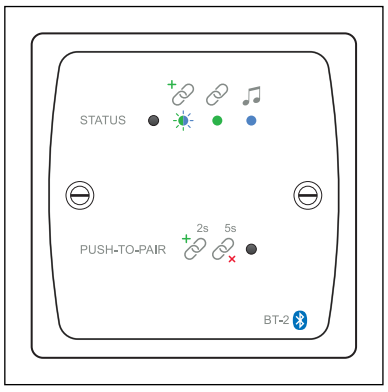
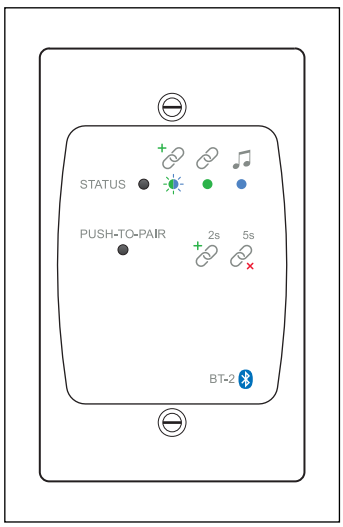
BT-2 Series

Bluetooth Wireless Audio Module

BT-2FW (UK, White)
BT-2FB (UK, Black)
BT-2EW (UK, White)
BT-2EB (UK, Black)



BT-2AFW (US, White)
BT-2AFB (US, Black)
BT-2AEW (US, White)
BT-2AEB (US, Black)



Installation Guide

CONFORMITIES

The BT-2 is compliant with the following EMC directives:

EN 55032: 2015+A11:2020+A1:2020, EN 55035: 2017+A11:2020,

EN 61000-3-3: 2013+A1:2019+A2:2021, EN IEC 61000-3-2: 2019+A1:2021,

EN 300 328 V2.2.2, EN 301 489-1 V2.2.3, EN 301 489-17 V3.2.4,

EN IEC 62311:2020, EN IEC 62368-1:2020+A11:2020.

CONTENTS

INTRODUCTION

The BT-2 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-2 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-2's **OUTPUT TO MIXER** port is normally connected to the host unit's Facility Port or Extension Port by a single screened Cat 5 cable. However, the BT-2 is also fitted with a **LINK INPUT** connector, so if the installation includes remote Cloud input modules such as the LM-2, LE-1 or BE-1, the BT-2 may be "daisy-chained" with these modules, in any order. Screened Cat 5 cable and shielded RJ45 connectors should be used in all cases.

If the Zone where the BT-2 is installed also requires an RL or RSL Series remote control plate, the plate may be connected to the BT-2 instead of directly to the host unit, which will simplify installation wiring in many cases. Note that RL/RSL connectivity is only available on BT-2F variants.

BT-2 variants

There are two primary variants of the BT-2: the BT-2F, which is suitable for use with host units fitted with one or more Facility Ports, and the BT-2E, for use with host units fitted with one or more Extension Ports. The BT-2F will route an (L+R) mono sum of the streamed audio to the host unit; the BT-2E routes the audio in stereo.

Variant BT-2F 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
- 46-120, 46-120MEDIA, 46-120MK2 and 46-240 Zone Mixer-Amplifiers
- 46-80 and 46-80T Zone Mixing Amplifiers
- 24-120 and 24-240 Zone Mixer-Amplifiers
- MPA-120MK2 and MPA-240MK2 Mixer-Amplifiers
- MA40F, MA40T and MA40E Mini Amplifiers
- MA80FT and MA80E Mini Amplifiers

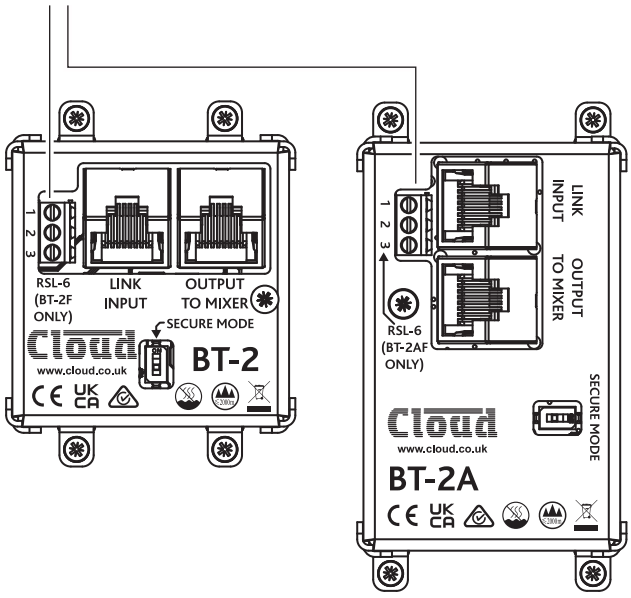
Variant BT-2E may be used with the following Cloud products, which are fitted with RJ45 Extension Port(s):

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

Additionally, either variant may be used with other (including discontinued) Cloud products not fitted with either type of expansion port by the use of an FPA-1 Facility Port Adaptor. This gives these products BT-2 compatibility: streamed audio will be in summed mono (BT-2F) or true stereo (BT-2E).

