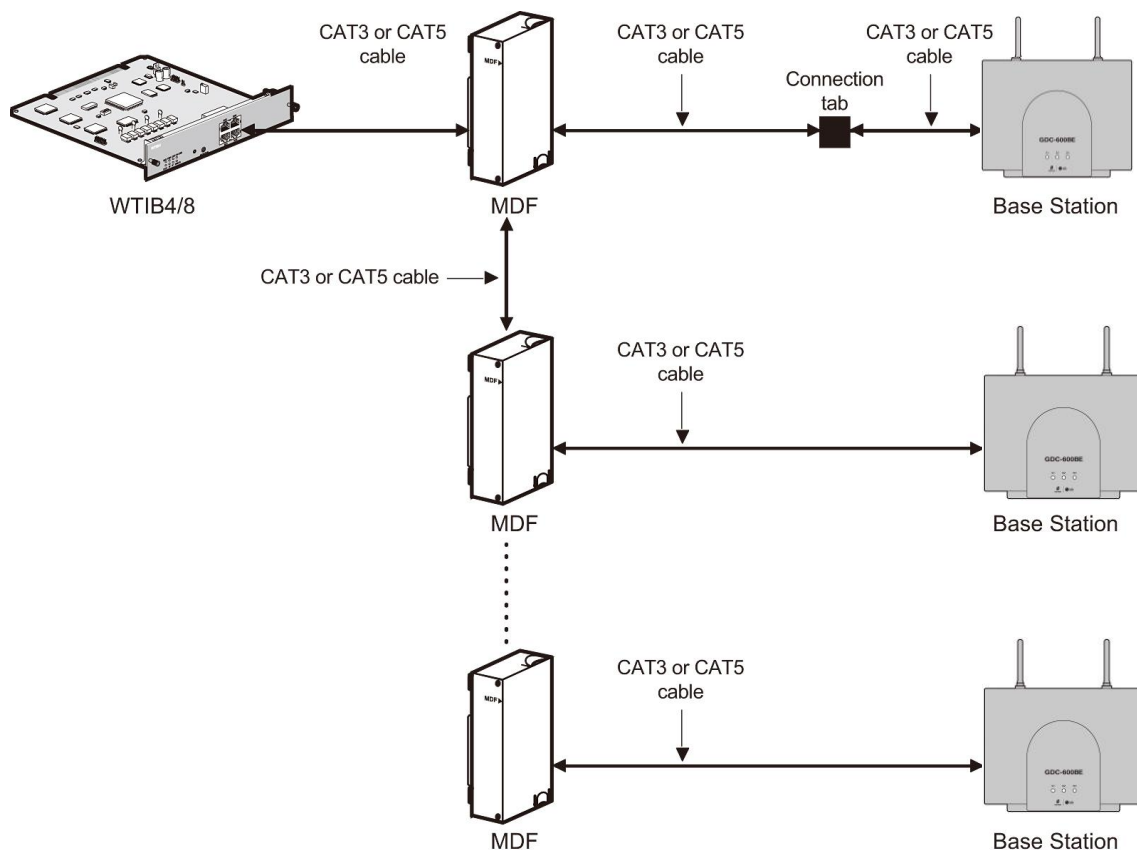| CONNECTOR | PIN | SIGNAL NAME | FUNCTION |
|---|---|---|---|
| RJ11 | 5, 6 | Not used | |
| | 1 | TX+ (GND) | Transmit Data & Gnd Power feed |
| | 4 | TX- (GND) | |
| | 2 | RX+ & (+30V) | Receive Data & +30VDC power |
| | 3 | RX- & (+30V) | |



**Figure 4.4.5.5-1 WTIB Connection to Multiple System DECT Base Stations**

### 4.4.5.6    Serial Port

The WTIB include an Audio jack connected to a Serial port. The serial port is used for diagnostic purposes. For wiring information, refer to section 4.6.

## 4.5      Function Boards

### 4.5.1      VMIB (Voice Mail Interface Board) and AAIB (Auto-Attendant Interface Board)

VMIB and AAIB provide memory for System Greetings including CCR and ACD/UCD announcements.

In addition, VMIB provides memory for User Greetings and Voice Message storage, 100 hours.

VMIB and AAIB include a processor and DSP circuitry to support eight (8) simultaneous channels.

| BOARD | CHANNEL | SYSTEM GREETING/USER GREETING |
|-------|---------|-------------------------------|
| VMIB | 8 | System Greeting (0.5hrs.), User Message (100 Hours) |
| AAIB | 8 | System Greeting (0.5hrs.), User Message (None) |

VMIB and AAIB have a standard USB connector that is used to back-up System and User greetings, and Voice Messages (VMIB only).

In addition, the VMIB and AAIB have a LAN and Audio Serial port jack used for advanced diagnostic purposes and board upgrades only.
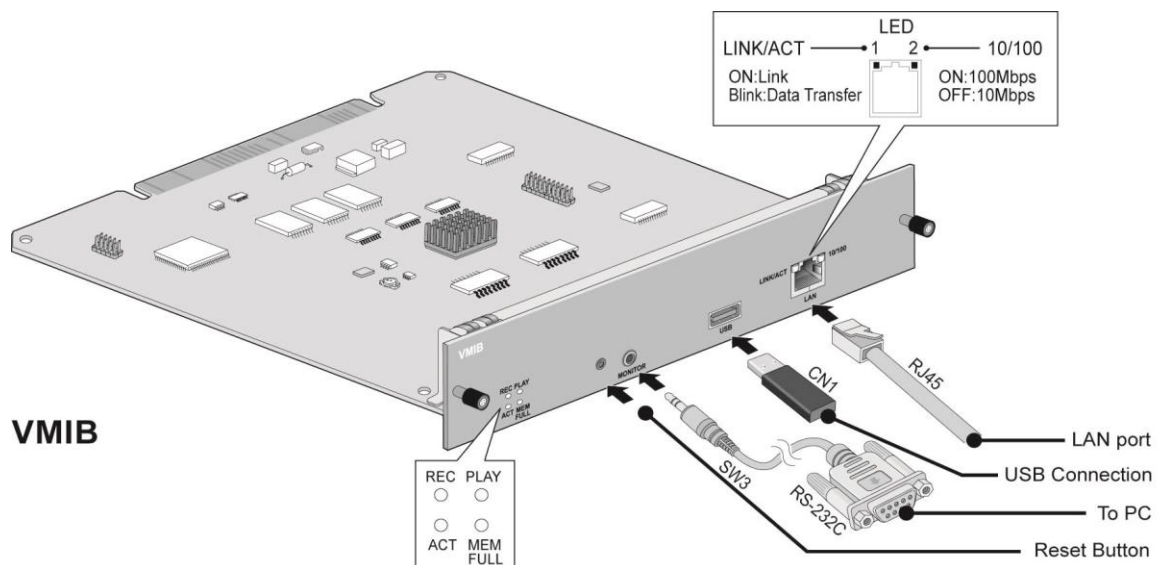


**Figure 4.5.1-1 AAIB and VMIB**

**NOTE**
- If VMIB or AAIB is installed in System, VMIB/AAIB prompts (Default=1-English, 2-3-Blank) should be uploaded for each country.
- System Voice prompts are stored on MPB and not on VMIB or AAIB.
- Voice prompt Language can be changed using Web Admin, VMIB upgrade function.

### 4.5.1.1 Switch, and LED Functions

**Table 4.5.1.1-1 Switch Functions**

| SWITCH | FUNCTION | REMARK |
|---|---|---|
| SW1 | 4-POLE Dip Switch (Function: not defined) | Default: Off |
| SW3 | Reset switch | |
| SW2 & 4 | - | |

**Table 4.5.1.1-2 LED Indication**

| LED | FUNCTION | REMARK |
|---|---|---|
| LD1 | Normal operation indication (Activity Indication) | Blink (blue Color) |
| LD2 | Memory Full (ON – Full, OFF – Usable) | AAIB – Not used |
| LD3 | Record (ON – Active, OFF – Idle) | |
| LD4 | Play (ON – Active, OFF – Idle) | |
| RJ45-LD1 (Green/Orange) | ON – Link, Blink – Data Transfer | |
| RJ45-LD2 (Yellow) | ON - 100Mbps, OFF – 10Mbps | |

### 4.5.1.2 VMIB and AAIB Installation

VMIB and AAIB have no switches or connectors that are field useable. VMIB and AAIB can be installed in any universal slot of any KSU; the 1st slot of the BKSU is for MPB only.

1) Assure Power is OFF
2) Slide the VMIB/AAIB in the guide rails of the desired slot.
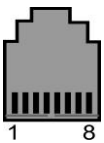3) Tighten thumbscrews to hold the board firmly in place.

### 4.5.1.3 VMIB and AAIB Wiring

There is no wiring required for proper operation of the VMIB or AAIB.

### 4.5.1.4 VMIB and AAIB LAN Connector

The VMIB and AAIB include an RJ45 for connection to a 10/100 Base-T Ethernet (IEEE 802.3) connection. The port supports auto negotiation for speed (10 or 100 Mbps) and full or half-duplex operation. If need be, the RJ45 is wired as indicated in the RJ45 pin-out chart below.

**Table 4.5.1.4-1 VMIB & AAIB RJ45 Pin-out Chart**

| CONNECTOR | PIN | SIGNAL NAME | FUNCTION |
|---|---|---|---|
| RJ45 | 4,5,7,8 | Not used | |
| | 1 | TX+ | Transmit Data |
| | 2 | TX- | Transmit Data |
| | 3 | RX- | Receive Data |
| | 6 | RX+ | Receive Data |

### 4.5.1.5 Serial Port

The VMIB and AAIB include an Audio jack connected to a Serial port. The serial port is used for diagnostic purposes. For wiring information, refer to section 4.6.

## 4.5.2     VOIB (Voice over Internet protocol Board, 8 and 24channel)

The VOIB is available in two (2) models, the VOIP8 with 12 IP channels and the VOIB24 with 24 IP channels. Other than the number of channels, there are no significant differences in the VOIB8 and VOIB24. The VOIB provides the Ethernet interface for Ericsson-LG Enterprise IP Phones, SIP phones and trunks, IP Networking and applications. The VOIB is used to provide packet relay for remote devices to communicate with the host and translate between the iPECS proprietary protocols and other standard protocols (H323 rev.4, SIP RFC3261).The VOIB connects to a standard IEEE 10/100 Base-T Ethernet switch port and supports auto negotiation for speed (10MBps or 100Mbps) and full or half-duplex operation. The VOIB supports various codecs (g.711, g.726, g.729, g.723.1), T.38 for IP FAX, and Echo Cancellation (g.168).
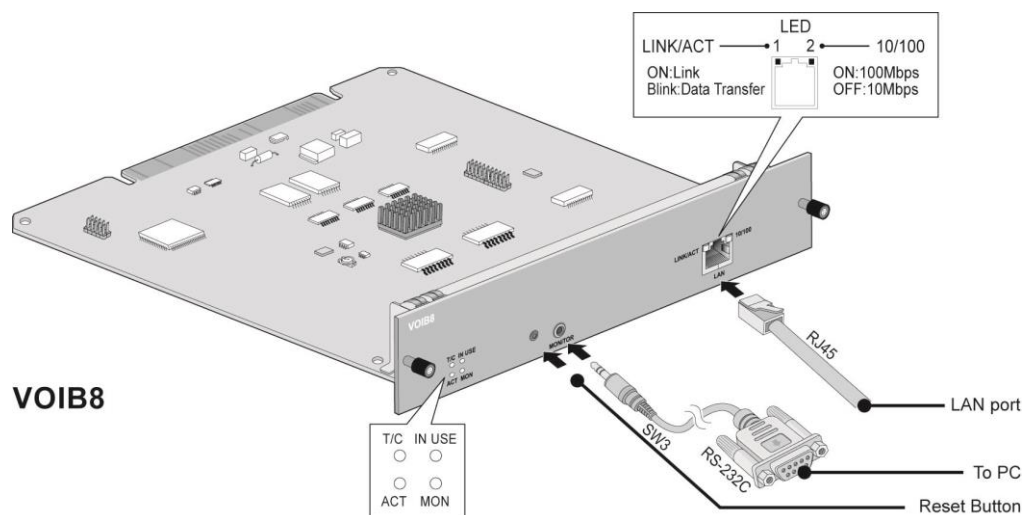


