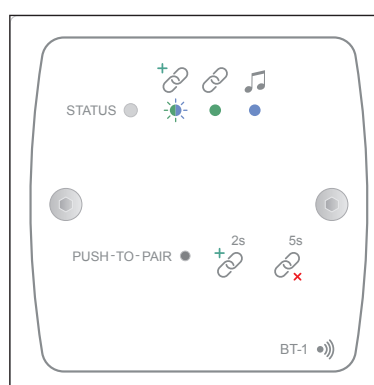
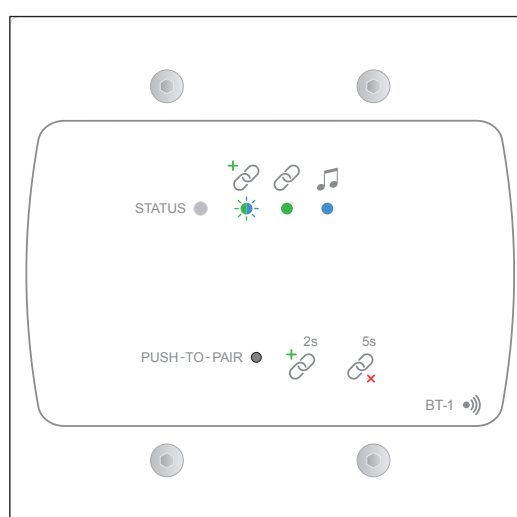


BT-I Series Bluetooth Wireless Audio Module

BT-IFW (UK, White)
BT-IFB (UK, Black)
BT-IEW (UK, White)
BT-IEB (UK, Black)



BT-IAFW (USA, White)
BT-IAEW (USA, White)



Installation Guide

Conformities

The BT-I is compliant with the following EMC directives:

EN 301 489-17V2.1.1

EN 300 328V1.8.1

EN60950-1:2006+A11:2009+A1:2010+A12:2011

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Introduction

The BT-I is a wireless remote audio input module for use with all Cloud products fitted with an RJ45 Facility Port or an RJ45 Extension Port.

The BT-I enables compatible portable devices such as laptops, tablets and smartphones to stream audio wirelessly to the interface, and thus into the audio system of the Zone where the interface is installed.

The BT-I is connected to the host unit's Facility Port or Extension Port by a single Cat 5 cable. Alternatively, it may be connected to remote Cloud input modules such as the LM-2, LE-I and BE-I in "daisy-chain" fashion, these modules being connected in turn to the host unit. Screened Cat 5 cable and shielded RJ45 connectors should be used in all cases. If the Zone where the BT-I is installed also requires RL and RSL Series remote control plates, they may be "daisy-chained" to the BT-I instead of being connected to the host unit, which will simplify installation wiring in many cases.

BT-I variants

There are two primary variants of the BT-I: the BT-IF, suitable for use with host units fitted with one or more Facility Ports, and the BT-IE, suitable for use with host units fitted with one or more Extension Ports. The BT-IF will route an (L+R) mono sum of the streamed audio to the host unit; the BT-IE routes the audio in stereo.

Variant BT-IF may be used with the following Cloud products, which are fitted with Facility Port(s):

- Z4MK4 and Z8MK4 Zone Mixers
- Z4MK3 and Z8MK3 Zone Mixers
- 46-I20 and 46-I20MEDIA Zone Mixing Amplifiers
- MA40F, MA40T and MA40E Mini Amplifiers

Variant BT-IE may be used with the following Cloud products, which are fitted with Extension Port(s):

- DCM1 Digital Control Zone Mixer
- DCM1e Ethernet Digital Control Zone Mixer

BT-IE and BT-IF variants may be distinguished physically by an indent on the rear PCB: a black mark will be visible in one of two checkboxes:

- **DCM1:** BT-IE
- **FACILITY:** BT-IF

RJ45 PIN ASSIGNMENT STRIKE CHECKBOX AT BUILD	DCM1	FACILITY
	DCM VERSION P1: AUDIO L- P2: AUDIO L+ P3: SENSE P4: +V P5: 0V P6: -V P7: AUDIO R+ P8: AUDIO R- SCREEN: GND	FACILITY VERSION P1: AUDIO- P2: AUDIO+ P3: VCA CV P4: +V P5: 0V P6: -V P7: REM.LEVEL P8: REM.SRC SCREEN: GND

Additionally, the BT-I is available in two form factors to suit either UK single-gang or US standard dual-gang electrical back boxes; US-size modules are denoted by a suffix 'A' to the Part No.

UK-size modules are available either in white (a further suffix 'W' to the Part No.), or black (suffix 'B') finish.

NOTE: Unless specifically stated otherwise, all references to "BT-I" in this Installation Guide can be taken to apply to all BT-I mechanical and cosmetic variants.