BT-2F variants are distinguishable physically by the presence of the **RSL-6** connector (3-pin Euroblock type) on the rear of the module. This connector is not fitted to BT-2E variants.

RSL-6 connector: not fitted on BT-2E variants



Physical options:

BT-2E and BT-2F variants are available in two form factors to suit either UK single-gang or US New Work drywall single-gang electrical back boxes; US-size modules are denoted by a suffix 'A' to the Part No.

Modules are available in white (a further suffix 'W' to the Part No.), or black (suffix 'B') finish.

NOTE: Unless specifically stated otherwise, all references to "BT-2" (without suffixes) in this Installation Guide can be taken to apply to all BT-2 physical and cosmetic variants.

MOUNTING - MECHANICAL

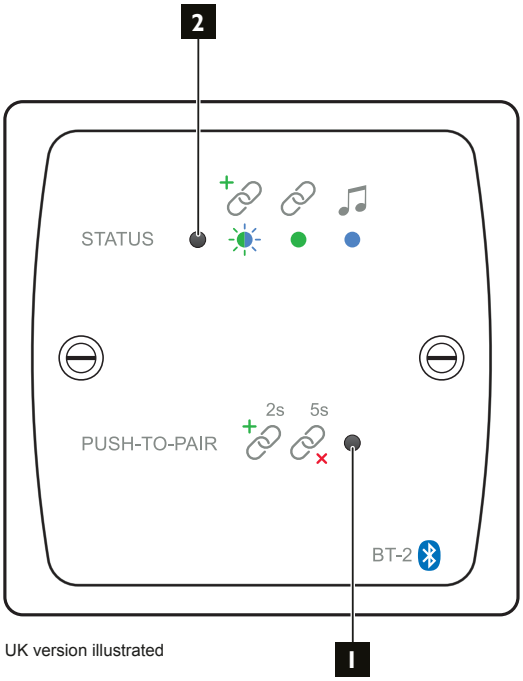
BT-2 (UK version)

The Cloud BT-2 (BT-2EB, BT-2EW, BT-2FB, BT-2FW) fits a standard UK-style single-gang electrical back box. The box used should have a depth of at least 35 mm.

BT-2A (US version)

The Cloud BT-2A (BT-2AEB, BT-2AEW, BT-2AFB, BT-2AFW) fits a standard US New Work drywall single-gang electrical back box in vertical orientation. The box used should have a depth of at least 1½".

FACEPLATE CONTROLS



UK version illustrated

1. PUSH-TO-PAIR: a small protruding push-button. The two adjacent "chain" symbols depict the effect of "short" and "long" presses on the button.

Short press:

In the module's default Secure Mode (see page 13), pressing the button for 2 secs puts the BT-2 into "Awaiting Pairing" mode. The BT-2 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-2. The **STATUS** LED [2] blinks blue/green in Awaiting Pairing mode.

While the module is paired to a device, a short press on **PUSH-TO-PAIR** will break the connection, and the **STATUS** LED will go out.

If no device connects during the timeout period, the BT-2 reverts to "Secure" mode, preventing a connection to be made by new devices.

Long press:

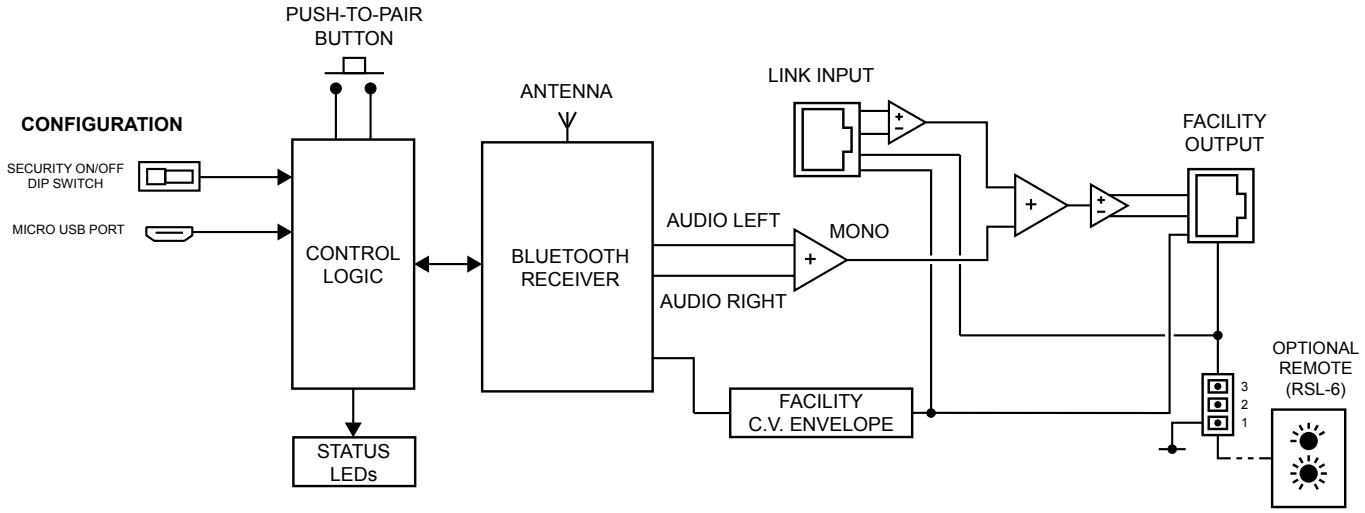
Pressing the button for 5 secs will cancel any currently active connection and will also clear all stored pairings. The BT-2 will now not be visible on any external devices' scan lists (unless the BT-2 is in Non-secure mode – see page 13. The STATUS LED will turn off.