**Figure 4.5.2-1 VOIB8**

### 4.5.2.1     Switch and LED Functions

**Table 4.5.2.1-1 Switch Functions**

| SWITCH | FUNCTION | REMARK |
|--------|----------|--------|
| SW1 | 4-Pole Dip-switch (Function: not defined) | Default: Off |
| SW2 | | |
| SW3 | Reset switch | |
| SW4 | | |

**Table 4.5.2.1-2 LED Indication**

| LED | FUNCTION | REMARK |
|-----|----------|--------|
| LD1 | VOIB Task Active (CMD/Event Processing) | Blink (Blue Color) |
| LD2 | Trace Task Active (Line Monitor) | Blink (Blue Color) |
| LD3 | Transcoding | On: Transcoding in use  Off – Transcoding not in use |
| LD4 | Active VOIP call (Channel in use) | On: Channel in use,  OFF: All channels Idle |
| RJ45-LD1 (Green/Orange) | Data Link | On Link - established  Blink – Data transfer |
| RJ45-LD2 (Yellow) | Port speed | On – 100 Mbps  Off – 10 Mbps |

### 4.5.2.2 VOIB Installation

The VOIB Dip switches should be set to the OFF position before installation. To install the VOIB,

1) Assure Power is OFF

2) Slide the VOIB in the guide rails of the desired slot.

3) Tighten thumbscrews to hold the board firmly in place.

### 4.5.2.3 VOIB Wiring

The VOIB is connected to the LAN through the RJ45 connector on the front panel. The connector is terminated as a standard EIA 568B MDI (Media Dependent Interface) port.

Referring to the pin-out chart below,

- Using UTP cable, wire each VOIB TX and RX pairs to the termination point of an Ethernet switch port RX and TX pairs, respectively.

**Table 4.5.2.3-1 VOIB LAN PORT**

| CONNECTOR | PIN | SIGNAL NAME | FUNCTION |
|---|---|---|---|
| RJ45 | 4,5,7,8 | Not used | |
| | 1 | TX+ | Transmit Data |
| | 2 | TX- | Transmit Data |
| | 3 | RX- | Receive Data |
| | 6 | RX+ | Receive Data |

### 4.5.2.4 Serial Port

The VOIB includes an Audio jack connected to a Serial port. The serial port is used for diagnostic purposes. For wiring information, refer to section 4.6.

### 4.5.3        VOIB128 (Voice over Internet protocol Board, 128 channel)

The VOIB128 supports 128 VoIP channels (Default:32/ 96 channels by license). The VOIB128 provides the Ethernet interface for Ericsson-LG Enterprise IP Phones, SIP phones and trunks, IP Networking and applications. The VOIB128 is used to provide packet relay for remote devices to communicate with the host and translate between the iPECS proprietary protocols and other standard protocols (H323, SIP).

The VOIB128 can be installed on MPB only and connects to a standard IEEE 10/100/1000 Base-T Ethernet directly to a MPB by connector.

It supports auto negotiation for speed (100Mbps or 1000Mbps) and full or half-duplex operation. The VOIB128 supports various codecs (g.711, g.726, g.729, g.723.1), T.38 for IP FAX, and Echo Cancellation (g.168).
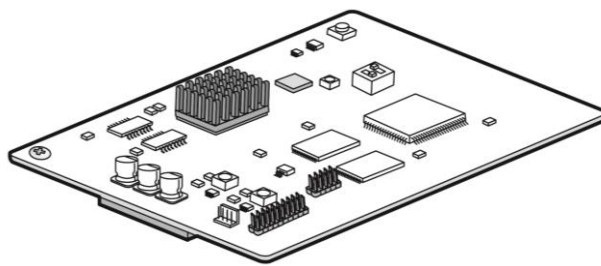


**Figure 4.5.3-1 VOIB128**

#### 4.5.3.1        Switch and LED Functions

**Table 4.5.3.1-1 Connector, Jack and Switch Functions**

| SWITCH & CONNECTOR | FUNCTIONS | DESIGNATION |
|---|---|---|
| SW1 | System Reset | |
| CN1, CN2 | MPB Mounting | Installation on MPB |

**Table 4.5.3.1-2 SW2 – 2-pole Dip switch (SW Development purpose)**

| Pole | Normal operation | Boot Recovery Mode |
|---|---|---|
| Pole 1 | OFF(Default) | ON |
| Pole 2 | ON(Default) | OFF |

**Table 4.5.3.1-3 LED Indication**

| LED | DESCRIPTION |
|---|---|
| 1 (Green) | Link Status LED – ON: Link OK, OFF: No Link |
| 2 (Green) | Speed Status LED – ON: 1000Mbps (Green), OFF: 100Mbps |

#### 4.5.3.2        VOIB128 Installation

The VOIB128 can be installed on connectors CN11 and CN12 of the MPB. Use care to align pins of the CN11 and CN12 connector with the CN1 and CN2 connectors on the VOIB128 and press firmly in place.

1) Assure Power is OFF
2) Be careful to check the installation direction of VOIB128 board.
3) Tighten with a screw to hold the board firmly in place after mounting on MPB.

## 4.6      Serial to Audio Cable Specification

Several board types include a serial port presented as an Audio jack. This serial port is not required for normal operation.

It is only used for advanced diagnostics. Boards that include the Audio Serial connector are PRIB, BRIB2/BRIB4, AAIB/VMIB, VOIB, and WTIB.
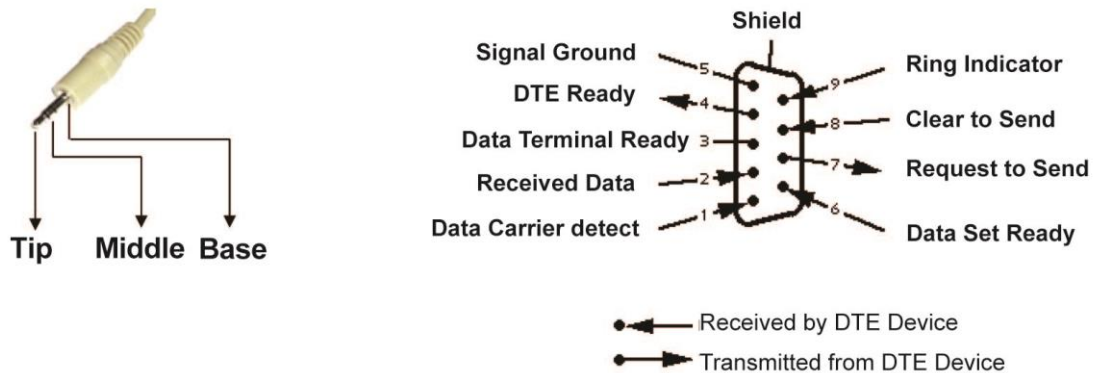


**Figure 4.6-1 Audio Jack, Serial Specification**

### 4.6.1      Serial to Audio Cable Wiring

Connection to the Serial port through the Audio connector is made with a Serial to Audio cable.

The cable should be terminated on one end with a DB9 RS-232 connector and on the other end with an audio jack.

The three (3) wires of the audio jack are wired to the DB9 as follows.

- Wire the Tip conductor of the Audio jack to pin 2 of the DB9
- Wire the Ring conductor of the Audio jack to pin 3 of the DB9
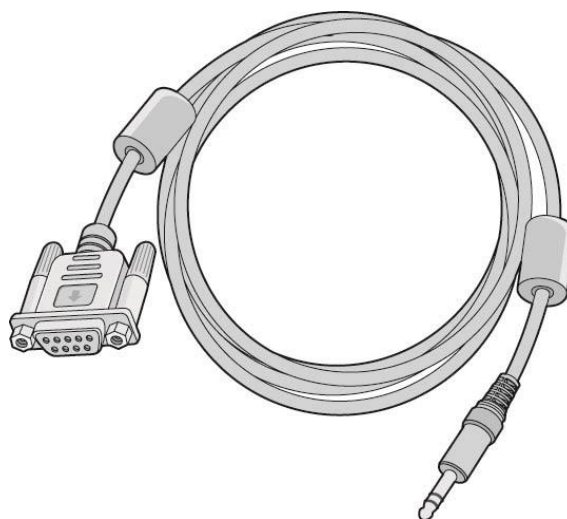- Wire the Grd conductor of the Audio jack to pin 5 of the DB9



**Figure 4.6.1-1 Audio Jack to Serial Cable**

## 4.7    Cable Dressing

To provide a neat professional installation, the wiring to the KSU(s) should be dressed. The wiring cables should be bundled and tie wrapped to the KSU(s) and to the wall or rack.

### 4.7.1    Wall Mount Wiring

To dress wiring for a Wall mount installation,

1) Ensure all boards are installed and that wiring is complete.
2) Using the supplied Cable Ties, tie all wiring cables and Power cord (if desired) together in a neat bundle.
3) Using the supplied Cable Ties, tie the bundled cables to a Rack Mount bracket.
4) Dress the cable bundle under the bottom KSU and attach to the wall at regular spacing back to the wiring termination point.
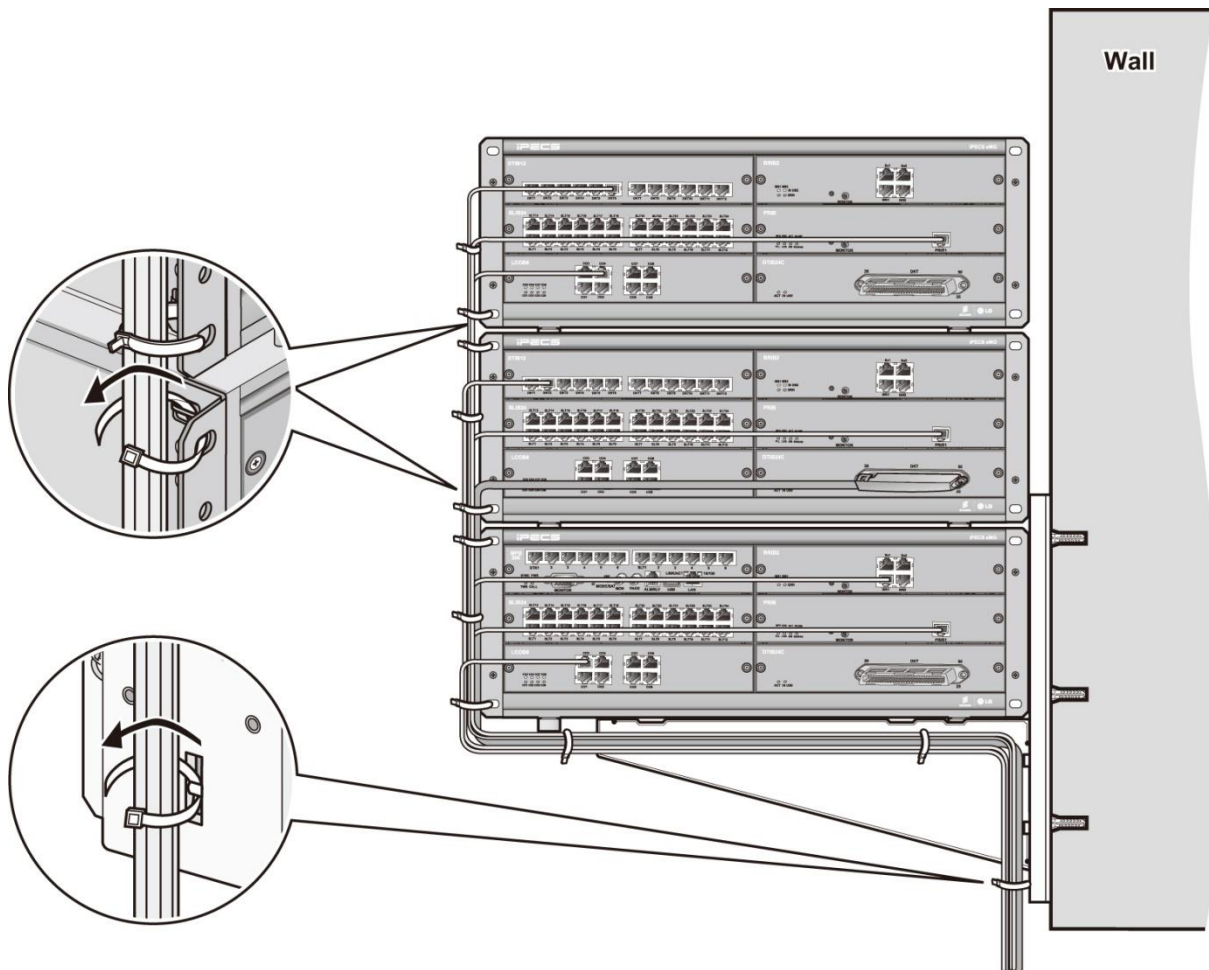


