Mitel IP-DECT Base Station and Gateway

Installation Guide

Mitel
Powering connections

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Abbreviations and Glossary

DECT	Digital Enhanced Cordless Telecommunications
DECT Base Station	A communication hub that connects cordless handsets to external networks, enabling high-quality, wireless voice transmission. It ensures secure, interference-free communication.
GUI	Graphical User Interface The interface between a user and a computer application.
IPBL	IP-DECT Gateway
IPBS	IP-DECT Base Station
ISDN	Integrated Services Digital Network
LAN	Local Area Network
RFP	Radio Fixed Part
RSTP	Rapid Spanning Tree Protocol
TDM-DECT Base Station	Another name for DB1.
TFTP	Trivial File Transfer Protocol

Contents

1 Introduction

This document describes the requirements, connections, and procedures for installing the following devices:

- IP-DECT Base Station (IPBS3);
- IP-DECT Gateway (IPBL);
- TDM-DECT Base Station (DB1).

For additional details, refer to *Mitel IP-DECT System, Installation and Operation Manual, TD 92682EN*.

2 Description

This section gives a general description of the devices.

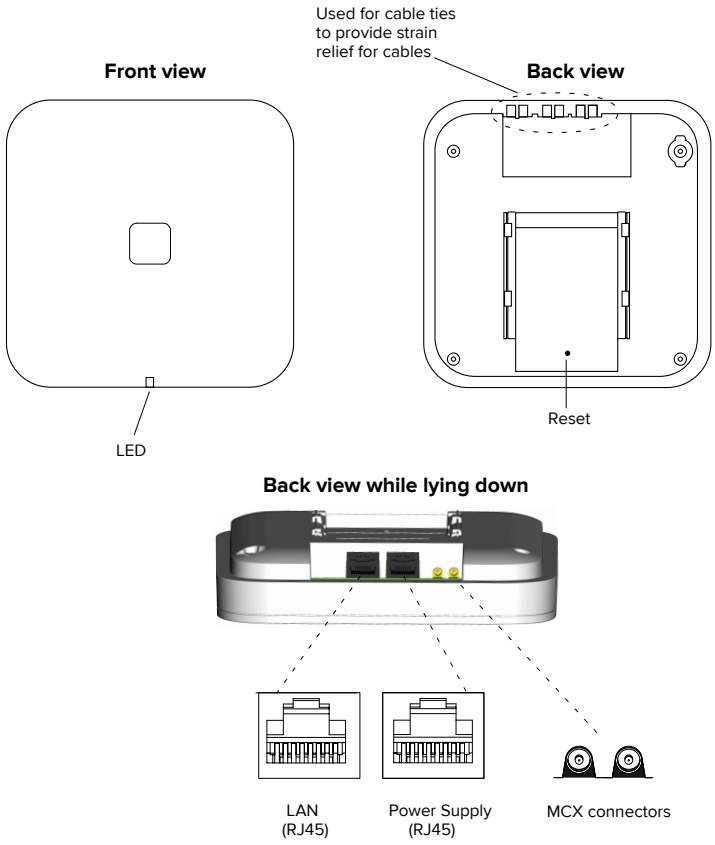
2.1 IPBS3

The following versions of the IPBS3 are available:

- IPBS3 with internal antenna;
- IPBS3 with external antennas.

IPBS3 is backward compatible with the IPBS1/IPBS2 when it comes to coverage, functionality, accessories and mounting bracket. If an old IPBS1/IPBS2 has to be replaced, you just reuse the mounting bracket and install the IPBS3.

Figure 1. IPBS3 overview



Delivery Includes

IPBS3 with internal antenna	IPBS3 with external antennas
• IPBS3 • A mounting bracket; • Two screws with wall plugs.	• IPBS3 • A mounting bracket; • An antenna bracket; • Two antenna coaxial cables; • Two antennas; • Four screws with wall plugs.

Power Distribution

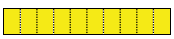
For more information about power distribution, see 3.3 Power the Base Station, page 13.

Software

For information about how to update the software in the IPBS3, refer to *Mitel IP-DECT System, Installation and Operation Manual, TD 92682EN*.

LED Indication

The device has one RGB LED to indicate status. In the table below: each blink pattern is represented by a number of blocks where each block is 100 ms. Light grey blocks mean that the LED is off. Whenever the indication is changed the new pattern always starts from the first block.