Mounting - mechanical

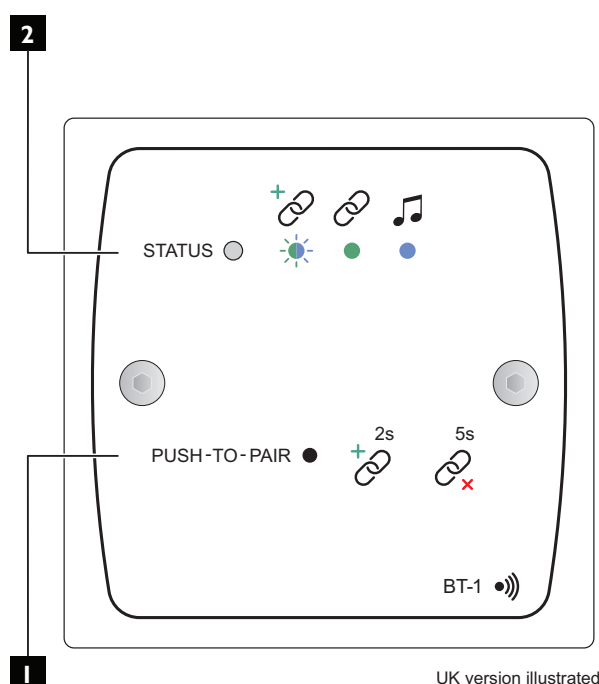
BT-I (UK version)

The Cloud BT-I (BT-IFB, BT-IFW, BT-IEB, BT-IEW) fits a standard UK-style single-gang electrical back box. The box used should have a depth of at least 35 mm.

BT-IA (US version)

The Cloud BT-IA (BT-IAFW, BT-IAEW) fits a standard US dual-gang electrical 'J' box in vertical orientation. The box used should have a depth of at least 1 1/2".

Faceplate Controls



1. **PUSH-TO-PAIR** – recessed push-button accessed through a 2 mm dia. hole. The two “chain” symbols adjacent to the access hole depict the effect of “short” and “long” presses on the button:

Short press:

Pressing the button for 2 secs puts the BT-I into “Awaiting Pairing” mode. The BT-I will be visible on the scan list of external wireless devices within range for 30 seconds; during this timeout period, an external device may initiate pairing. Once paired, no other device can connect to the BT-I. The **STATUS** LED [2] blinks blue/green in Awaiting Pairing mode. If no device connects during the timeout period, the BT-I reverts to “Secure” mode, preventing a connection to be made by new devices.

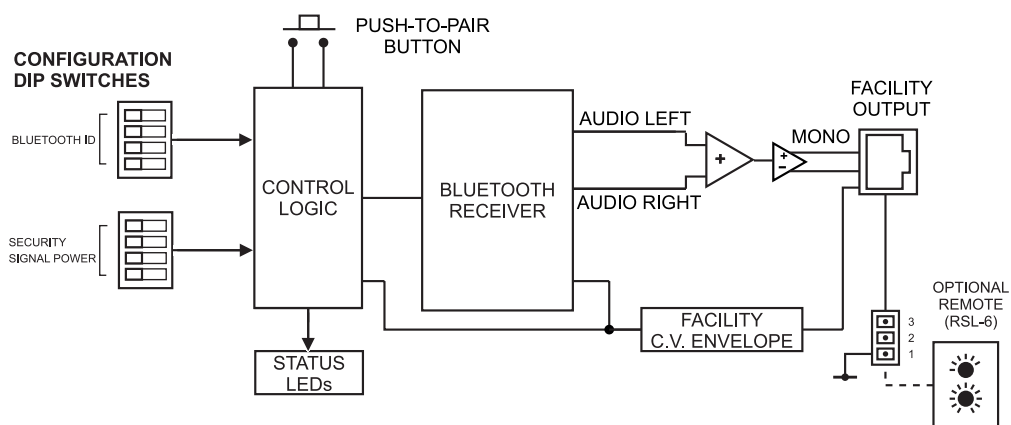
Long press:

Pressing the button for 5 secs puts the BT-I into “Factory” mode. This clears any active connection and the BT-I will not be visible on any external devices’ scan lists (unless the BT-I is in Unsecured mode – see “Secured and non-secured modes” on page 12. The **STATUS** LED [2] will turn off.

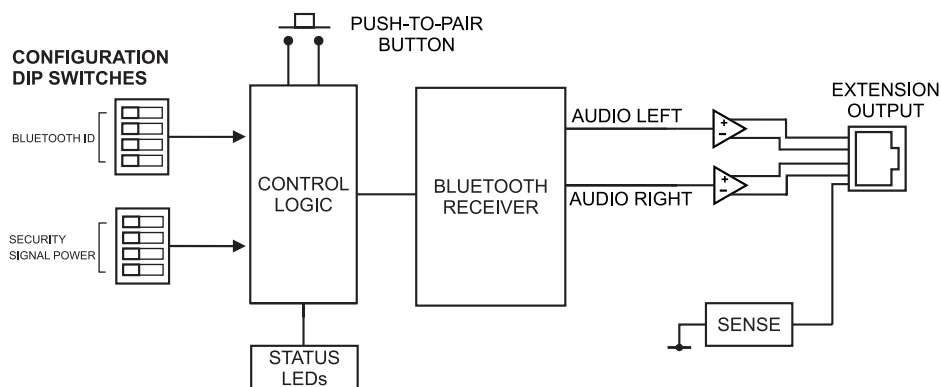
2. **STATUS** – bicolour (green/blue) LED indicating BT-I operating mode:

LED STATE	MEANING
Off	BT-I is not connected to any external device
Flashing blue/green	BT-I is awaiting pairing
Green	BT-I is connected to an external device
Blue	Audio data is being streamed from the external device

Block Diagrams



BT-IF

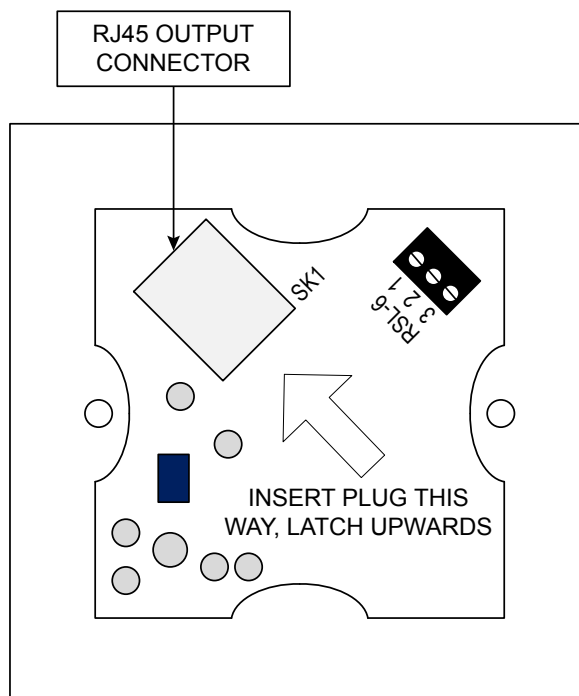


BT-IE

Installation - connections

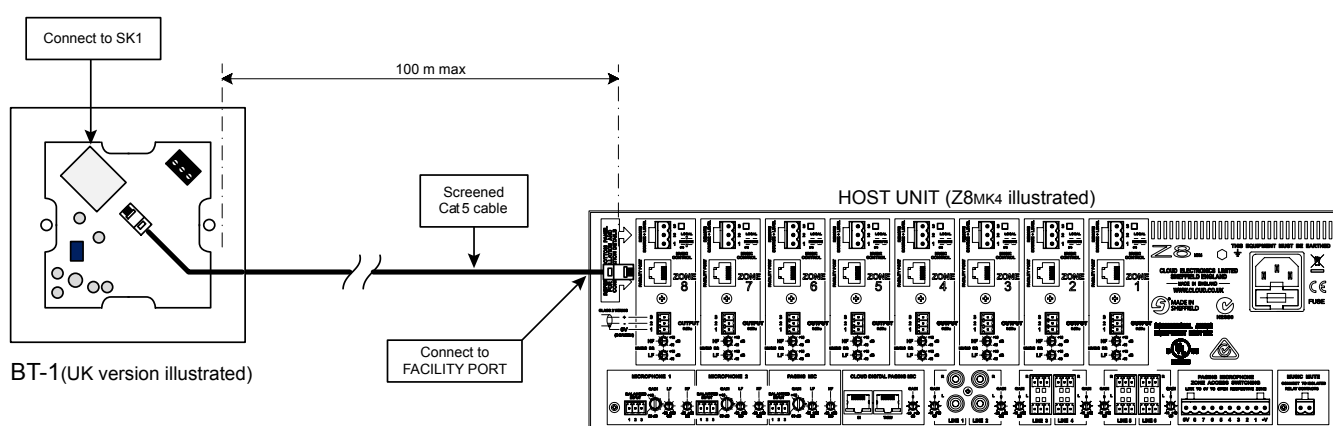
Connection to a Facility Port (BT-IF only)

The BT-I has two PCBs “piggy-backed” onto the rear of the faceplate. The RJ45 output connector (SK1) is located on the upper PCB:



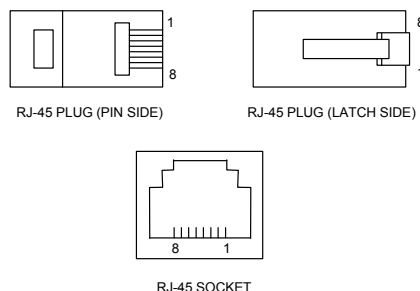
LOCATION OF REAR RJ45 CONNECTOR
(Sketch simplified; only primary components shown)

The output connector should be connected to the host unit's **FACILITY PORT** for the Zone in which it is installed* with screened Cat 5 cable and shielded RJ45 plugs.



The maximum total Cat 5 cable length should not exceed 100 m. If further modules are being “linked” together (see “Connecting a BT-IF to an LM-2” on page 10), this figure applies to the overall cable run from the host unit to the farthest module in the chain.