**Figure 4.7.1-1 Wall Mount Wiring**

## 4.7.2    Rack Mount Wiring

To dress wiring for a Rack mount installation,

1)    Ensure all boards are installed and that wiring is complete.

2)    Using the supplied Cable Ties, tie all wiring cables and Power cord (if desired) together in a neat bundle.

3)    Using the supplied Cable Ties, tie the bundled cables using holes in the 19" Rack.

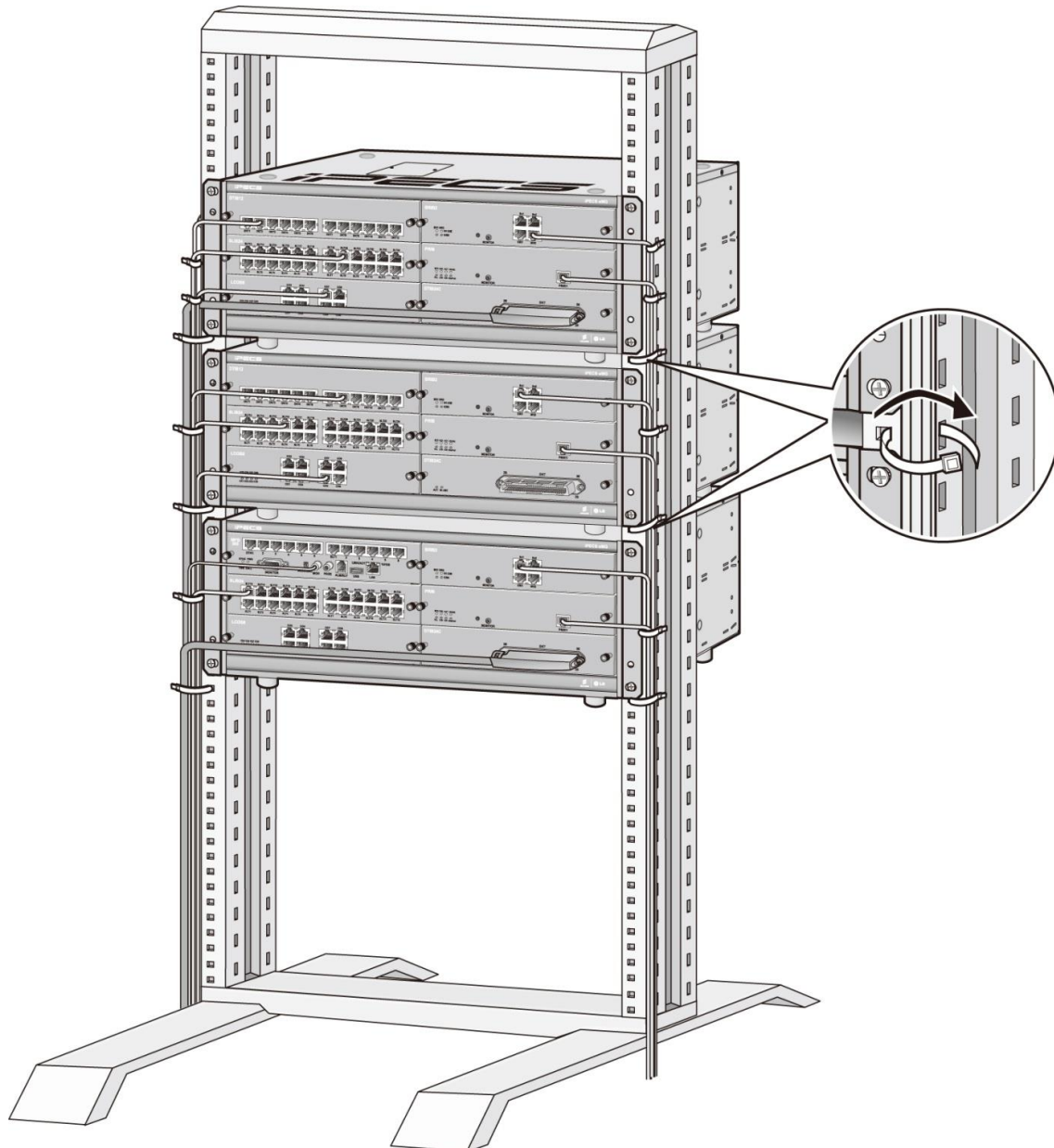4)    Dress the cable down the rack back to the wiring termination point.



**Figure 4.7.2-1 Rack Mount Cable Dressing**

# 5  TERMINAL CONNECTION AND WIRING

## 5.1    Terminal and Door Phone Models

Various types of digital terminals and IP Terminals can be used with the iPECS eMG800 as listed in the table and shown below. Other older model digital phones may also be compatible with iPECS eMG800, check with your local Ericsson-LG Enterprise representative for details.

Digital Key Telephones connect to the DSIU or a DTIB. IP Key Telephones connect to the LAN where they have access to a VOIB channel.

**Note**
For more detailed information about Phone installation, DSS connection, and Wall mount, etc. refer to User guide or Quick Guide (Quick Installation Guide) of the terminal model.

| MODEL | DESCRIPTION |
|---|---|
| LDP-7004N | 4 Flexible Button No display |
| LDP-7004D | 4 Flexible Button w/Display |
| LDP-7008D | 8 Flexible Button w/Display |
| LDP-7016D | 16 Flexible Button w/Display |
| LDP-7024D | 24 Flexible Button w/Display |
| LDP-7024LD | 24 Flexible Button w/Large Display |
| LDP-7048DSS | 48 Button DSS/DLS Console |
| LDP-DPB | Door Phone Box |
| LDP-9008D | 8 Flexible Button w/Display |
| LDP-9030D | 30 Flexible Button w/Display |
| LDP-9048DSS | 48 Button DSS Console |
| LDP-9208D | 8 Flexible Button Display |
| LDP-9224D | 24 Flexible Button Display |
| LDP-9224DF | 24 Flexible Button, Full duplex |
| LDP-9240D | 24(12*2 page) Flexible Button, Full duplex |
| LDP-9248DSS | 48 Flexible Button DSS Console |
| LIP-7008D | 8 Flexible Button w/Display |
| LIP-7016D | 16 Flexible Button w/Display |
| LIP-7024D | 24 Flexible Button w/Display |
| LIP-7024LD | 24 Flexible Button w/Large Display |
| LIP-8002 | 4 Feature Button w/Display |
| LIP-8004D | 4 Flexible Button w/Display |
| LIP-8008D | 8Flexible Button w/Display |
| LIP-8012D | 12 Flexible Button w/Display |
| LIP-8024D | 24 Flexible Button w/Display |
| LIP-8040L | 10 Flexible Button w/Large Display |
| LIP-8012DSS | 12 Button DSS Console / Power supply |
| LIP-8012LSS | 12 Button LSS Console / via keyset up to 2 |

| MODEL | DESCRIPTION |
|---|---|
| LIP-8048DSS | 48 Button DSS Console / via external up to 4 |
| LIP-8040LSS | 48 Button DSS Console w/Display via external or PoE up to 9 |
| LIP-8002E/2AE | 4 Feature Button w/Display |
| LIP-8008E | 8 Flexible Button w/Display |
| LIP-8012E | 12 Flexible Button w/Display |
| LIP-8024E | 24 Flexible Button w/Display |
| LIP-8040E | 10 Flexible Button w/Large Display |
| LIP-8050V | 5 Flexible Button, w/Color Display & Video Camera |
| LIP-8050E | 4.3 inches wide color Graphic screen, 5 buttons, |
| LIP-9002 | 4-flexible buttons w/Display |
| LIP-9010 | 3-line 320 by 48 dot graphic LCD and 5 flexible buttons. |
| LIP-9020 | 4-line 320 by 80 dot graphic LCD, 10 flexible buttons and 3 soft keys. |
| LIP-9030 | 6-line 320 by 112 dot graphic LCD, 8 flexible buttons and 3 soft keys. |
| LIP-9040 | 8-line 320 by 144 dot graphic LCD, 12 flexible buttons and 3 soft keys. |
| LIP-9012DSS | 12 flexible buttons with tri-color LED |
| LIP-9024DSS | 24 flexible buttons with tri-color LED |
| LIP-9024LSS | 12 flexible buttons with tri-color LED/ two flexible button pages to represent 24 total flexible buttons |
| LIP-9048DSS | 48 flexible buttons with tri-color LED |
| LIP-9070 | Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol) |
| LIP-9071 | Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol) |
| WIT-400HE | iPECS WLAN Phone |
| GDC-450H/480H/500H/800H | Business DECT, Full color LCD |
| 1010i | 4-line 132 by 64 dot graphic LCD, 4 flexible buttons and 3 softkeys. |
| 1020i | 4-line 132 by 64 dot graphic LCD, 8 flexible buttons and 3 softkeys. |
| 1030i | 5-line 320 by 240 dot graphic LCD, 6 flexible buttons and 3 softkeys. |
| 1040i | 6-line 480 by 320 dot graphic LCD, 8 flexible buttons and 3 softkeys. |
| 1050i | 8-line 480 by 272 dot graphic LCD, 12 flexible buttons and 3 softkeys. |
| 1080i | Premium Touch Screen IP Phone, 7 Inch TFT color LCD, Android 10 OS, WVGA resolution, Video communications, Soft flexible buttons (48 for SIP/ 30 for iPECS protocol) |
| 1024idss | 24 flexible buttons with tri-color LED, Paper Label |
| 1048ilss | 2x24 flexible buttons with tri-color LED, LCD Display |
| 1048idss | 48 flexible buttons with tri-color LED, Paper Label |