Status of LED	IPBS3 status
Solid blue 	Operational, with no traffic.
100 ms blue, 100 ms off 	Non-operational, in start-up phase. For example, waiting for parameters from PARI Master or is searching for air synchronization, or the radio is disabled.
400 ms off, 2000 ms blue 	Operational, with traffic.
400 ms red, 2000 ms blue 	Operational, fully occupied with traffic.
400 ms blue, 600 ms off 	Operational, download of firmware in progress.
100 ms yellow, 100 ms off 	Non-operational, in mini firmware mode.
Solid yellow 	Non-operational, in TFTP mode.
100 ms red, 100 ms off 	Non-operational, no Ethernet connection.

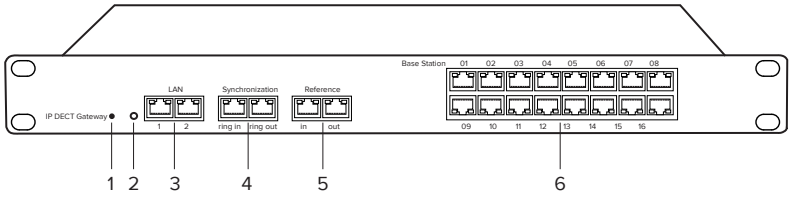
Solid red	Non-operational, fatal hardware error.
2000 ms blue, 400 ms yellow	Deployment mode, with good air sync coverage.
400 ms blue, 600 ms off, 400 ms blue, 600 ms off, 400 ms yellow	Deployment mode, with unstable (is fading and might be lost) air sync coverage.
2000 ms red, 400 ms yellow	Deployment mode, no air sync coverage.

2.2 IPBL

Available version:

- IPBL, AC/DC powered (for 110/230 V AC and 48 V DC).

Figure 2. IPBL overview



Number	Name	Function
1	Reset	Resets the IPBL.
2	Status LED	Indicates the status on the IPBL.
3	LAN	10BASE-T/100BASE-T Ethernet interface. LAN1 port must be used in the IP-DECT system (LAN2 port is for administration only). This does not apply when RSTP is used.
4	Synchronization	Sync ring in and sync ring out interfaces.
5	Reference	Reference sync in and reference sync out interfaces.
6	Base station 01-16	ISDN U_{PN} DECT base station interfaces.

Delivery Includes

- IPBL.

No power cable is included in delivery.

Power Supply

For more information about power supply, see 4.3 Power the IPBL, page 17.

Software

Software in the IPBL can be updated by downloading new software without disconnecting the equipment. The new software is stored in flash memory. For information about how to update the software in the IPBL, refer to *Mitel IP-DECT System, Installation and Operation Manual, TD 92682EN*.

Table 1 IPBL Indication

Status of LED	**Description**
Not lit	Not powered, status is not defined.
Flashing slow green	When pressing the reset button.
Flashing fast green	Operational, firmware update or clear config after long reset.
Steady green	Operational, system is fully functional.
Steady red	Non-operational, system error.
Steady amber	Non-operational, system is in TFTP server mode.

Table 2 Base station LED

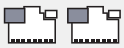
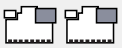
Status of LED		
Base station LED		
Not lit	No U_{PN} link established.	No speech activity in RFP.
Flashing	U_{PN} link established (activated state), RFP is not operational.	All speech channels occupied in RFP.
Steady	RFP is fully initialized and operational.	Speech activity in RFP.

Table 3 Sync/Ref sync LED

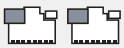
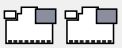
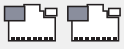
Status of LED		
Not lit	No sync communication established.	Sync port not selected as input sync source.
Flashing	—	Sync port selected as input sync source but the sync signal is not in sync.
Steady	Communication established.	Sync port selected as input sync source and the sync signal is in sync.