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

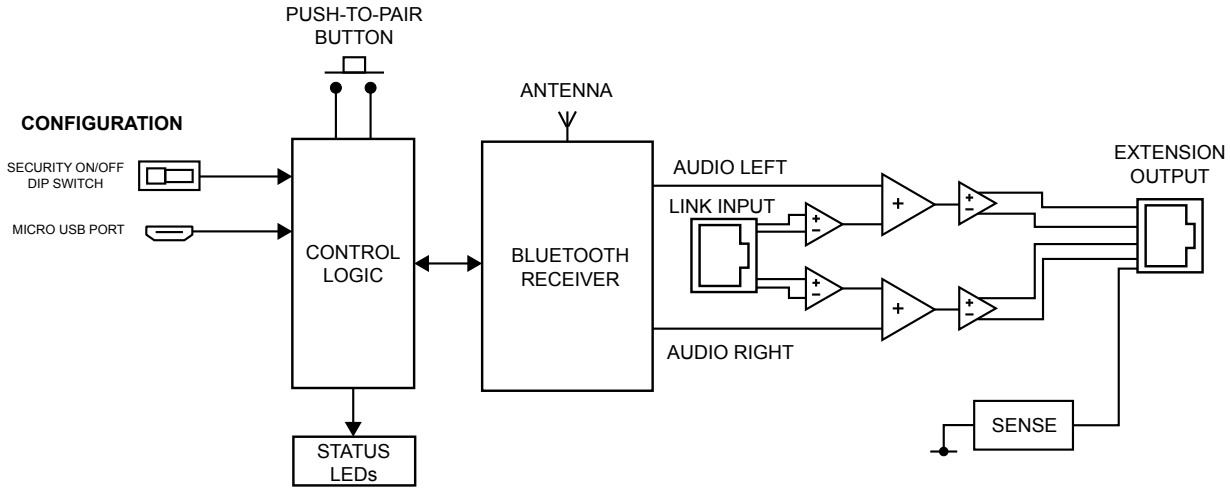
LED STATE	MEANING
Off	BT-2 is not connected to any external device
Flashing blue/green	BT-2 is awaiting pairing
Green	BT-2 is connected to an external device
Blue	Audio data is being streamed from he external device

BLOCK DIAGRAMS

BT-2F



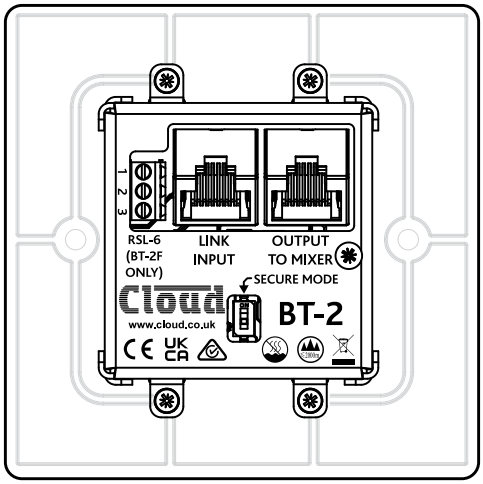
BT-2E



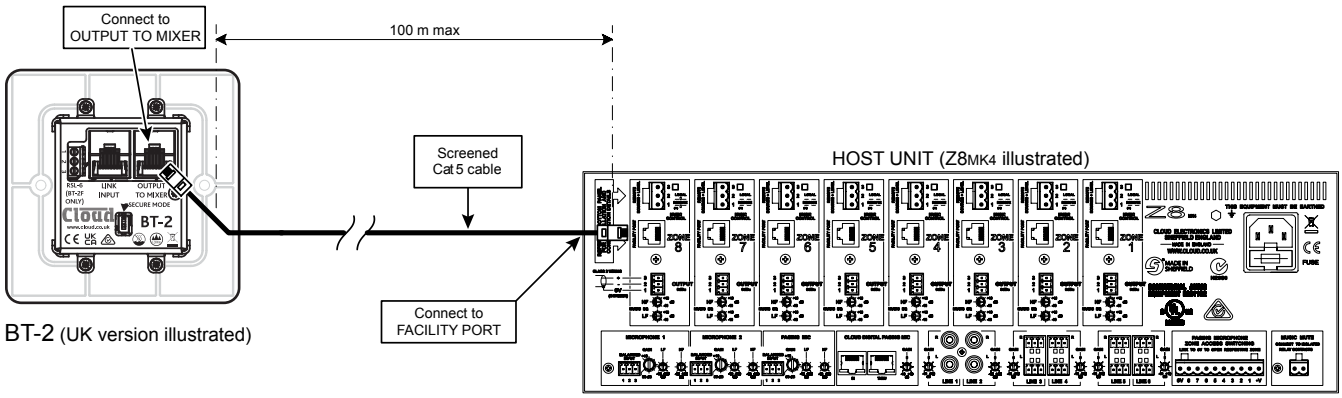
INSTALLATION - CONNECTIONS

Connection to a Facility Port (BT-2F only)

The BT-2 has a single PCB on the rear of the faceplate, housed by a steel cover. The connection ports are accessible above the cover:



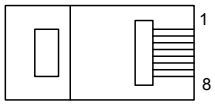
The **OUTPUT TO MIXER** connector should be connected to the host unit's **FACILITY PORT** for the Zone in which it is installed* with *screened* Cat 5 cable and shielded RJ45 plugs.