## 5.1.1    Terminal Cabling Distance
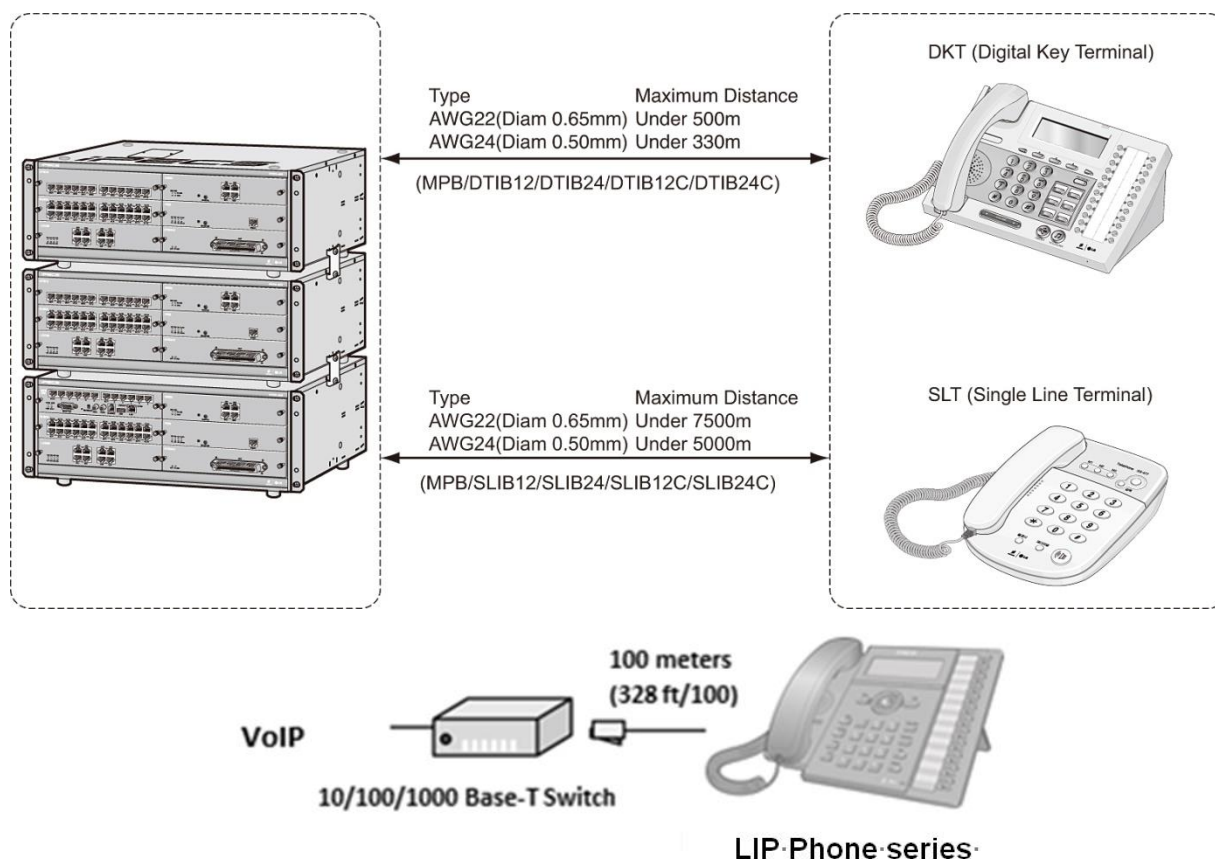


**Figure 5.1.1-1 Terminal Cabling Distance**
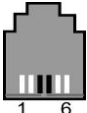
## 5.1.2    Terminal Connections

### 5.1.2.1    DKT Wiring

The Digital Key Telephone and digital DSS Console are terminated to the 1st pair of the RJ11 located in the bottom of the DKT or Console. The wall outlet for the DKT or Console should be connected back to an appropriate DTIB or MPB DSIU DKT port.

Refer to the pin-out chart below and Figure 5.1.1-1,

- Wire the wall outlet 1st pair to the DTIB or DSIU termination point using UTP cable.   Note separate wiring is required for the LDP-7048 DSS Console.
- Using the line cord provided, connect the DKT or DSS Console to the wall outlet.

**Table 5.1.2.1-1 DKT Pin-out Chart**

| Line Cord | CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|---|
| RJ11 | | 1,2 | Not used |
| | | 3 | Ring |
| | | 4 | Tip |
| | | 5,6 | Not used |

### 5.1.2.2    SLT wiring

SLTs are wired to the center pair of the RJ11, typically on the bottom or back of the SLT. The wall outlet should be connected back to an appropriate SLIB or DSIU SLT port.

Refer to the pin-out chart below and Figure 5.1.1-1,

1) Wire the center pair of the wall outlet to the SLIB or DSIU termination point using UTP cable.

2) Using the line cord provided with the SLT, connect the SLT to the wall outlet.

**Table 5.1.2.2-1 Standard SLT Pin-out Chart**

| Line Cord | CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|---|
| RJ11 | | 1,2 | Not used |
| | | 3 | Ring |
| | | 4 | Tip |
| | | 5,6 | Not used |

### 5.1.2.3    LIP Phone Keyset Wiring

iPECS eMG800 supports LIP Phone series. LIP-7008D and LIP-8004D have a single LAN port that is wired to an Ethernet switch port. Generally all other LIP phone series shown here have two (2) Ethernet ports, a LAN port and a PC port. The LAN port is connected to an Ethernet switch port and the PC port is connected to the LAN port of a PC. The LIP phones are wired to any 10/100 (or 1000) Base-T Ethernet switch port with access to a VOIB channel. The LIP phones can be powered from a POE compatible Ethernet switch port or using the AC/DC Adaptor-K.
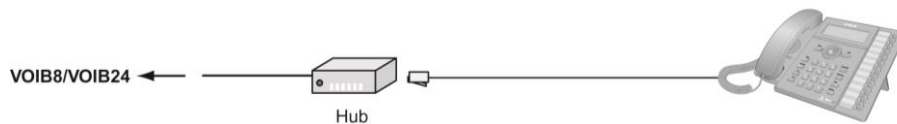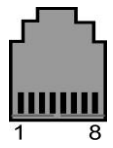


**Figure 5.1.2.3-1 LIP Phone Connection**

**Table 5.1.2.3-1 LIP Phone Pin-out Chart**

| CONNECTOR | PIN | SIGNAL NAME | FUNCTION |
|---|---|---|---|
| RJ45 | 4,5,7,8 | Not used | |
| | 1 | TX+ | Transmit Data |
| | 2 | TX- | Transmit Data |
| | 3 | RX- | Receive Data |
| | 6 | RX+ | Receive Data |

1) Using the above wiring chart, wire the RX and TX pins from the RJ45 Wall outlet, or equal, for the IP Phone to the appropriate Ethernet switch termination point using Cat 5 or, for 1000 Base-T Cat 5e UTP cable. The maximum wire length between the IP Phone and the Ethernet switch port is 100 meters or 328 feet.

2) Use the RJ45 terminated cable provided with the phone to connect the IP Phone LAN port to the Wall outlet.

3) Connect the PC port to a PC LAN port using a CAT 5 cable terminated on each end with an RJ45 connector.

4) If not using a POE switch port, connect the DC connector of an AC Adaptor-K to the DC input on the bottom of the IP Phone and plug the AC plug of the AC adaptor in to a 100-240 VAC outlet.

Once the LIP phone powers up, it will attempt to register with the eMG80. From default, the LIP phone should complete the registration successfully. If not, the phone will display the "No Response" message shown below.

```
NO RESPONSE FROM MFIM [L]
SET[*] – RETRY[#]
```

This indicates the LIP phone needs to be configured for the local network environment. To configure the phone, perform the following steps.

1) Press '*' to set the network configuration

2) Enter the password, 147*.

3) Use the Volume Up/Down buttons to scroll through the menu shown below.

4) Enter appropriate values for the local network.

5) When complete, press the Speaker button.

6) Press '*' to exit and restart the LIP Phone.

| Menu Display | Description |
|---|---|
| MODE[R/L]<br>[LOCAL] – CHANGE[#] | Registration mode, use '#' to set Remote mode |
| PHONE IP ADDRESS<br>(DOT:*) | Use the dial pad to enter the fixed IP address, use DHCP for dynamic addressing |
| PHONE NET MASK(DOT:*) | Use the dial pad to enter the Subnet mask if using fixed IP addressing |
| ROUTER IP<br>ADDRESS(DOT:*) | Use the dial pad to enter the default Gateway if using fixed IP addressing |
| MFIM IP ADDRESS(DOT:*) | Use the dial pad to enter the IP address of the MFIM IP address. |
| SAME LAN WITH MFIM<br>[YES] – CHANGE[#] | Indicates if the IP Phone and the eMG80 are on the same LAN segment. Use # to change, Yes/No. |
| INPUT DEVICE NUMBER: | |
| DHCP ?<br>[DISABLED] – CHANGE[#] | The IP Phone supports fixed or dynamic addressing, use # to change the value. |
| VLAN CONFIGURATION<br>NOT SET | Not used |
| WEB PASSWORD | Not used |
| PHY MODE : AUTO NEGO<br>CHANGE[*] SAVE[#] | Speed and Duplex negotiation, use * to change the selection |

## 5.1.3    LDP Door Phone Box

The iPECS eMG800 supports the LDP DPB, digital Door Phone Box. The Door Phone Box can place a call to assigned stations and a station can answer the Door Phone Box call.

If configured, the station user can activate a door-lock release mechanism to allow entry.

### 5.1.3.1    Door Phone Box Installation

The Door Phone Box can be wall mounted in a protected environment; the DPB is not intended for exterior application. To wall mount the LDP-DPB,

1)    Locate the mounting position for the Door Phone Box,

2)    Mark position for two (2) screws

3)    Drill holes for two (2) plastic anchors

4)    Insert screws and tighten leaving about ¼ inch exposed.

5)    Align the screw holes in the back of the LDP-DPB with the screws and slide down to lock in place. It may be necessary to remove the box and loosen or tighten the screws for a secure fit.

### 5.1.3.2    Door Phone Box Wiring

The Door Phone Box is wired using screw terminals in the box. The terminals are wired to any available DKT port except for the first DKT port.

1)    Refer to Figure 5.1.3.2-1 and the pin-out chart below,

2)    Loosen the screw holding the Door Phone Box cover.

3)    Loosen the two (2) screw terminals.

4)    Using a UTP cable terminated on one end with an RJ11, strip approximately ¼ inch of insulation from the center pair at the un-terminated end of the wire.

5)    Insert the DKT Tip in one terminal and the DKT Ring.

6)    Tighten the screws to connect and securely fasten the wires.

7)    Plug the terminated end of the wire into a standard wall outlet with an RJ11.