IMPORTANT: Because the cables carry low-level audio, *only* screened Cat 5 should be used, the foil screen of the cable being bonded to the metal screening can of the plugs. If a BT-I is being installed in very close proximity to the host unit, it *may* be possible to use ready-made screened Cat 5 “patch” cables of short length. In all other situations, shielded RJ45 plugs should be crimped onto the installed screened Cat 5 cable using the pinout shown below.



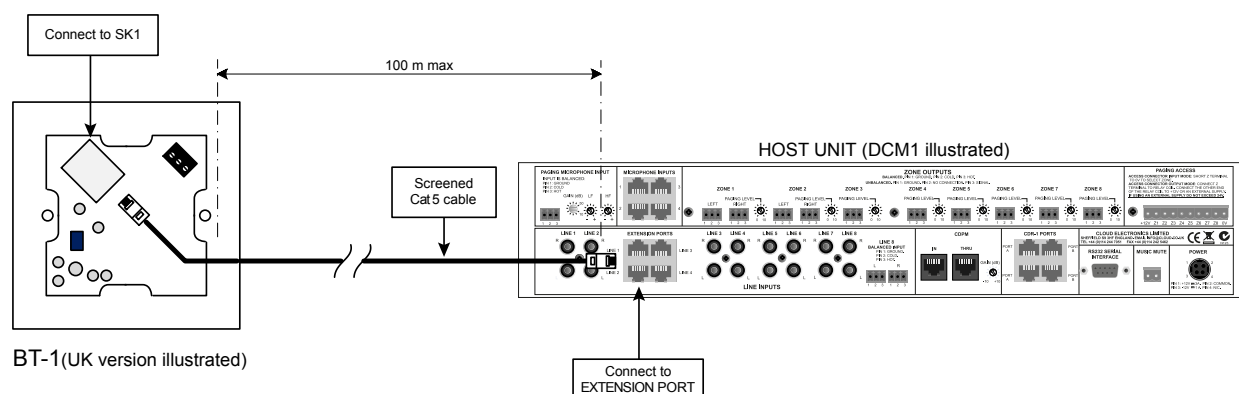
PIN	USE	Cat 5 CORE
1	Audio 'cold' phase (-)	White + Orange
2	Audio 'hot' phase (+)	Orange
3	Priority VCA control	White + Green
4	+ Vsupply	Blue
5	0V	White + Blue
6	- Vsupply	Green
7	Music level control (0 to 10 V)	White + Brown
8	Music source select control (0 to 10 V)	Brown
SCN	GND ref for system music controls	Connector shell

The audio streamed to the BT-IF module will be available in the Zone as soon as the module is connected to the host unit's Facility Port for that Zone. Audio fed into the Zone will be an (L+R) mono sum of the stereo audio streamed from the user's wireless device (e.g., smartphone, tablet, etc.). Audio volume will be controlled solely from the user's device in the normal way and will be unaffected by any of the host unit's front panel controls.

*There is no reason why the module cannot be connected to the Facility Port of a Zone other than that in which it is installed – though this is unlikely to be an common installation scenario.

Connecting to an Extension Port (BT-IE only)

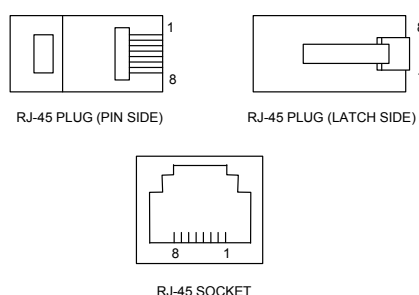
The BT-IE is connected in exactly the same manner as the BT-IF, except that it should be connected to an **EXTENSION PORT** on the host unit.



IMPORTANT: Note that on the DCM1 and DCM1e Digital Control Zone Mixers, the four Extension Ports are alternative input connectors for Line Inputs 1 to 4. When a BT-IE is connected to an Extension Port, the corresponding pair of Line Input phono connectors must not be connected to a music source device of any kind.

The maximum total Cat 5 cable length should not exceed 100 m. If further modules are being “linked” together (see “Connecting a BT-IE to an LE-I or BE-I” on page 10), this figure applies to the overall cable run from the host unit to the “furthest” module in the chain.