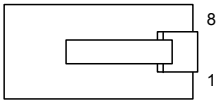
The maximum total Cat 5 cable length should not exceed 100 m. If further modules are being "daisy-chained" together (see "Connecting a BT-2F to an LM-2" on page 10), this figure applies to the overall cable run from the host unit to the "furthest" module in the chain.

** 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.*

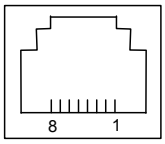
IMPORTANT: Because the cables carry low-level audio, *only* screened Cat 5 should be used, the foil screen of the cable being bonded to the metal screening can of the plugs. If a BT-2 is being installed in very close proximity to the host unit, it *may* be possible to use ready-made screened Cat 5 "patch" 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.



RJ-45 PLUG (PIN SIDE)



RJ-45 PLUG (LATCH SIDE)



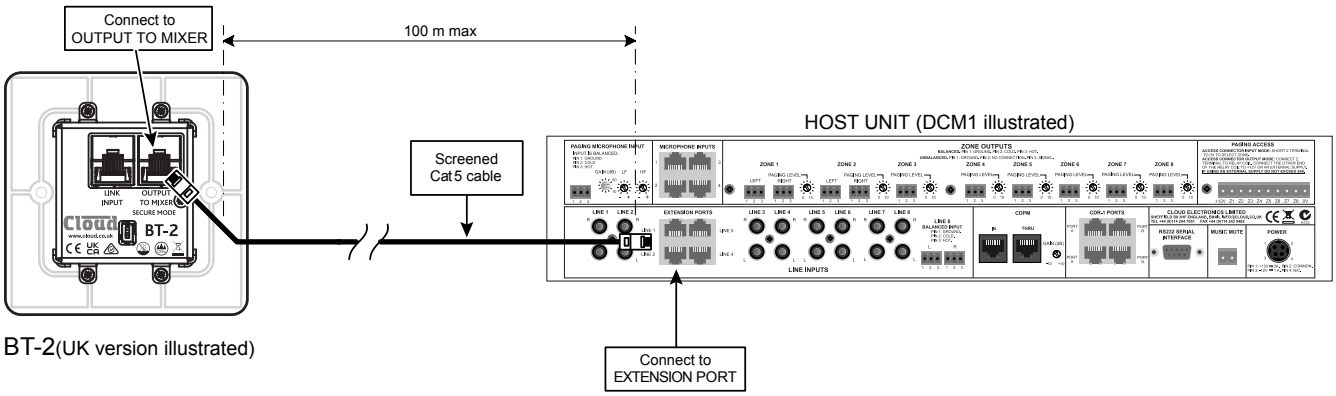
RJ-45 SOCKET

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

The audio streamed to the BT-2F 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.

Connecting to an Extension Port (BT-2E only)

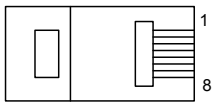
The BT-2E is connected in exactly the same manner as the BT-2F, except that it should be connected to an **EXTENSION PORT** on the host unit.



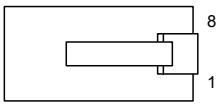
IMPORTANT: Note that on the DCM-1 and DCM-1e Digital Control Zone Mixers, the four Extension Ports are alternative input connectors for stereo Line Inputs 1 to 4. When a BT-2E is connected to an Extension Port, the corresponding pair of Line Input phono connectors must not be connected to a music source device of any kind.

The maximum total Cat 5 cable length should not exceed 100 m. If further modules are being "daisy-chained" together (see "Connecting a BT-2E to an LE-1 or BE-1" on page page 11), this figure applies to the overall cable run from the host unit to the "furthest" module in the chain.

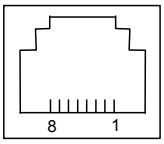
IMPORTANT: Because the cables carry low-level audio, *only* screened Cat 5 should be used, the foil screen of the cable being bonded to the metal screening can of the plugs. If a BT-2 is being installed in very close proximity to the host unit, it *may* be possible to use ready-made screened Cat 5 "patch" 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:



RJ-45 PLUG (PIN SIDE)



RJ-45 PLUG (LATCH SIDE)



RJ-45 SOCKET

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-2 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.