8)    Wire the wall outlet 1st pair to the DTIB or DSIU termination point using UTP cable.
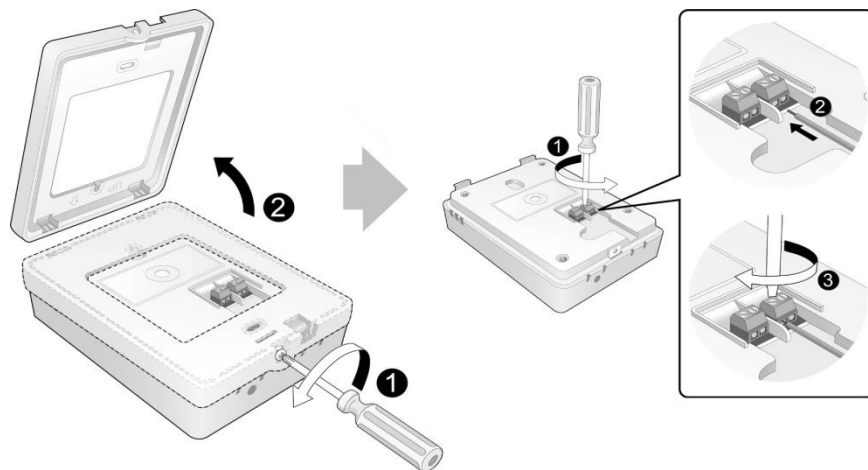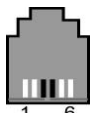


**Figure 5.1.3.2-1 Door Phone Box Wiring**

**Table 5.1.3.2-1 LDP-DPB Pin-out Chart**

| Line Cord | CONNECTOR | PIN | SIGNAL NAME |
|---|---|---|---|
| RJ11 | | 1,2 | Not used |
| | | 3 | Ring |
| | | 4 | Tip |
| | | 5,6 | Not used |

## 5.1.4 DSS/BLF Console Installation & Wiring

### 5.1.4.1 LDP-7048 DSS Installation & Wiring

The digital LDP-7048 DSS/BLF Console is provided with a phone-mounting bracket, used to fasten the Console to the phone securely. To attach the fastener,

1) Turn the Console and phone upside down,

2) Place the fastener in position,

3) Insert and tighten screws. Caution: do not over-tighten as this may damage the plastic phone housing.
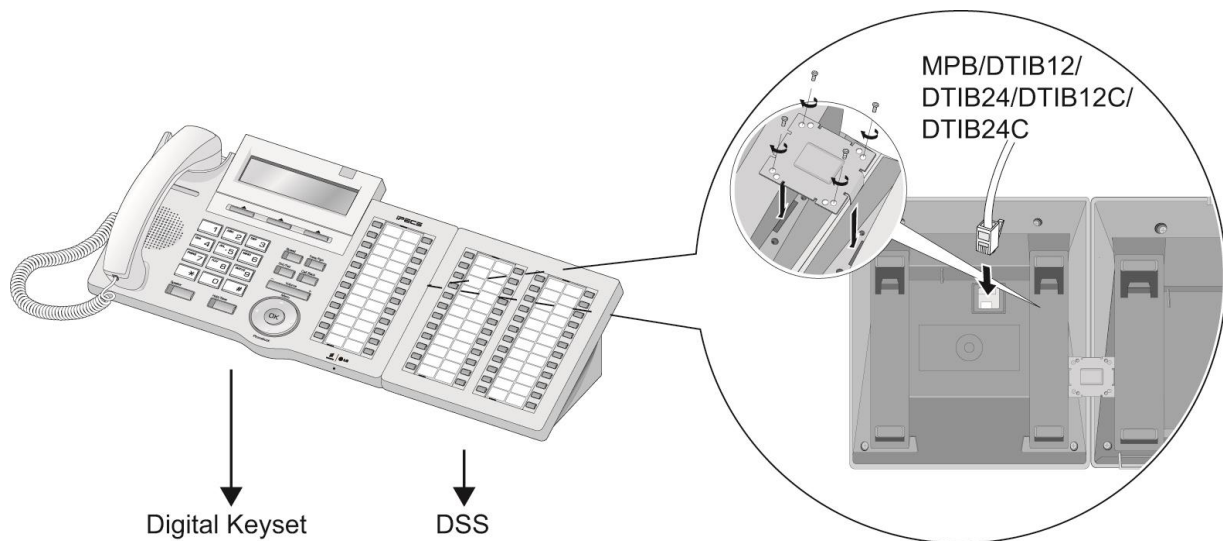


**Figure 5.1.4.1-1 LDP-7048 Console Install**

LDP-7048 DSS Console is wired as a normal Digital Key Telephone to a separate port of a DISU or DTIB, refer to section 5.1.2.1.

### 5.1.4.2 LIP-8000 DSS Installation and Wiring

LIP-8000/8000E Series DSS/BLF Console is available in three (3) models 12 button w/paper labels (LIP-8012DSS), 12-button w/LCD (LIP-8012LSS), and 48-button w/paper labels (LIP-8048DSS).

Up to four (4) consoles can be connected to LIP-8000/800E series phone using the serial ribbon cable from the console.

LIP-8000 phones will power a maximum two (2) LCD DSS Consoles and, when more than two consoles are connected, one must be the 48-button Console.

In all cases, the 48-button Console must be powered by the AC/DC Adaptor-K. The figures below depict installation of various console configurations.

Note that in all cases, AC/DC Adaptor-K is attached to the 48-button Console.

Refer to install an LIP-8000 series DSS Console,

1) Turn the LIP phone and DSS Console upside down.

2) Remove the rubber plug in the LIP phone protecting the DSS serial cable connector.

3) Insert the flat ribbon cable from the DSS Console into the connector in the LIP phone.

4) Insert and tighten two (2) screws through the DSS Console mounting flange into the LIP phone. Caution: do not over-tighten the screws as this may damage the LIP phone housing.

5) For additional DSS/BLF Consoles, repeat the procedure connecting one console to the previous console. A maximum of three consoles can be supported by LIP-8000 series phone.

6) For each LIP-8048DSS and LIP-8040LSS, insert the DC plug of an AC Adaptor-K to the DC input of the DSS Console and plug the AC plug into an appropriate (110/240 VAC) outlet.
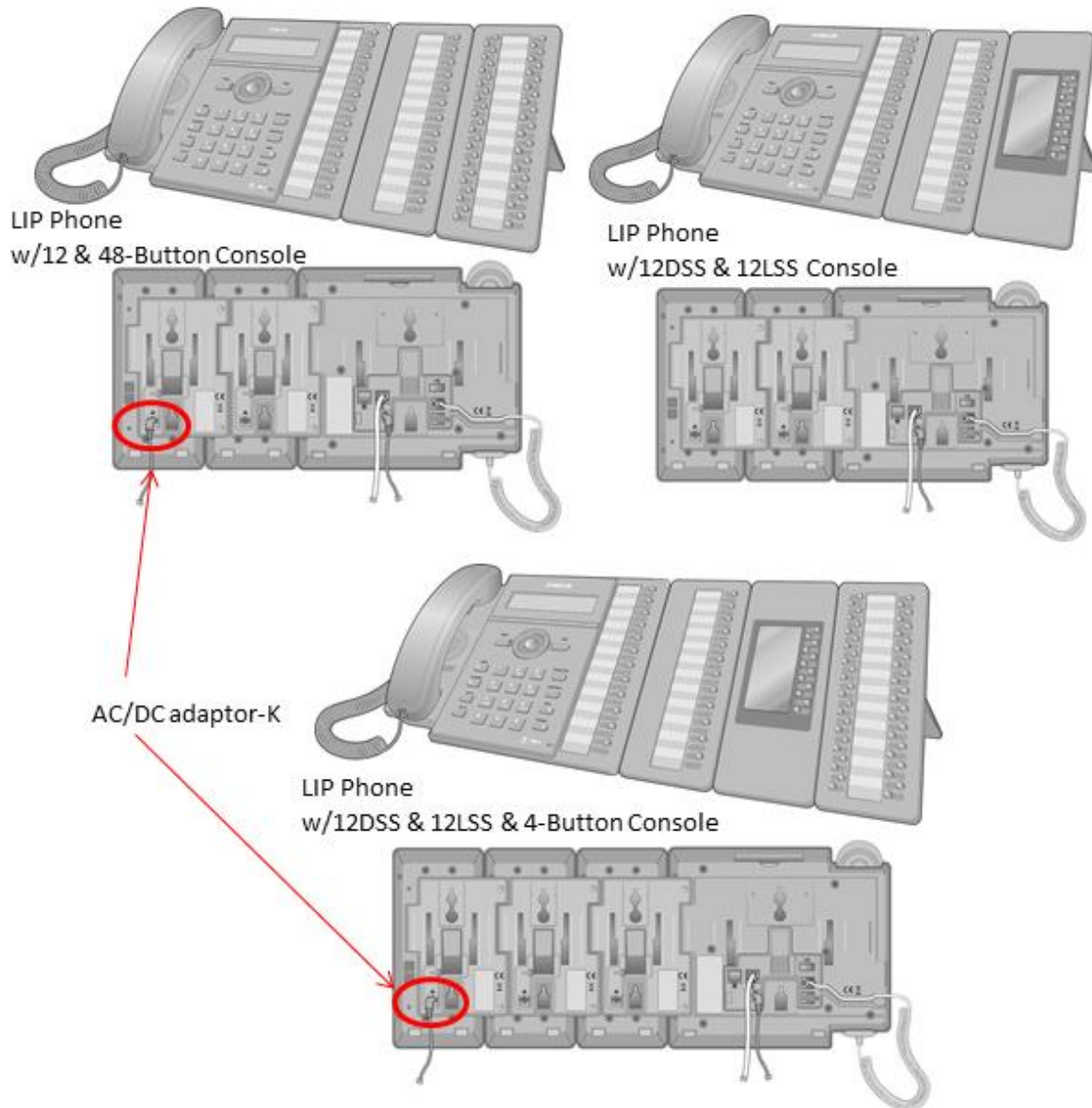
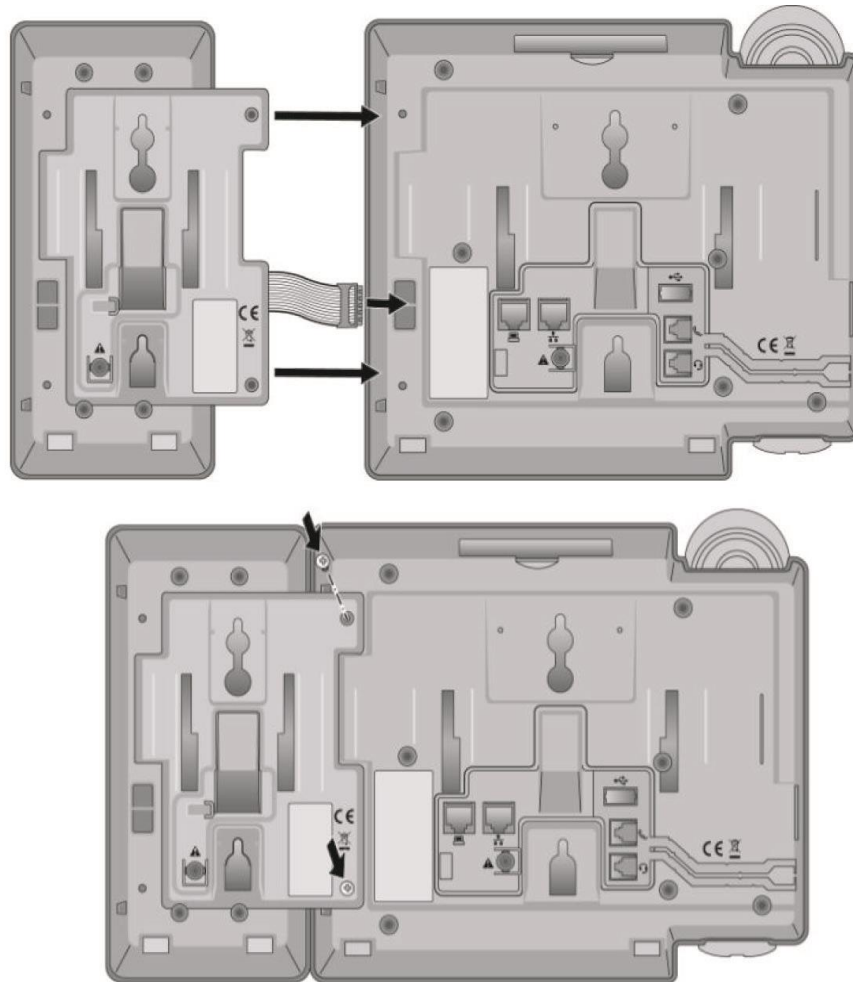**Figure 5.1.4.2-1 LIP-8000/8000E series Console Configurations**

**Figure 5.1.4.2-2 LIP-8000DSS Installation**

### 5.1.4.3     LIP-9000 Console Installation

The Button kits for the LIP-9000 Series phone provide 12, 24, or 48 additional flexible buttons. The flexible buttons on the Button kit are used as with the flexible buttons on the phone proper and can be assigned for any of the flexible button functions. One of three Button kits may attach to an LIP-9020, LIP-9030 or LIP-9040 phone, and can be placed on your desktop or can be wall-mounted with the phone.