IMPORTANT: Because the cables carry low-level audio, *only* screened Cat 5 should be used, the foil screen of the cable being bonded to the metal screening can of the plugs. If a BT-I is being installed in very close proximity to the host unit, it *may* be possible to use ready-made screened Cat 5 “patch” cables of short length. In all other situations, shielded RJ45 plugs should be crimped onto the installed screened Cat 5 cable using the pinout shown below:

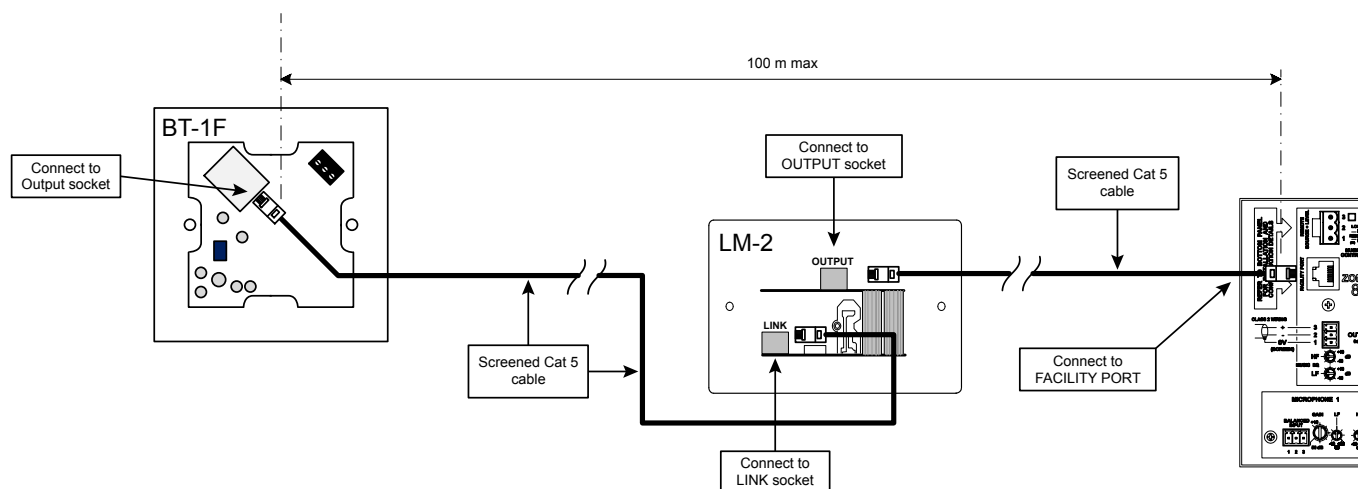


PIN	USE	Cat 5 CORE
1	Left audio channel ‘cold’ phase (-)	White + Orange
2	Left audio channel ‘hot’ phase (+)	Orange
3	Model sense	White + Green
4	- Vsupply	Blue
5	0 V	White + Blue
6	- Vsupply	Green
7	Right audio channel ‘hot’ phase (+)	White + Brown
8	Right audio channel ‘cold’ phase (-)	Brown
SCN	GND ref for system music controls	Connector shell

On the DCM1 and DCM1e, the RJ45 Extension Ports are alternative input connectors for Line Inputs 1 to 4, and are NOT associated exclusively with any of the eight Zones which the host unit supports. Use the Select Input option in the Music Menu to assign the Line Input to which the BT-I is connected to route the streamed audio to the Zone required. See page 28 of the DCM1/DCM1e Installation and User Guide for full details.

Connecting a BT-IF to an LM-2

If a BT-IF is being installed in a Zone which also contains an LM-2 Remote Input/Control Module, it should be connected to the LM-2's **LINK** connector instead of directly to the host unit, as shown below:

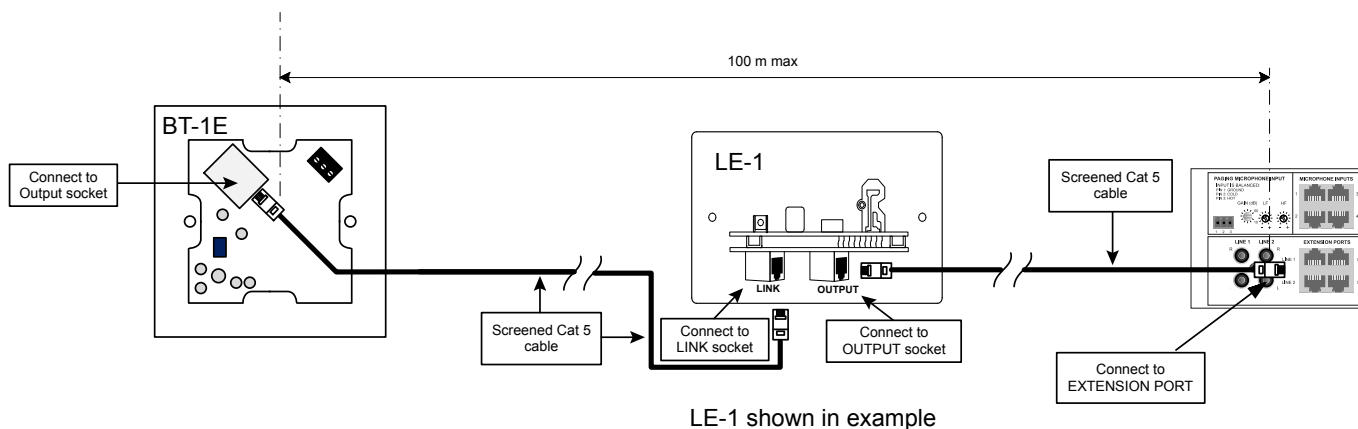


If multiple LM-2s are “daisy-chained” in the Zone, the BT-IF should be connected to the **LINK** connector of the “last” LM-2 in the chain. Note that as the BT-IF has no Link connector, it must always be the last module in a chain.