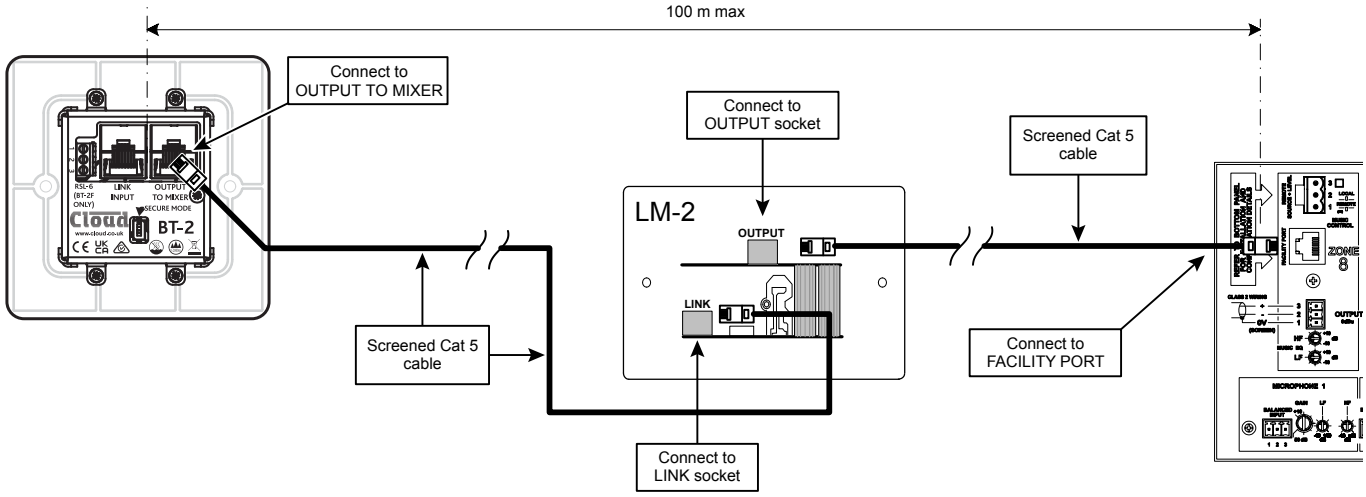
Installing a BT-2F with an LM-2 in a Zone

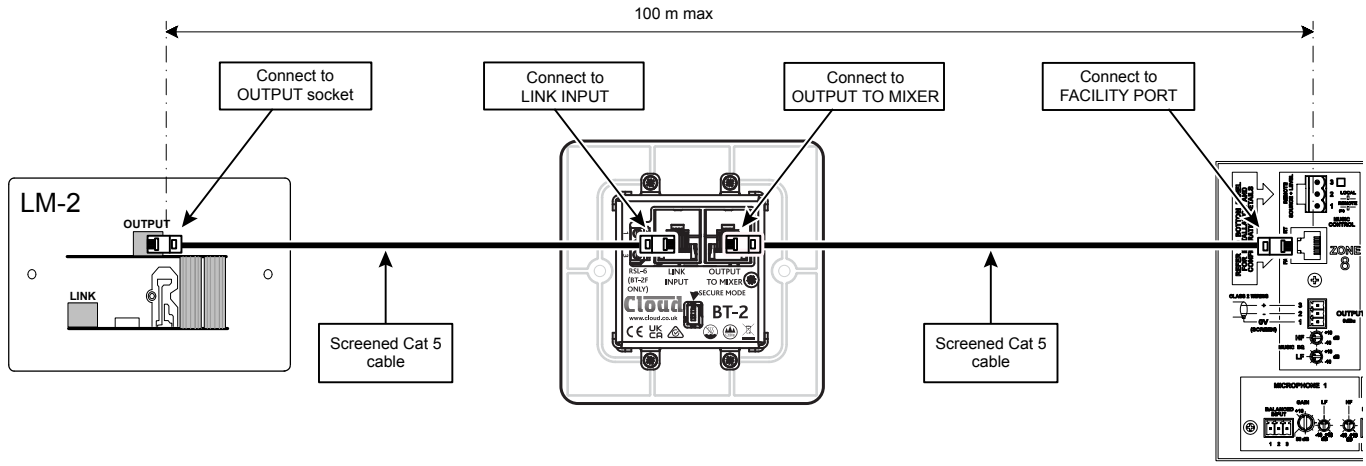
If a BT-2F is being installed in a Zone which also contains an LM-2 Remote Input/Control Module, it may be connected in either of two ways:

i. Connect the BT-2F's **OUTPUT TO MIXER** port to the LM-2's **LINK** port instead of directly to the host unit; the LM-2's **OUTPUT** port should then be connected to the host unit, or:

ii. Connect the BT-2F's **OUTPUT TO MIXER** port directly to the host unit, and the LM-2's **OUTPUT** port to the BT-2F's **LINK INPUT** port.

Which of these two wiring topologies is employed will be dictated by the relative locations of the BT-2F, the LM-2 and the host unit: use whichever method simplifies cable installation. The two arrangements are illustrated below:





If multiple LM-2s are fitted in the Zone, they, and the BT-2F may be "daisy-chained" in whichever sequence optimises the cabling, with the **OUTPUT** port of one module connected to the **LINK** (or **LINK INPUT**) port of the next in the chain.