Table 4 LAN LED

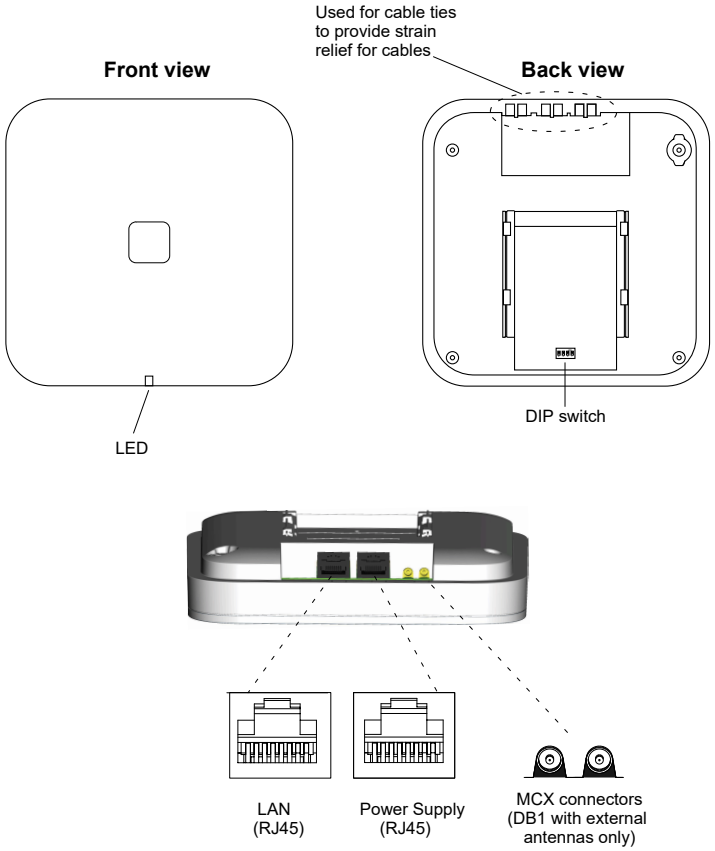
Status of LED		
Not lit	No link.	10 Mbps operation.
Flashing	Link present and network activity.	—
Steady	Link present, but no network activity.	100 Mbps operation.

2.3 DB1

The following versions of the DB1 are available:

- DB1 with internal antenna;
- DB1 with external antennas.

Figure 3. DB1 overview



Delivery Includes

DB1 with internal antenna	DB1 with external antennas
• DB1; • A mounting bracket; • Two screws with wall plugs.	• DB1; • A mounting bracket; • An antenna bracket; • Two antenna coaxial cables; • Two antennas; • Four screws with wall plugs.

Power Distribution

For more information about power distribution, see 3.3 Power the Base Station, page 13.

Software

The software in the DB1 can be updated by downloading new software without disconnecting the equipment. The new software is stored in flash memory. For information about how to update the software in the DB1, refer to *Mitel IP-DECT System, Installation and Operation Manual, TD 92682EN*.

Connectors

Two 8-pin RJ45 modular jacks for data and powering.

LEDs

The device has one RGB LED to indicate status. In the table below: each blink pattern is represented by a number of blocks where each block is 100 ms. Light grey blocks mean that the LED is off. Whenever the indication is changed the new pattern always starts from the first block.

Status of LED	**IPBS3 status**
Solid blue 	Operational, with no traffic.
100 ms blue, 100 ms off 	Non-operational, in start-up phase, that is waiting to be initialized by the IPBL.
400 ms off, 2000 ms blue 	Operational, with traffic.
400 ms red, 2000 m blue 	Operational, fully occupied with traffic.
400 ms blue, 600 ms off 	Operational, download of firmware in progress.
100 ms red, 100 ms off 	Non-operational, U_{PN} layer 1 communication error.
Solid red 	Non-operational, fatal hardware error.

DIP Switches

When connected to IPBL, frequency settings are defined by the IP-DECT system and DIP switches are ignored.

DIP switch 3 and 4 shall be set to ON. Set DIP switch 1 and 2 to ON or OFF as follows:

DIP switch 1: ON DIP switch 2: ON	1880-1900 MHz (Europe, Africa, Middle East, Australia, New Zealand and parts of Asia)
DIP switch 1: OFF DIP switch 2: ON	1900-1920 MHz

DIP switch 1: ON DIP switch 2: OFF	1910-1930 MHz (South America)
DIP switch 1: OFF DIP switch 2: OFF	1920-1930 MHz (North America)

2.4 AC Adapter

The AC adapter is used to power a base station locally. The maximum length of cable from adapter must not exceed 10 meters.

If local power supply is used for the RFPs, the EPP cable pair must NOT be connected.

Versions (different type of mains plug)

For European countries, excluding the UK	P/N: BSX-0013
For UK, Australia, and North America	P/N: 660538

3 Install the IPBS3 and DB1

This section describes how to install the IPBS3 and DB1.

3.1 Base Station Cabling

The recommended base station cable is a standard unshielded CAT5 Ethernet cable with a minimum of 26 AWG copper conductors. This cable is also used to power the base station. It is assumed that installation personnel are familiar with crimping RJ45 connectors onto the cable.

Since the distance between the base station and the wall is limited, a RJ45 modular jack without cable retention must be used.

Ensure that each base station is provided with an extra 5–10 meters of cable during installation, as it may need to be repositioned later for various reasons.

3.2 Mount the Base Station

All base stations can be mounted vertically or horizontally on a wall, ceiling, pole, or beam using the mounting bracket included in the delivery. For wall or ceiling installation, the included plugs and screws must be used. For mounting on a pole or beam, a strap or flexible metal band is required (not included in the delivery).

It is recommended to mount the base station at least 30 cm away from a metal surface and at least 2.5 m away from a Wi-Fi access point.