The available button kits are shown in the below and described as follows.

- **LIP-9012DSS** has 12 flexible buttons with tri-color LED. The DSS button kit uses a paper label for the button designations.
- **LIP-9024DSS** has 24 flexible buttons with tri-color LED. The DSS button kit uses a paper label for the button designations.
- **LIP-9024LSS** has 12 flexible buttons with tri-color LED. The LSS button kit uses an LCD for the button labels and has two flexible button pages to represent 24 total flexible buttons. The two lower buttons control the page view. The page button LED will flash when there is new activity under a button on the page. You can press the page button at any time to change the flexible button page view.
- **LIP-9048DSS** has 48 flexible buttons with tri-color LED. The DSS uses a paper label for the button designations.
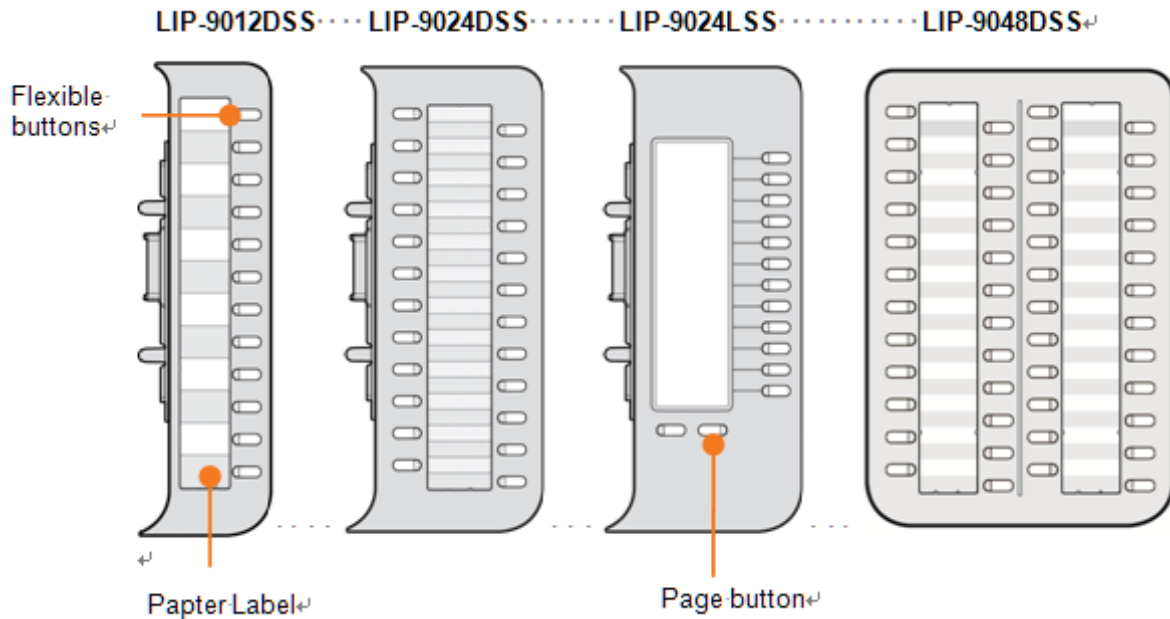
The Button kit should be installed on the phone prior to making any connections to the phone. This simplifies the installation.

## To install the button kit for the LIP-9012 DSS, LIP-9024 DSS and LIP-9024 LSS

1) First, assure the phone is NOT connected to power. For convenience, you may wish to remove the handset and foot-stand; this simplifies the Button kit installation.
2) On the right side of the phone, remove the Button kit cover.
3) Align the Button kit and phone as shown in the drawing.
4) Push the Button kit into the phone until the button kit is fully engaged.
5) Insert the screws provided through the screw tabs in the Button kit and tighten the screws into the phone. Do not over-tighten.
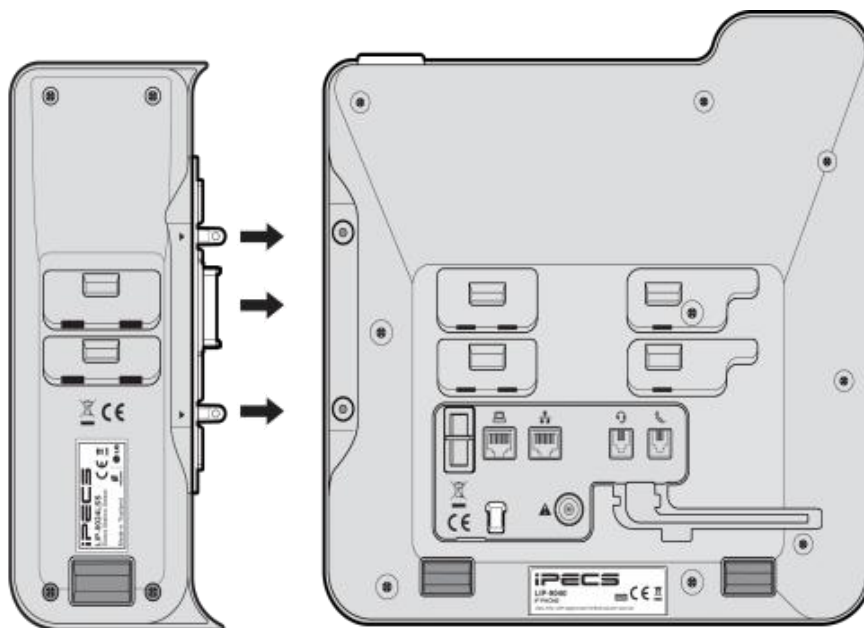
## To install the button kit for the LIP-9048DSS

Prepare your LIP-9048DSS for connection depending on the type of LIP phone. The setting switches are hidden on the back of right side of the LIP-9048 DSS. Before you begin, remove protective cover from the LIP-9048 DSS.
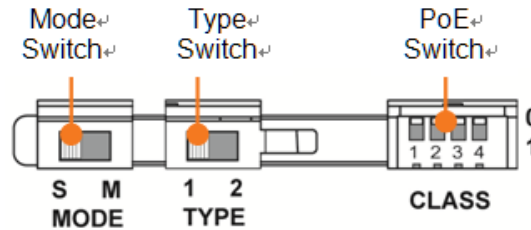


### Power Mode
The MODE switch is used to choose the power mode between Slave and Master.

| Symbol | Mode | Mode | Description |
|--------|------|------|-------------|
| S | Slave | 5V | LIP-9048DSS receives power from another DSS. |
| M | Master | 48V | LIP-9048DSS provides power itself. |

### Protocol Type
The TYPE switch is used to choose a call protocol type between iPKTS and SIP.

| Symbol | Mode | Description |
|--------|------|-------------|
| 1 | iPKTS | iPKTS protocol type of communication supported. |
| 2 | SIP | SIP protocol type of communication supported. |

### PoE Class
The PoE (Power over Ethernet) Class is indicated the class of the Powered Device (PD), and CLASS switch is used to select the PoE class. DSS module supports all 4 classes listed in below table.

| Class | Power Ranges | Description |
|-------|--------------|-------------|
| 1 | 0.44W to 3.84W | -. One LIP-9048DSS or two LIP-9048DSS |
| 2 | 3.84W to 6.49W | -. One LIP-9048DSS with a LIP-9020<br>-. Two LIP-9048DSS with a LIP-9020 |
| 3 | 6.49W to 12.95W | -. One LIP-9048DSS with a LIP-9030<br>-. Two LIP-9048DSS with a LIP-9030<br>-. One LIP-9048DSS with a LIP-9040<br>-. Two LIP-9048DSS with a LIP-9040 |
| 4 | 12.95W to 25.5W | -. One LIP-9048DSS with a LIP-9050<br>-. Two LIP-9048DSS with a LIP-9050<br>-. One LIP-9048DSS with a LIP-9071<br>-. Two LIP-9048DSS with a LIP-9071 |

- The default switch position is '0'.
- '0' means the power OFF status and it does not support PoE power.
- '1' means the power ON status and it does support PoE power.

### Installation button kit

1) Set the power mode, protocol type, and PoE class in advance as described above.
2) Make sure that the Joint Bracket is aligned with the side of the LIP-9048 DSS, and insert the one side of the Joint Bracket into the mounting holes and insert the other side of the Joint Bracket into the mounting holes on the side of your phone.
3) Use the provided screws to connect the LIP-9048 DSS and phone firmly together.
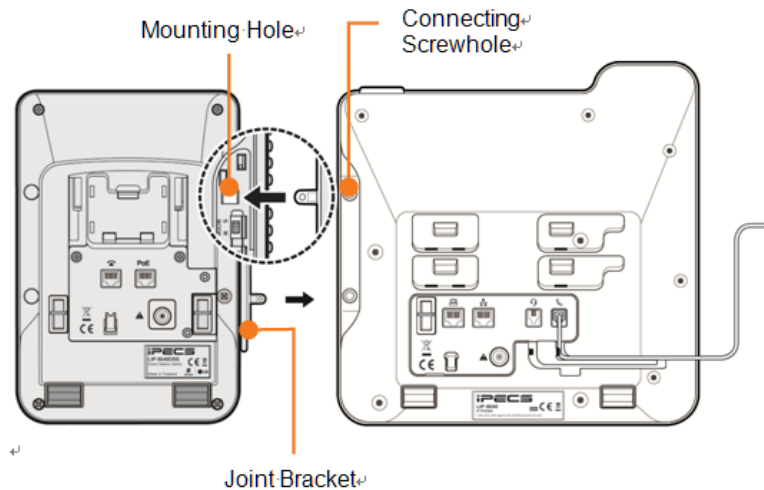


4) At the back of LIP-9048 DSS and phone, remove the rubber plug from the Accessory Expansion Module (AEM) port.
5) Plug the 12-Pin cable into the AEM port on LIP-9048 DSS and phone.
6) Place the Wire Protective Cover behind the LIP-9048 DSS and align the screw holes with the Wire Protective Cover screw holes on LIP-9048 DSS.
7) Tighten the screw to secure the Wire Protective Cover.
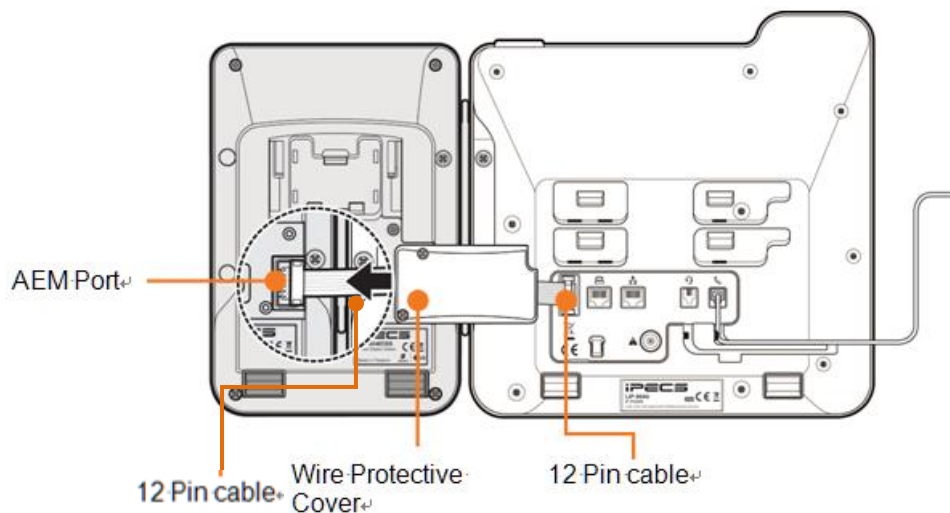


See Button kit for the LIP-9000 Series or LIP-9048DSS Quick Installation Guide for more detailed instruction.