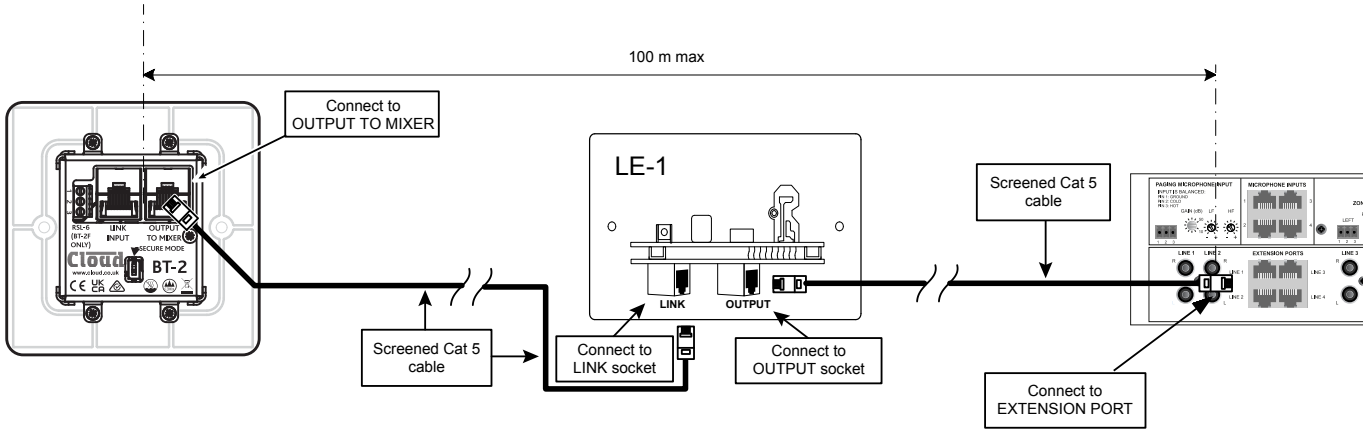
NOTE: For details of how to configure a Facility Port to operate correctly with an LM-2 Remote Input/Control Module, please see the LM-2 Installation Guide.

Installing a BT-2E with an LE-1 or BE-1 in a Zone

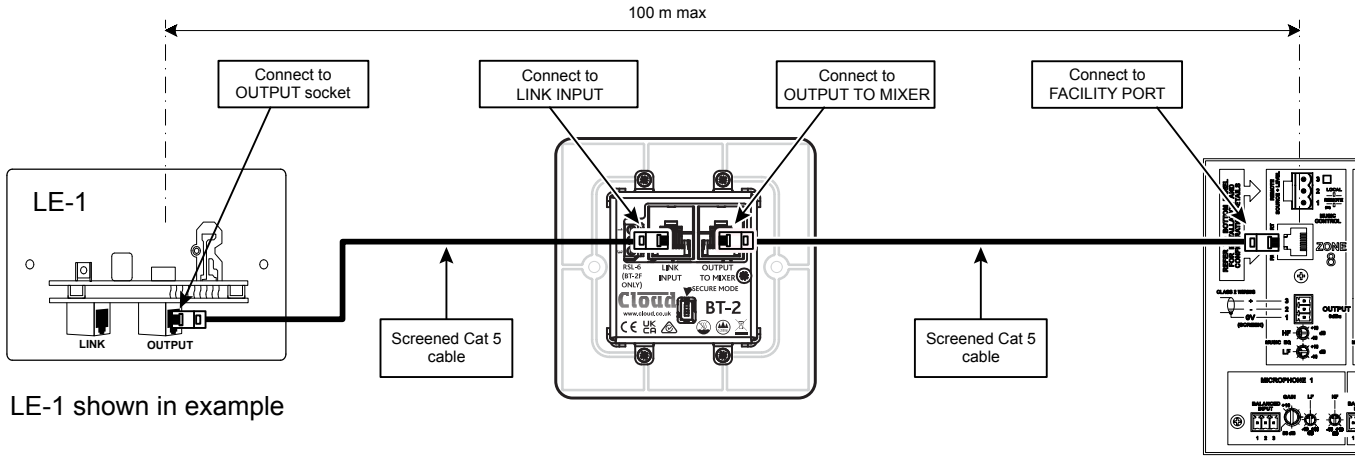
If a BT-2E is being installed in a Zone which also contains an LE-1 or BE-1 Remote Input Module, it may be connected in either of two ways:

i. Connect the BT-2E's **OUTPUT TO MIXER** port to the LE-1/BE-1's **LINK** port instead of directly to the host unit; the LE-1/BE-1's **OUTPUT** port should then be connected to the host unit, or:

ii. Connect the BT-2E's **OUTPUT TO MIXER** port directly to the host unit, and the LE-1/BE-1's **OUTPUT** port to the BT-2E's **LINK INPUT** port.