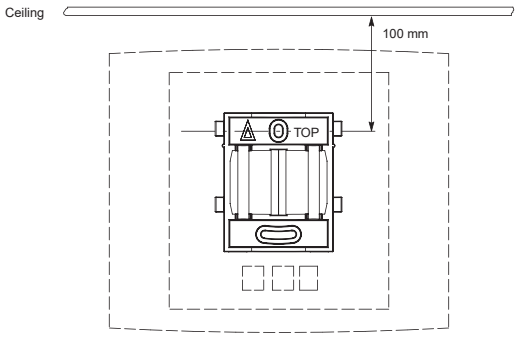
3.2.1 Fix the Mounting Bracket to a Wall or Ceiling

For all wall and ceiling materials, except plywood and solid wood, use the supplied anchors.

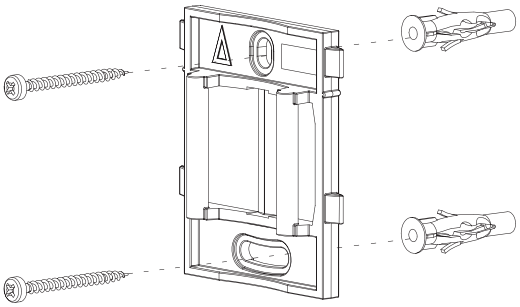
It is critical that the mounting bracket is securely and firmly attached to the wall or ceiling, this is especially important if it is mounted more than 2 meters above the floor:

- Make sure that there is a significant increase of the required torque when the screws are fully engaged.
- Test that the mounting bracket is securely attached by firmly pulling the back-plate from the wall/ceiling.

1. Hold the mounting bracket with its flat side against the wall or ceiling with the text ‘TOP’ upwards and mark the two holes. The minimum distance between the upper hole and the ceiling or any object above the base station must be at least 100 mm. If the distance is less, the base station cannot be slid onto the bracket.
   When the base station has to be positioned above a suspended ceiling, make sure that the front of the base station points downwards.

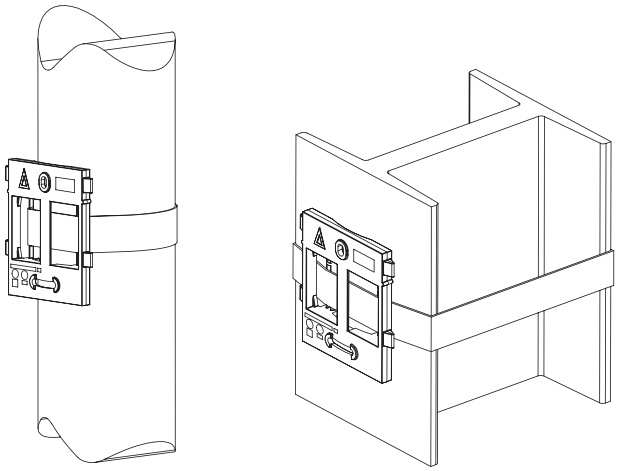


2. When using wall plugs: drill the two holes using a Ø 6 mm drill and insert the included wall plugs.
3. Position the mounting bracket with its flat side to the wall and fasten it with the two included Ø 3.5 mm screws.



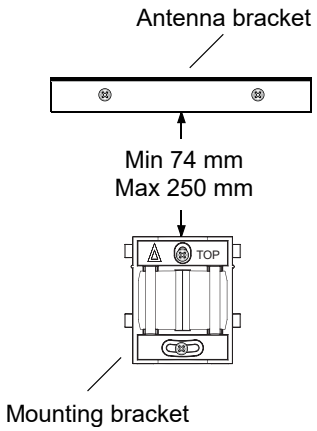
3.2.2 Fix the Mounting Bracket to a Pole or Beam

The mounting bracket can be fixed to a pole (diameter > 45 mm) or a beam (wider than 50 mm) using a strap or flexible metal band less than 30 mm wide. The strap or flexible metal band is not included in the delivery.