⚠️ **Caution!**
To avoid damaging the Phone or Button kit, remove power from the phone before installing a Button kit.

### 5.1.4.4        1000i DSS Console Installation

The 1000i DSS provide 24, or 48 additional flexible buttons. The flexible buttons on the DSS are used as with the flexible buttons on the phone proper and can be assigned for any of the flexible button functions.

All DSS can be placed on your desktop or can be wall-mounted with the phone.

The available DSS are shown in the below and described as follows.

- **1024idss** has 24 flexible buttons with tri-color LED. The DSS uses a paper label for the button designations.

- **1048ilss** has 2x24 flexible buttons with tri-color LED. The LSS uses an LCD for the button labels and has two flexible button pages to represent 48 total flexible buttons. The two lower buttons control the page view. The page button LED will flash when there is new activity under a button on the page. You can press the page button at any time to change the flexible button page view.

- **1048idss** has 48 flexible buttons with tri-color LED. The DSS uses a paper label for the button designations.



[1024idss]

Flexible Buttons
Paper Button Labels
[1048idss]

Page Button
Flexible Buttons
[1048ilss]
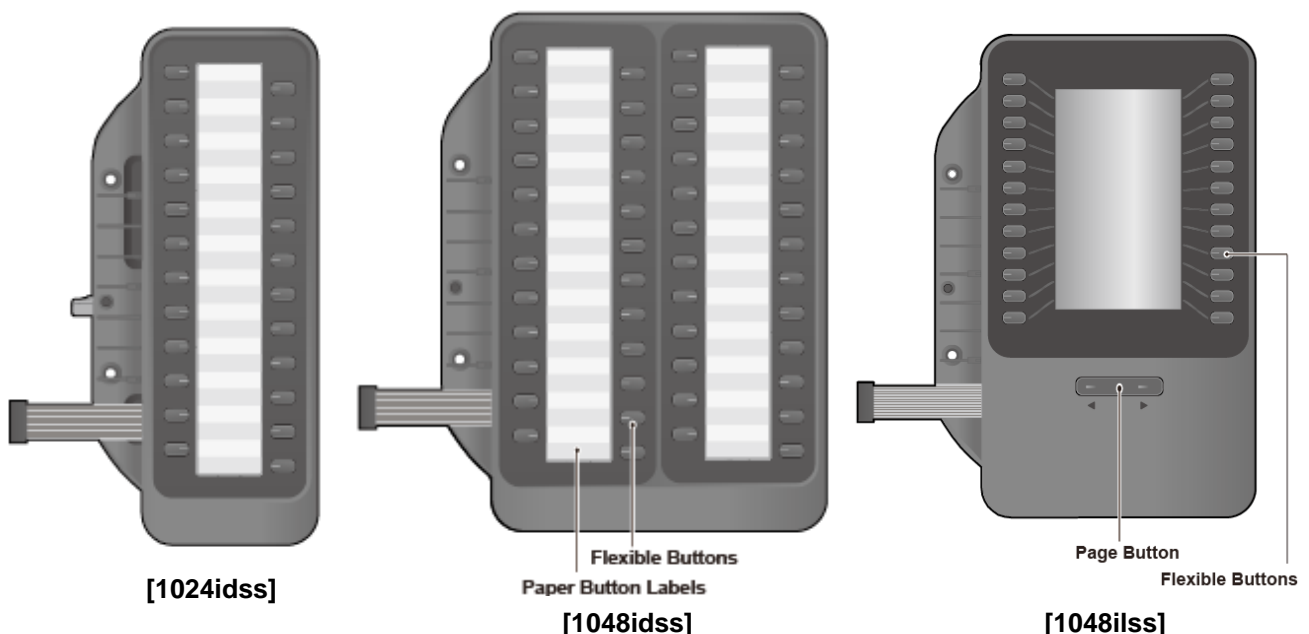
Only one 1024idss can attach to an 1020i, 1030i ,1040i,1050i,1080i phone.

Up to three(iPKTS) / two(SIP) 1048ilss can attach to an 1020i, 1030i ,1040i,1050i,1080i phone, but the 1048ilss cannot use with 1024idss or 1048idss.

Up to four(iPKTS) / two(SIP) 1048idss can attach to an 1020i, 1030i ,1040i,1050i,1080i phone, but the 1048idss cannot use with 1024idss or 1048ilss.

The DSS should install on the phone before making any connections to the phone. The below simplifies the installation for 1030i phone and 1024idss. You can install the 1048ilss and 1048idss in the same way.

For more detailed installation instructions, Scan the QR code printed on the product label of 1024idss or 1048ilss or 1048idss to refer to a Quick installation Guide.

### To install the DSS

1)   First, assure the phone is NOT connected to power. For convenience, you may wish to remove the handset and foot-stand; this simplifies the DSS installation.

2)   Align the DSS and phone as shown in the drawing.

3)   Connect the DSS Connecting Cable to the phone.

4)   Push the DSS into the phone until the DSS is fully engaged.

5)   Insert the screws provided through the screw tabs in the DSS and tighten the screws into the phone. Do not over-tighten.
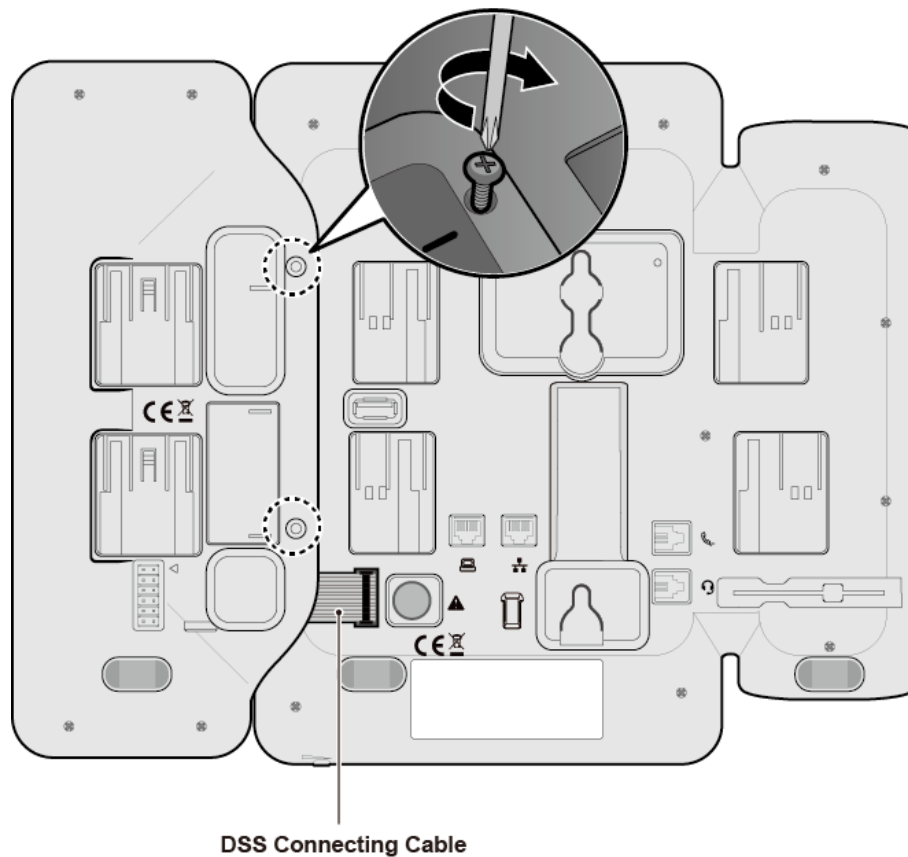
**Figure 5.1.4.4 1024idss Installation**

## 5.2      Terminal Wall Mount

### 5.2.1      LDP-7000/9000/9200 Series Wall Mount

LDP-7000/9000/9200 series phones can be mounted on the wall using the appropriate Wall Mount Kit. The Wall Mount Kit is installed as described below. A separate Wall Mount kit, available from Ericsson-LG Enterprise, is required for LDP-7000 series phones.

1)    Using the appropriate Wall Bracket, mark and drill two (2) 7 mm holes for the plastic wall anchors provided.

2)    Insert the two (2) anchors into the holes and insert and tighten the 2 screws leaving about 6 mm (¼-inch) exposed.

3)    Connect one end of a short cable terminated in RJ11 to the LDP Phone, respectively, and then connect the other end in a wall jack.

4)    Mount the Wall Mount bracket on the phone.

5)    Slide the Wall Mount bracket over the screws, if loose, tighten the screws slightly and mount the Wall Mount bracket again.

6)    Insert the Wall Mount handset hook to prevent the handset from slipping when wall mounted.

### 5.2.2      LIP-8000/8000E/1000i Series Wall Mount

LIP-8000/8000E series and 1000i phones(except of 1080i) incorporate wall mount into the base of the phone housing. Using the instructions, mount LIP-8000/8000E series and 1000i series phone on the wall. A LIP phone with Consoles can be Wall Mounted after the Console is properly connected to the LIP phone. The 1000i series installation method is same with the LIP-8000 series as below description and figure.

1)    Using Figure 7.4.2-1 Mark and drill two (2) 7mm holes for plastic wall anchors.

2)    Insert the two (2) anchors into the holes and insert and tighten the 2 screws leaving about 2.5 mm (1/8-inch) exposed. If installing a LIP phone with a Console, also drill anchor holes and insert and tighten screws for the Console Wall Mount slots.

3)    Slide the LIP-8000E phone over the screws and assure the phone is secure. It may be necessary to remove the phone and tighten or loosen the screws for a secure mounting.

4)    Remove the Handset hook from the phone as shown in the figures below. Reverse the hook and re-install in the LIP-8000E phone so that the hook catches the groove in the handset receiver.
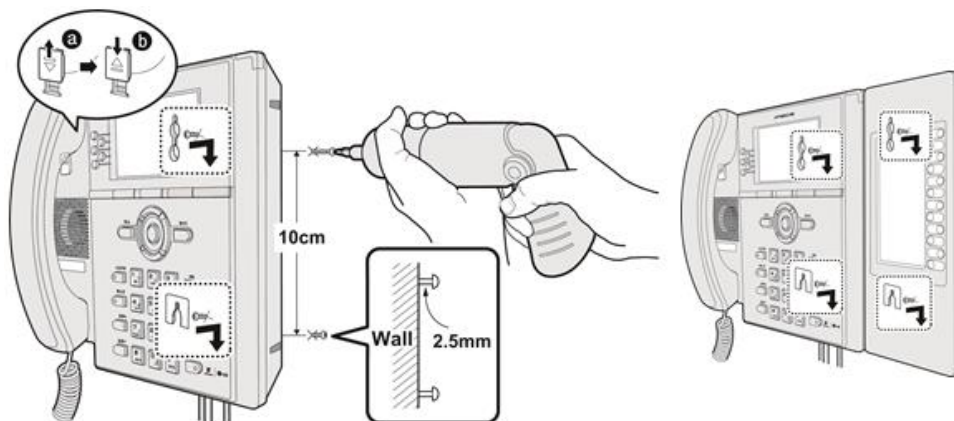
## 5.2.3    LIP-9000 Series and 1080i Wall Mount

LIP-9000 series and 1080i phones can be wall mounted as needed. The following instructions describe the LIP-9000 wall mount installation. Note the foot-stand must not be installed.