For details of how to configure a Facility Port to operate correctly with an LM-2 Remote Input/Control Module, please see the LM-2 Installation Guide.

Connecting a BT-IE to an LE-I or BE-I

If a BT-IE is being installed in a Zone which also contains an LE-I or BE-I Remote Input Module, it should be connected to the **LINK** connector on the Remote Input Module instead of directly to the host unit, as shown below:

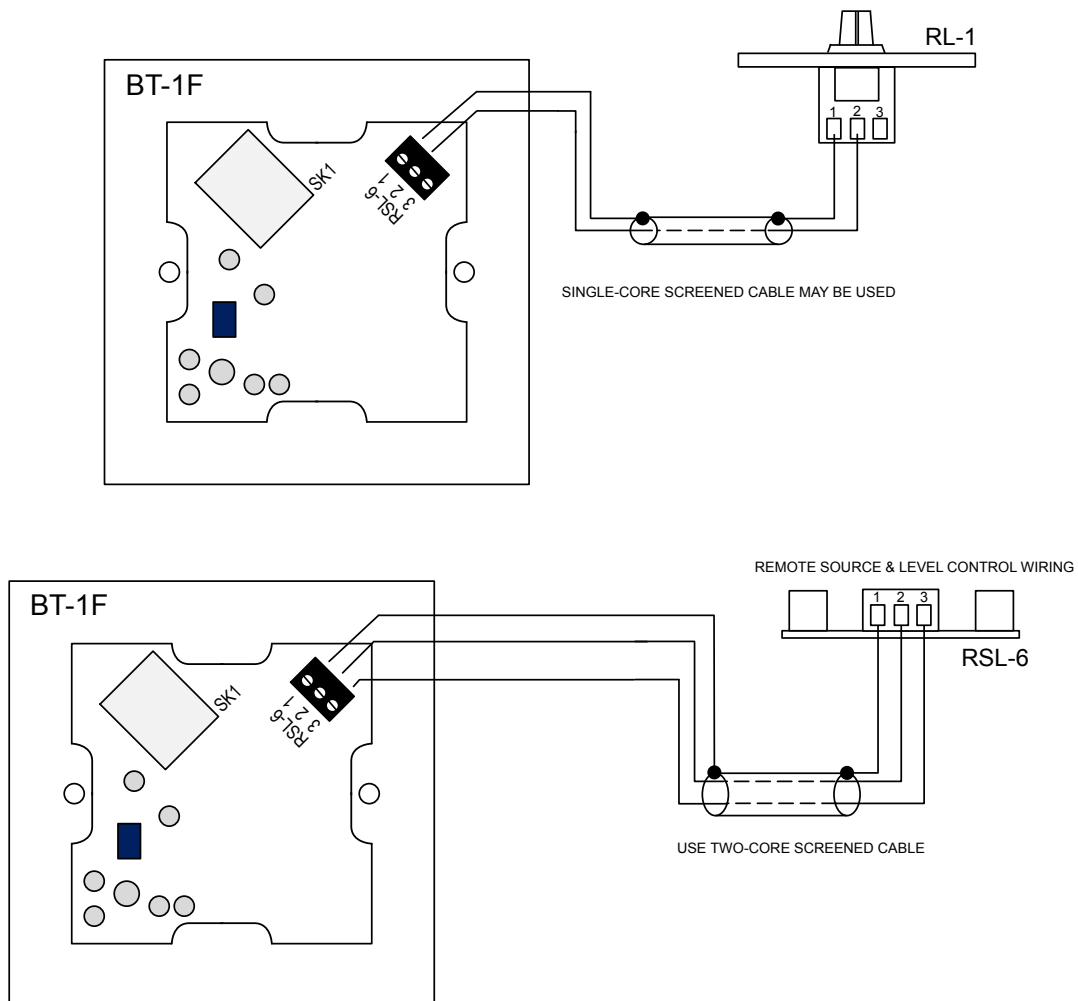


If multiple LE-I/BE-I are “daisy-chained” to an Extension Port, the BT-IE should be connected to the **LINK** connector of the “last” LE-I/BE-I in the chain. Note that as the BT-IE has no Link connector, it must always be the last module in a chain.

Note that it is not possible to connect a BT-IE to an ME-I Microphone Input Module; ME-I modules are connected to a DCMI's Microphone Inputs, not the Extension Ports.