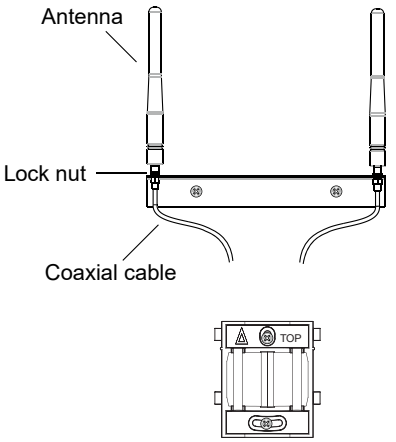


3.2.3 Connect External Antennas

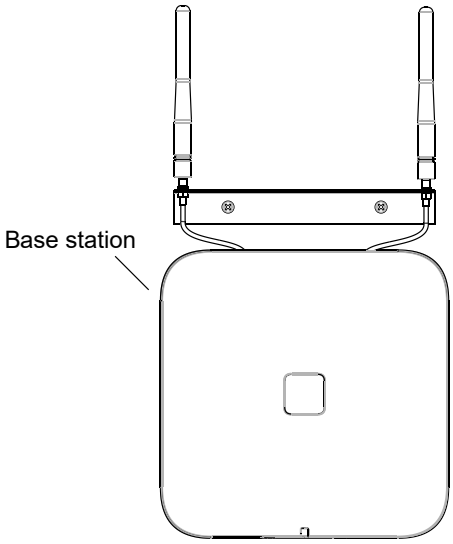
1. Position the included antenna bracket above the mounting bracket with a minimum distance of 74 mm (250 mm maximum) and mark the two holes for the antenna bracket.



2. When using wall plugs, drill two holes using a Ø 6 mm drill and insert the included wall plugs.
3. Place the antenna bracket on the wall and fasten it with the two included Ø 3.5 mm screws.
4. Mount the two included coaxial cables on the antenna bracket. Fasten the coaxial cables with the lock nuts which are found on the coaxial cable antenna connectors.
   Mount the antennas on the antenna connectors.



5. Connect the coaxial cables to the MCX connectors, see Figure 1. *IPBS3 overview*, page 2.
6. Mount the base station.



3.2.4 Secure the Cable

For safety reasons, secure the base station cable to a convenient point at about 30 cm from the base station.

3.2.5 Pin the Cable

Cut the cable to the correct length and connect the cable to a RJ45 modular jack. Since the distance between the base station and the wall is limited, a RJ45 modular jack without cable retention must be used.

Do NOT plug the connector in the base station yet!

Figure 4. Connector pinning of the LAN/PoE connector, power feed over the spare cable pairs

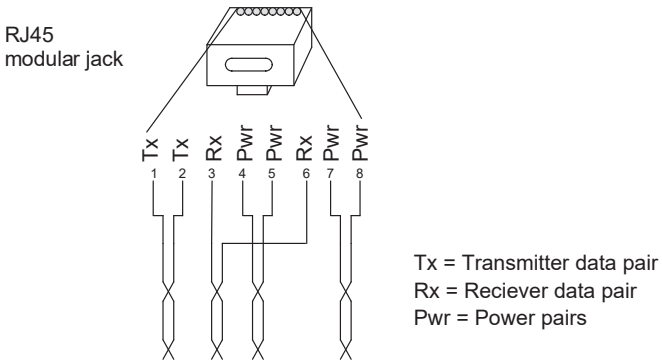
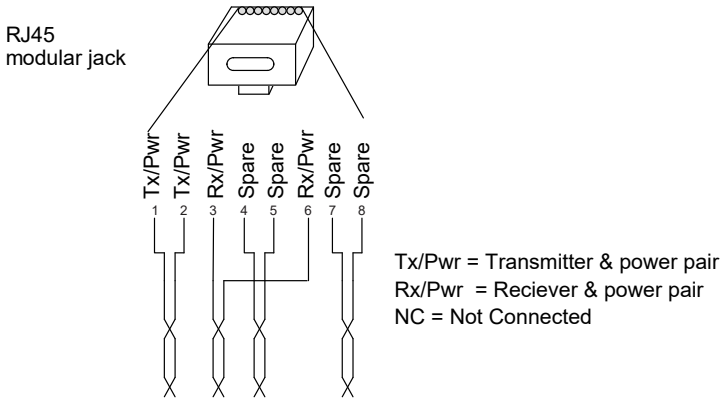


Figure 5. Connector pinning of the LAN/PoE connector, power feed over the Rx/Tx data cable pairs

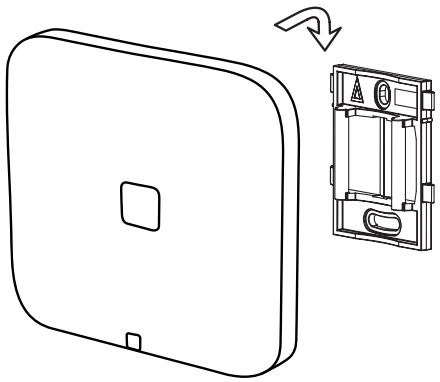


3.2.6 Connect the Base Station Cables

1. Plug the modular jack of the data cable into one of the data/power connectors.
2. When an AC adapter is used:
   - Plug the modular jack of the AC adapter in one of the data/power connectors.
   - Plug the AC adapter into a wall outlet.