LE-1 shown in example



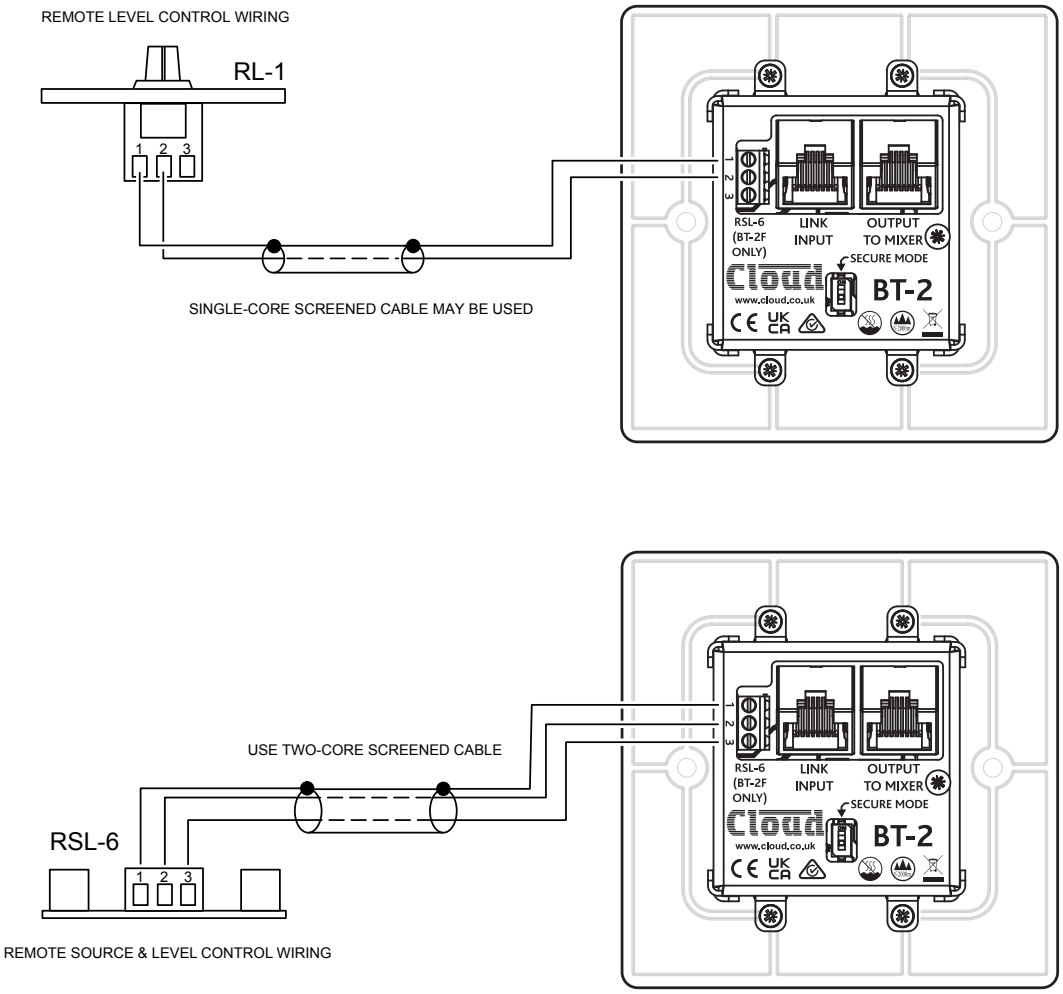
LE-1 shown in example

If multiple Remote Input Modules are fitted in the Zone, they, and the BT-2E may be "daisy-chained" in whichever sequence optimises the cabling, with the **OUTPUT** port of one module connected to the **LINK** (or **LINK INPUT**) port of the next in the chain.

Note that it is not possible to connect a BT-2E to an ME-1 Microphone Input Module; ME-1 modules should only be connected to a DCM1's Microphone Inputs, not the Extension Ports.

Connecting an RL/RSL plate to a BT-2F

The BT-2F is provided with a 3-pin screw-terminal connector to permit the connection of an RL-1 or RSL-6 remote control plate. These plates normally connect to the Music Control Port on the host unit (for the relevant Zone), but it may simplify room wiring to connect one to the BT-2F instead. The connector is at the left side of the rear metal housing.

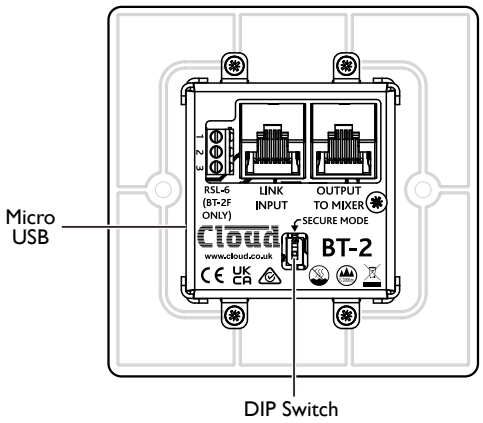


An RL-1/RSL-6 connected to a host unit via a BT-2F in this manner will only operate correctly if the host's Music Control functions have been correctly configured. For details of how to do this, please see the Installation Guide for the host unit.

NOTE: BT-1E Variants are not fitted with an RL/RSL connector.

SET-UP OPTIONS

Setting up the BT-2 is very simple: there is a single DIP switch (accessible through the rear metal housing) to select secure or non-secure mode, and a 'Micro USB' port at the left side to permit a module ident to be set.