Connecting an RL/RSL plate to a BT-1F

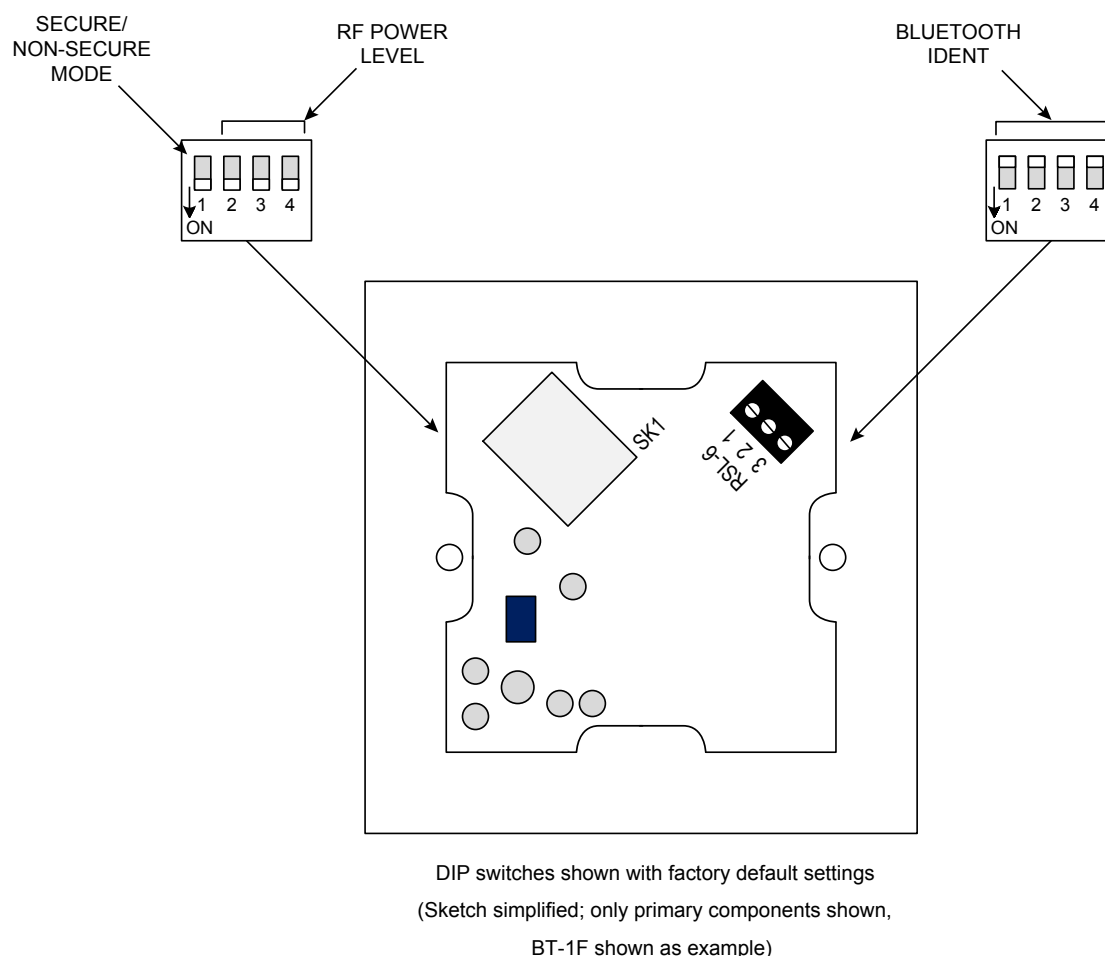
The BT-1F is provided with a 3-pin screw-terminal connector (on the rear PCB) to permit the connection of an RL-1 or RSL-6 remote control plate. These plates normally connect to the Music Control Port for the relevant Zone at the host unit, but it may simplify wiring to connect one to the BT-1.



An RL-1/RSL-6 connected to a host unit via a BT-1F in this manner will only operate correctly if the host's Music Control functions have been correctly configured. For details of how to do this, please see the Installation Guide for the host unit.

Set-up Options

Setting up the BT-I is very simple: there are two 4-way DIP switches on the lower rear PCB which may need to be set to configure the BT-I to suit the specifics of the installation.



Secured and non-secured modes

Normal operation of the BT-I will be with “Secured” mode selected: this requires the user to press the **PUSH-TO-PAIR** button to place the module into “Awaiting Pairing” mode, and then to initiate pairing from his/her portable wireless device within 30 seconds.

Under some circumstances, it might be preferable to select “Non-secured” mode to circumvent use of the **PUSH-TO-PAIR** button, giving any user within range the ability to connect to the BT-I.

“Secured” mode is selected by setting SW1 of the left-hand DIP switch (as seen from the rear of the BT-I) to ON (switch down). With SW1 OFF, the BT-I is in “Non-secured” mode.

RF power setting

The RF power level at which the Bluetooth interface operates – and hence the operational range of the BT-I – is adjustable. Units are shipped with the power setting at maximum, but in some installation circumstances, it may be desirable to limit the power of the module, thereby restricting the operational range. Typically, it may be necessary to do this where there are BT-I modules installed in adjoining rooms, as it reduces the likelihood of the BT-I in one room appearing in the Device List on smartphones, tablets, etc., in other rooms.