3.2.7 Mount the Base Station

Hold the base station flat against the mounting bracket and move it downwards until it clicks.



3.3 Power the Base Station

The base station is powered in one of the following ways:

- Power over Ethernet (only IPBS3);
- Power over Express Powering Pairs (EPP) and data pairs (only DB1);
- By a local power supply.

Do not power the base station using both power supplies. Parallel powering will not harm the base station but it can disturb the signalling.

3.3.1 Power over Ethernet

The base station supports Power over Ethernet (PoE), IEEE 802.3af, Class 2. The power source will allocate 7 W to the base station. This must be considered when planning the power supply for multiple base station units to ensure the PoE power source's limit is not exceeded.

The PoE standard supports two ways of feeding the power:

1. Power over the Rx/Tx data pairs;
2. Power over the spare cable pairs.

Both power feed methods are supported by the base station, and it is not sensitive to polarity changes.

3.3.2 Power the DB1 over EPP and Data Pairs

When a base station is powered remotely via the IPBL/PBX, the maximum length between the base station and the IPBL/PBX depends on the supply voltage, the number of twisted pairs used and the wire size. The length of the cable should never exceed "data-limited" length of the cable, see Appendix A RFP Power Consumption, page 19.

3.3.3 Power with a Local Power Supply

The base station can be powered using a local power supply through the second data/power inlet. It can be powered individually with an AC adapter, which is equipped with an 8-pin RJ45 plug that connects to the power supply jack. For specifications, see 2.4 AC Adapter, page 8.

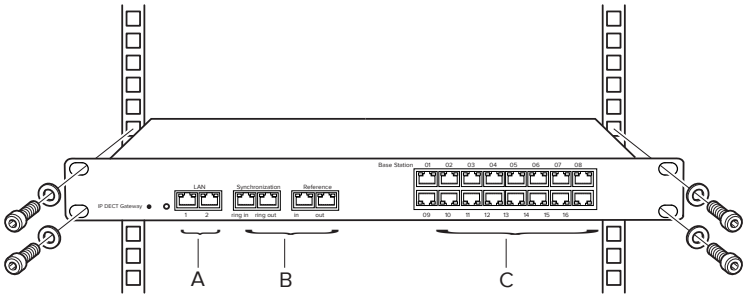
Only power supplies compliant with EN/IEC/CSA/UL/AU/NZS 62368-1 standards shall be used.

4 Install the IPBL

This section describes how to install the IPBL.

4.1 Mount the IPBL

1. Install the IPBL in a standard 19" rack.
2. Pin the cables, see 4.2 Pin the IPBL Cable, page 15.
3. Attach the power cable, see 4.3 Power the IPBL, page 17.
4. Connect the cables in the following order:
   a. Ethernet cable (A) LAN1 port must be used in the IP-DECT system (LAN2 port is for administration only). This does not apply when RSTP is used.
   b. Synchronization cable (ring sync, reference sync) (B);
   c. Base station cable (RFP cable) (C). The connected RFPs must not be connected to protective earth.



5. Monitor the total current consumption from the IPBL's GUI. Make sure that the total current consumption does not exceeds the following values:
   – Max current consumption[1] is 2.0/1.1 A when supplied with 110/230 V AC.

   For more information of power consumption of the RFPs, see Appendix A RFP Power Consumption, page 19.

4.2 Pin the IPBL Cable

All data cables used for the IPBL are standard unshielded CAT5 cables. It is assumed that installation personnel are familiar with crimping these connectors onto the cable.

4.2.1 Synchronization Cable

The maximum cable length between two IPBLs must not exceed 2000 meters.