Secure and non-Secure modes

Normal operation of the BT-2 will be with "Secure" 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-Secure" mode to circumvent use of the **PUSH-TO-PAIR** button, giving any user within range the ability to connect to the BT-2.

"Non-Secure" mode is selected by setting the **SECURE MODE** DIP switch to OFF (switch down). With the switch ON, the BT-2 is in "Secure" mode.

Bluetooth ident

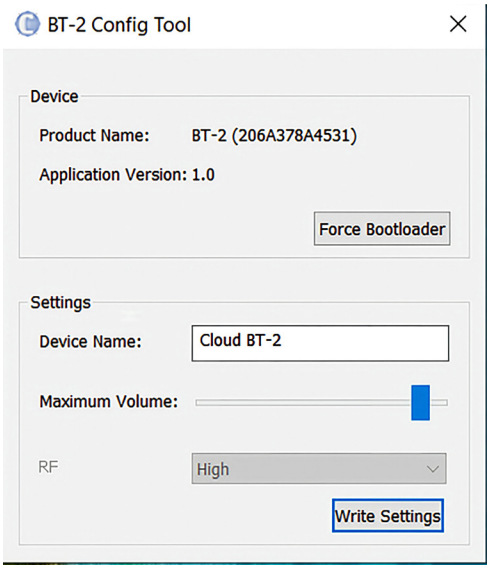
In installations where multiple BT-2s are installed, it will generally be desirable to give each a unique identifier. A downloadable software Tool allows one of 16 alphanumeric idents to be assigned to each BT-2 from a Windows-based external device (e.g., laptop).

By default, a BT-2 will appear in the Bluetooth Scan List on a user's device as "Cloud BT-2" to indicate that the BT-2 is within range. We recommend that a specific alphanumeric ident is assigned to each BT-2 in an installation where multiple BT-2s are in use.

The BT-2 Config Tool

The Config Tool can be downloaded from the BT-2 page of the Cloud website: **https://www.cloud.co.uk/product/456/bt-2/**. On this page, select the **`Resources`** tab, and then the **`BT-2_ConfigTool`** to initiate the download. The download is an .exe file and needs no additional installation: simply save it in a suitable location in the normal way.

The BT-2 must be powered in order to assign an ident. Connect the device in use to the BT-2 with a USB 'A'-to-'Micro B' cable. Run the Config Tool, and you will see the window below.



Replace the default **`Device Name`** "Cloud BT-2" with a 16 character name that will easily identify the module: we suggest using the room's name. e.g., "Classroom 1". Spaces are allowed, but are included in the character count. Click the **`Write Settings`** button. After a few seconds, the display will confirm that the new name has been assigned.

It is recommended that installers affix a printed label to each module to confirm its ident.

It is also possible to set the level of received audio that the module will pass to the host device with the **`Maximum Volume`** slider. This should be adjusted after the host device has been satisfactorily set for audio levels.

Operation

When the BT-2 first has power applied to it, the **STATUS** LED briefly flashes twice - blue, then green - to confirm correct operation.

The procedure for pairing the BT-2 to an external device is different depending on the mode selected by the rear **SECURE MODE** DIPswitch.

Normal ("Secure") mode:

This is the default mode, and will be appropriate for the majority of installations. The BT-2 is shipped with Secure mode already selected (DIPswitch UP, in ON position).

In this mode, the module will not be discoverable by any smartphone, tablet, etc. within range. Thus no connection will be in place, and it will not be possible to pair with the BT-2.

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, the BT-2 will be discoverable, and a user can select it from his/her Scan List. If pairing is successful, the **STATUS** LED will turn steady green. The BT-2's ident will now not be visible on any other Scan Lists, and therefore it will not be possible for another device to connect to it. In order for another device to connect to the BT-2, the current device must first disconnect, and the pairing procedure restarted with the **PUSH-TO-PAIR** button.

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

Disconnection may be achieved in three ways:

- from the user device – the connection is cancelled and the **STATUS** LED goes out. The BT-2's internal pairing memory 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-2 itself, by a brief press of the **PUSH-TO-PAIR** button. This has exactly the same consequences as cancelling the connection from the user device.
- From the BT-2, by pressing the **PUSH-TO-PAIR** button for five seconds. This closes any existing connection and clears the internal pairing memory. Any device that was previously connected to the BT-2 will need to reconnect with the use of the **PUSH-TO-PAIR** button as described above.

Non-secure mode:

In Non-secure mode, it is not necessary to initiate a connection with the **PUSH-TO-PAIR** button. The BT-2 will "pair" with the first device that requests pairing. Once pairing is established, no other device can discover it, in the same way as in Secure 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 "Secure" mode.

Power considerations

The BT-2 will operate from a bipolar DC power supply in the range ±12V to ±16V. 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 ±15V from their Facility Ports while the Z4/Z8MK4 and 46-120 host units supply ±12V. Host units in the DCM1 range supply ±12V from their Extension Ports.

The BT-2 consumes 20 to 24 mA from the positive rail and 4 mA from the negative rail. In the majority of installations, the host unit will have ample spare current capacity to power one or more BT-2s. 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-2, please visit **www.cloud.co.uk/resources**, where you will find additional technical information.

Cloud

www.cloud.co.uk