The power level is set by SW2, SW3 and SW4 on the left-hand DIP switch (as seen from the rear of the module). The three switches work in a binary manner, thus eight power levels are theoretically available, though this is limited to seven in practice. The power levels are in 4 dBm steps. The table below lists the available power settings:

LEVEL	SW2	SW3	SW4	POWER ¹
1	OFF	OFF	OFF	-18 dBm
2	OFF	OFF	ON	-14 dBm
3	OFF	ON	OFF	-10 dBm
4	OFF	ON	ON	-6 dBm
5	ON	OFF	OFF	-2 dBm
6	ON	OFF	ON	+2 dBm
7	ON	ON	OFF	+6 dBm
8 ²	ON	ON	ON	

NOTES:

1. relative to 0 dBm = 1 mW

2. Level 8 is set at the factory as the default

Bluetooth ident

In installations where multiple BT-I's are installed, it will generally be desirable to give each a unique identifier. The right-hand DIP switch (viewed from the rear) allows one of 16 idents to be assigned to each BT-I.

The BT-I appears in the Device List on a user's laptop, tablet, etc., with a numeric suffix (#01 to #16) to indicate all the BT-I's that are within range; in this way, the user can be certain of connecting to the intended module. It is recommended that installers affix a printed label to each module to indicate the ident set, in such cases.

The idents are selected by the four sections of the DIP switch using binary weighting, as shown below:

IDENT	SW1	SW2	SW3	SW4
#1	OFF	OFF	OFF	OFF
#2	OFF	OFF	OFF	ON
#3	OFF	OFF	ON	OFF
#4	OFF	OFF	ON	ON
#5	OFF	ON	OFF	OFF
#6	OFF	ON	OFF	ON
#7	OFF	ON	ON	OFF
#8	OFF	ON	ON	ON
#9	ON	OFF	OFF	OFF
#10	ON	OFF	OFF	ON
#11	ON	OFF	ON	OFF
#12	ON	OFF	ON	ON
#13	ON	ON	OFF	OFF
#14	ON	ON	OFF	ON
#15	ON	ON	ON	OFF
#16	ON	ON	ON	ON

Operation

When the BT-I first has power applied to it, the **STATUS** LED flashes alternate green/blue for a few seconds to confirm correct operation.

Normal ("Secured") mode:

In Secured Mode, the module will appear in the Bluetooth Device List of any smartphone, tablet, etc. within range. At this time, no connection will be in place, and it will not be possible to pair with the BT-I.

To initiate pairing, press the **PUSH-TO-PAIR** button for two seconds; the **STATUS** LED will flash alternate blue/green for 30 seconds, indicating "Awaiting Pair" mode. During this timeout period, a user can select the BT-I from his/her Device List, and if pairing is successful, the **STATUS** LED will turn steady green. The BT-I's ident will now not be visible on other Device Lists, and therefore it will not be possible for any other device to connect to it. In order for another device to connect to the BT-I, the current device must first disconnect.

Streaming may now commence: on receipt of audio data, the **STATUS** LED turns blue.

Disconnection may be achieved in three ways:

- from the user device – the connection is cancelled and the **STATUS** LED goes out. The BT-I's internal "User List" will retain the identity of the user's device, in which case, that specific user will be able to reconnect at a future time without the **PUSH-TO-PAIR** button being pressed.
- from the BT-I itself, by pressing the **PUSH-TO-PAIR** button for two seconds. This has exactly the same consequences as cancelling the connection from the user device.
- From the BT-I, by pressing the **PUSH-TO-PAIR** button for five seconds. This places the BT-I in "Factory" mode and clears the internal "User List". Any device that was previously connected to the BT-I will need to reconnect with the use of the **PUSH-TO-PAIR** button as described above.

Non-secured mode:

In Non-secured mode, it is not necessary to initiate a connection with the **PUSH-TO-PAIR** button. The BT-I will “pair” with the first device that requests pairing. Once pairing is established, no other device can connect to it, in the same way as in Secured mode.

Streaming may now commence: on receipt of audio data, the **STATUS** LED turns blue.

Disconnection may be achieved by any of the three methods outlined above for “Secured” mode.

Power considerations

The BT-I will operate from a DC power supply in the range 12 V to 24 V. This will be supplied by the host unit's Facility Port or Extension Port via the Cat 5 connection: Cloud Z4/Z8MK3 host units supply +/- 15 V from their Facility Ports while the Z4/Z8MK4 and 46-120 host units supply +/- 12 V. The DCM1 range supply +/- 12 V from their Extension Ports.

The BT-I consumes 20 to 26 mA from the host unit's power supply. In the majority of installations, the host unit will have ample spare current capacity to power one or more BT-I s. However, installers should note that this may not be the case in a very large system with multiple remote modules in several Zones. If there is any doubt about the power capability, please refer to the host unit's Installation and User Guide where full details of power supply ratings can be found.

Should you have any questions concerning the installation and connection of the Cloud BT-I, please visit www.cloud.co.uk/resources, where you will find additional technical information.

www.cloud.co.uk



www.cloudusa.pro

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