1. Cut the cable to the correct length.
2. Connect the cable to a RJ45 modular jack.

1. The IPBL current consumption is 0.3 A and is included in max current consumption.

Figure 6. Connector pinning of the Sync IN cable

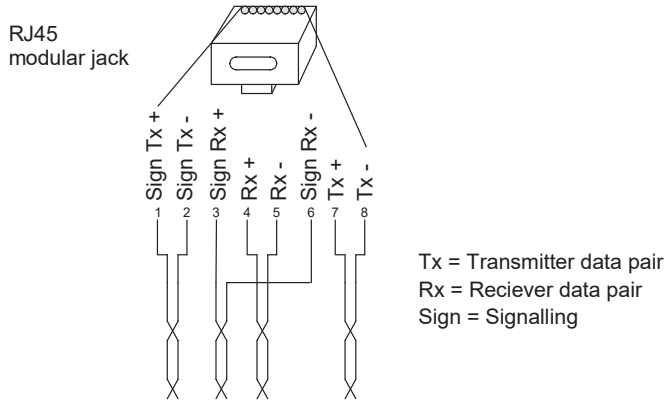
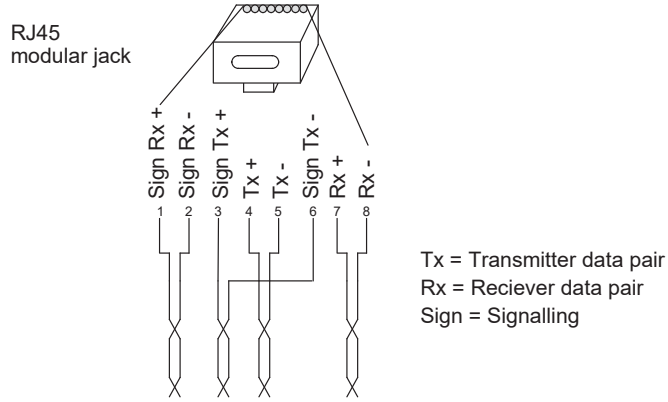


Figure 7. Connector pinning of the Sync OUT cable



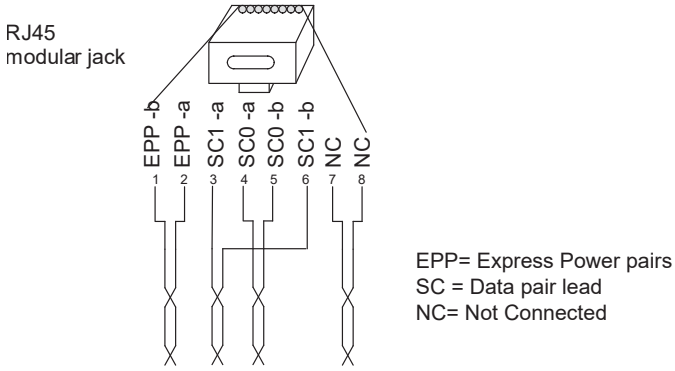
3. Label the cable.

4.2.2 RFP Cable

The RFP cable connects the IPBL with the RFPs. The maximum cable length between IPBL and a single RFP must not exceed 1500 meters. Ensure that during the installation, each RFP is given an extra length (5-10 metres) of cable because it is possible that it will have to be moved for one reason or another.

1. Cut the cable to the correct length.
2. Connect the cable to a RJ45 modular jack.

If a local power supply is used for the RFP, the EPP cable pairs must NOT be connected.

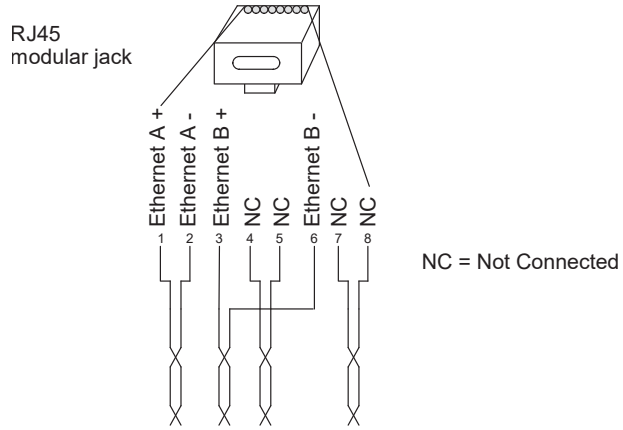


3. Label the cable.

4.2.3 LAN Cable

The TX/RX crossover detection feature is not supported by the IPBL. A straight-through cable must be used between the IPBL and the switch port.

1. Cut the cable to the correct length.
2. Connect the cable to a RJ45 modular jack.



3. Label the cable.

4.3 Power the IPBL

The IPBL power supply connectors are located at the rear. The power supply feeds both the IPBL and the connected RFPs.

There are two alternatives to power the IPBL:

- 110/230 V AC, 60/50 Hz;
- 48 V DC.

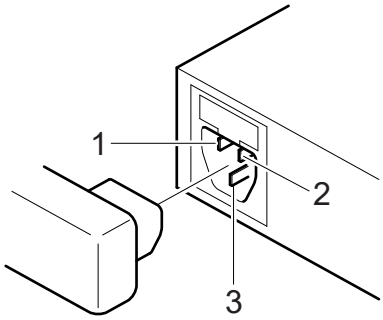
If the primary power source (110/230 V AC) fails, the IPBL will restart to use the 48 V DC power source instead.

4.3.1 110/230 V AC

The IEC 60320 type C14 (male) connector consists of:

- Live lead (1);

- Neutral lead (2);
- Protective earth (3).