1) If installed, remove the foot-stand from the Phone and Button kit.
2) Connect all wiring to the Phone. Connect the Phone side wiring only.
3) If required, install the Button kit.
4) Align the wall-mount bracket (ordered separately) over the back of the phone, then press the bracket onto the phone applying steady pressure until it clicks into place.
5) (LIP-9000 only) Install the Button kit wall-mount bracket if required, in the same manner as the bracket for the phone.
6) Mark and drill two 7mm holes for plastic wall anchors (not included).
7) Insert the two anchors into the holes and insert and tighten the two screws (not included) leaving about 2.5 mm (1/8-inch) exposed.
8) Align the key holes in the bracket over the screws and slide the phone down assuring the phone is secure.
9) Remove, reverse and re-install the handset hook so that the hook catches the groove in the handset receiver.
10) Hang the handset up on the handset hook.
11) Complete all wiring connections as described in Quick Installation Guide or User Guide.
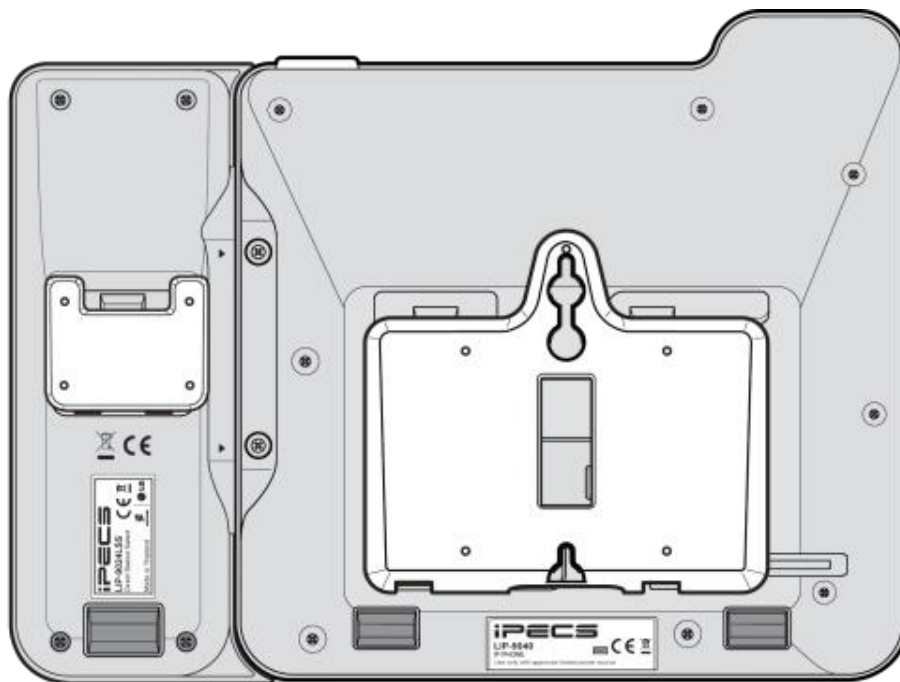


**NOTE**
It may be necessary to remove the phone and tighten or loosen the screws for a secure mounting.

# 6 STARTING THE IPECS eMG800

## 6.1 Initializing Databases

After completing installation, it is highly recommended that the iPECS eMG800 System database be initialized to default values for the local Country Code. During the initialization sequence, the System will identify all the installed resources and assigns port numbers to the each port on each board based on the order of appearance starting at the 1st DKT port on the MPB DSIU then the SLT ports 1 to 6 of the DSIU. Port numbers are then assigned to the ports of slot 1 to 6 then to slots 1 to 6 of the first EKSU and finally, the 2nd EKSU slot 1 to 6. Port numbers are assigned separately for different 'Types' of boards,

- Extension boards including the DSIU, DTIB, WTIB, SLIB
- CO boards including the LCOB, E1/PRI, T1/PRI, VOIB
- Voice Service boards including the VMIB, AAIB

In the initialization process, in addition to setting the database to default, scratched pad memory is cleared and any Voice Mails are erased along with any Greetings or Name recordings.

- To initialize the database, the System must be powered up with the Mode switch ON.
- Place the MPB Mode switch in the OFF position.
- Assure the AC power cord for each KSU is plugged into an appropriate AC outlet, grounded, 3-prong.
- Turn on the power switch of each of the Expansion KSU.
- Turn on the power switch of the Basic KSU.
- After restart place the Mode switch in the ON position

After several moments various front panel LEDS will illuminate indicating the power-up sequence. The LEDs of the MPB will assume the normal operation illumination as shown in the chart below. It may take a short period, 120 seconds for all the boards to achieve full initialization and normal LED indications.

**Table 6.1-1 MPB 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 (PRI or BRI) Clock synchronization<br>• ON: PLL circuit activation by External Clock from ISDN Board iPECS eMG800 will operate based on external ISDN clock (refer to "NOTE").<br>• OFF: PLL activation by Internal Clock iPECS eMG800 will operate based on the internal clock. |
| LD4 (Blue), PWR | System DC Power ON Indication – ON, Power ON; OFF, Power OFF |

Once the MPB has assumed normal operation, the Country Code should be verified and, if need be, changed as described below and in the '*Administration& Programming Manual*'.

- Locate Station 100, this should be the DKT attached to the 1st station port of the MPB DSIU.
- Press the TRANS/PGM button, the On/Off or Speaker LED illuminates.
- Dial '*' and '#', confirmation tone is heard from the speaker.
- Press the TRANS/PGM button again to receive confirmation tone.
- Dial 100, confirmation tone is received.
- Press Flexible button 1, the display indicates the Country Code.
- If the Country Code is correct, press the On/Off or Speaker button and change the Mode switch to ON. The System is now ready for programming; refer to the '*Administration& Programming Manual*'.

If the Country Code is not correct,

- Enter the correct Country Code, refer to the Nation Code chart below.
- Press the **[HOLD/SAVE]** button to store the entry.

**Table 6.1-2 Nation Code Listing**

| NATION | CODE | NATION | CODE | NATION | CODE |
|---|---|---|---|---|---|
| Argentina | 54 | Honduras | 504 | Peru | 51 |
| Australia | 61 | Hong Kong | 852 | Philippines | 63 |
| Azerbaijan | 994 | India | 91 | Poland | 48 |
| Bahrain | 973 | Indonesia | 62 | Portugal | 351 |
| Bangladesh | 880 | Iran | 98 | Qatar | 974 |
| Belarus | 375 | Iraq | 964 | Rumania | 40 |
| Belgium | 32 | Ireland | 353 | Russia | 7 |
| Bolivia | 591 | Israel | 972 | Saudi Arabia | 966 |
| Brazil | 55 | Italy | 39 | Senegal | 221 |
| Brunei | 673 | Japan | 81 | Singapore | 65 |
| Cameroon | 237 | Jordan | 962 | South Africa | 27 |
| Chile | 56 | Kenya | 254 | Spain | 34 |
| China(P.R.C) | 86 | Korea | 82 | Sri Lanka | 94 |
| Colombia | 57 | Kuwait | 965 | Swaziland | 268 |
| Costa Rica | 506 | Kyrgyzstan | 996 | Sweden | 46 |
| Cyprus | 357 | Liberia | 231 | Switzerland | 41 |
| Czech(Slovak) | 42 | Libya | 218 | Tajikistan | 992 |
| Denmark | 45 | Luxembourg | 352 | Telkom | *27 |
| Ecuador | 593 | Malaysia | 60 | Telstra | *61 |
| Egypt | 20 | Moldova | 373 | Thailand | 66 |
| El Salvador | 503 | Malta | 356 | Tunisia | 216 |
| Ethiopia | 251 | Mexico | 52 | Turkey | 90 |
| Fiji | 679 | Monaco | 377 | Turkmenistan | 993 |
| Finland | 358 | Morocco | 212 | U.A.E. | 971 |
| France | 33 | Myanmar(Burma) | 95 | Ukraine | 380 |
| Gabon | 241 | Netherlands | 31 | United Kingdom | 44 |

| Georgia | 995 | New Zealand | 64 | Uruguay | 598 |
|---------|-----|-------------|-----|---------|-----|
| German | 49 | Nigeria | 234 | U.S.A | 1 |
| Ghana | 233 | Norway | 47 | Uzbekistan | 998 |
| Greece | 30 | Oman | 968 | Venezuela | 58 |
| Guam | 671 | Pakistan | 92 | Vietnam | 84 |
| Guatemala | 502 | Panama | 507 | Y.A.R. | 967 |
| Guyana | 592 | P.N.G | 675 | | |
| Haiti | 509 | Paraguay | 595 | | |

After changing the Country Code, you must reset the System,

- Press the **[TRANS/PGM]** button.
- Dial 499.
- Press Flexible button 2.
- Press **[HOLD/SAVE]** button.

The System will proceed to initialize the database with the new Country Code. Once initialized and operating normally, change the position of the MPB mode switch to the ON position. With initialization complete, the iPECS eMG800 can be configured to meet the needs of the business and individual user.

For detailed information on programming iPECS eMG800, refer to the iPECS eMG800 Admin. & Programming manual.

# 7  TROUBLESHOOTING

| PROBLEM | CAUSE/SYMPTOM | SOLUTION |
|---|---|---|
| System power failure | AC Power Fail | Assure Fuse/Breaker is operational.<br>Assure AC Power is delivered to AC outlet.<br>Check the PSU Fuse<br>Check LD21, LD22 on the backplane, if out, replace the PSU. |
|  | Check +5V, +30V Fail | Verify MPB is installed.<br>Assure no short circuits on any board by removing one board at a time from the KSU. |
|  | LD4 LED OFF on the MPB | Check DC Output status on MB |
| System does not operate | Short circuit in some board(s) | Check the connection of each board with the MPB by removing one board at a time from the KSU. |
|  | Bad board connection |  |
|  | System database corrupted | Press the Reset button when the Dipswitch (SW1 for database protection) is in the default position. |
|  | MPB operation | Check MPB status and SW1 position |
| DKT does not operate | Bad DTIB circuit | Replace the malfunctioning board. |
|  | Bad connection between the DSIU/DTIB and DKT Terminals | Check the connection between the board and the DKT.<br>Assure proper wiring terminations.<br>Repair any broken connection between the Board and DKTs. |
|  | Installation Distance of DKT and System | Assure the distance between the board and DKT does not exceed specs. |
|  | 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/SLIB | Exchange the Extension board. |
|  | Bad connection between the DSIU/SLIB port and SLT | Check that the connection between the board and the SLT. |
| CO line operation failure | CID/Tone Detection Fail | Check CID type assigned for CO line.<br>Assure CID provided from carrier.<br>If one CO Line or board, replace the board. |
|  | Bad connection | Check all connections. |
| Expansion KSU does not operate | Power ON sequence | Use the proper power-up sequence.<br>Turn on all EKSUs then power on the Basic KSU.<br>Press the MPB Reset button to reset the system. |
|  | Expansion cable connection | Check Expansion cable to verify the connection and condition. |

| | Expansion KSU PSU is not providing power. | Assure that the BKSU power is ON and the MPB is installed. Assure the PSU is plugged in, that the AC power is delivered to the outlet, and the Fuse/Breaker is operational. |
|---|---|---|
| Noise on External MOH and Paging port | Induced noise on the wire between the System and the amplifier | Assure the wiring is not run near equipment that generates high RF interference. Assure there are no coils in the wiring. Use shielded pair wiring and ground the shield. |

# 8 Open Source Software Notice

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