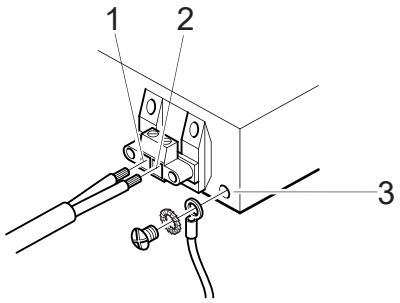


1. Connect the power cable to the IPBL.
2. Plug the power cable into a wall socket with protective earth. The IPBL switches on.

4.3.2 48 V DC

The 48 V DC (42–56 V DC) power input includes a fuse to protect against overload. The IPBL is also equipped with a protection circuit that safeguards both the IPBL and the external power supply from damage caused by reversed input terminals during installation.

1. Fasten the ground cable to the protective earth (3) using the attached M4 screw (Philips) and washer.
2. Cut the power cable to the correct length. The recommended wire size diameter is 1 mm (18 AWG).
3. Attach the positive lead to (1).
4. Attach the negative lead to (2).
5. Connect the power cable to a 48 V DC power source.



4.4 Fans Replacement

It is highly recommended to replace all fans at the same time. All fans in a unit must move the air in the same direction.

To replace IPBL fans, do as follows:

1. Turn off power to the unit and disconnect the cables.
2. Remove all 20 screws that hold the upper cover. The screw head is TX10.
3. Remove the existing fans.
4. Install new fans while making sure that the arrow on the fans is pointing out from the casing.
5. Put back the upper cover, fasten the screws and reconnect all cables back to the unit.

Appendix A RFP Power Consumption

The table below shows power consumption for a DB1 base station connected to and powered from the IPBL/PBX.

The maximum cable length for base stations connected to the IPBL/PBX must not exceed 1500 meters.

The cable length limitation of the Ethernet 802.3 10/100 base-T is 100 metres.

Table 5 Power consumption (watts) of DB1 base stations and cabling

Cable length (metres)	Wire size (Ø)					
	0.4 mm		0.5 mm		0.6 mm	
	Without EPP	With EPP	Without EPP	With EPP	Without EPP	With EPP
0	2.0	2.0	2.0	2.0	2.0	2.0
100	2.0	2.0	2.0	2.0	2.0	2.0
200	2.1	2.0	2.0	2.0	2.0	2.0
300	2.1	2.1	2.1	2.0	2.0	2.0
400	2.1	2.1	2.1	2.1	2.1	2.0
500	2.2	2.1	2.1	2.1	2.1	2.0
600	2.2	2.1	2.1	2.1	2.1	2.1
700	2.3	2.2	2.2	2.1	2.1	2.1
800	2.3	2.2	2.2	2.1	2.1	2.1
900	2.4	2.2	2.2	2.1	2.1	2.1
1000	2.5	2.3	2.3	2.2	2.2	2.1
1100	2.6	2.3	2.3	2.2	2.2	2.1
1200	2.7	2.3	2.3	2.2	2.2	2.1
1300	2.8	2.4	2.4	2.2	2.2	2.1
1400	2.9	2.4	2.4	2.2	2.2	2.1
1500	3.2	2.5	2.4	2.3	2.3	2.2

Appendix B Related Documents

Mitel IP-DECT System, Installation and Operation Manual, TD 92682EN

Appendix C Document History

Version	Date	Description
I	13 June 2025	2.2 IPBL, page 4: Updated available versions with regard to power supply specification, and scope of delivery. 4.3 Power the IPBL, page 17: Updated information regarding power sources. 4.3.2 48 V DC, page 18: New section. Removed information about end-of-sales products IPBS1, IPBS2, BS3x0 from the whole document.
H	23 May 2024	Added IPBL information throughout the document. Document title changed.
G	16 May 2023	Document title changed. Appendix A RFP Power Consumption, page 30: Cable length information for IP-DECT added.
F	02 November 2022	2.5 DB1, page 11: New non-backwards compatible DB1 revisions with the corresponding SW added.
E	25 January 2021	Updated regulatory information in 3.3.3 Power the Base Station with a Local Power Supply, page 21. Updated AC-adapters in 2.5 AC-adapter, page 12. Added information about attaching Base Stations in 3.2.1 Fix the Mounting Bracket to a Wall, page 14.
D		Not released.
C	13 February 2020	Added IPBS3 where it is applicable.
B	27 April 2015	Updated section 3 Installation of the Base Station on page 24 regarding that it is recommended to mount the Base Station at least 30 cm away from a metal surface. Updated section DIP Switches on page 21.
A	15 January 2013	First released version.

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Powering connections

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