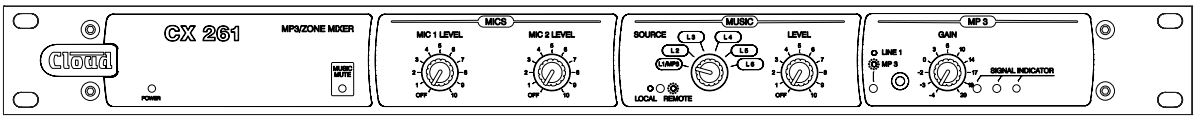
CX261
MP3/Zone Mixer



Installation and User Guide

Contents

Safety Information

Important Safety Instructions

Read these instructions.

- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING:

To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

CAUTION:

Use of controls or adjustments or performance of procedures other than those specified may result in hazardous radiation exposure.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

WARNING: SHOCK HAZARD - DO NOT OPEN

AVIS: RISQUE DE CHOQUE ÉLECTRIQUE - NE PAS OUVRIR

The lightning flash with the arrowhead symbol within an equilateral triangle, is intended to alert you to the presence of uninsulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Un point d'exclamation dans un triangle équilatéral est destiné à alerter l'utilisateur de la présence d'instructions importantes sur le fonctionnement et l'entretien (la réparation) dans la documentation accompagnant l'appareil.

The mains plug is used as the disconnect device and it should remain readily accessible during intended use. In order to electrically isolate the apparatus from the mains, the mains plug should be completely removed from the mains outlet socket.

La prise du secteur ne doit pas être obstruée ou doit être facilement accessible pendant son utilisation. Pour être complètement déconnecté de l'alimentation d'entrée, la prise doit être débranchée du secteur.

Meaning of the label: Evaluation for apparatus only based on temperate climate condition, therefore it's the only operating condition applied for the equipment .There may be some potential safety hazard if the equipment is used in tropical climate region.

L'évaluation pour les appareils est basée dans une condition climatique tempérée, donc c'est la seule condition de fonctionnement à appliquer pour l'appareil. Il peut y avoir un risque potentiel pour la sécurité si l'équipement est utilisé dans une région climatique tropical.

Meaning of the label: Evaluation for apparatus only based on altitude not exceeding 2000 m, therefore it's the only operating condition applied for the equipment .There may be some potential safety hazard if the equipment is used at altitude above 2000 m.

L'évaluation pour les appareils est basée uniquement sur une altitude inférieure à 2000 m, donc c'est la seule condition de fonctionnement à appliquer pour l'appareil. Il peut y avoir un risque potentiel pour la sécurité si l'équipement est utilisé avec une altitude au-dessus de 2000 m.

Conformities

This product conforms to the following European EMC Standards: **BS EN 55103-1:2009, BS EN 55103-2:2009**

CE This product has been tested for use in commercial and light industrial environments. If the unit is used in controlled EMC environments, the urban outdoors, heavy industrial environments or close to railways, transmitters, overhead power lines, etc., the performance of the unit may be degraded.

The product conforms to the following European electrical safety standard: **BS EN 60065:2012**

Safety Considerations and Information

The unit must be earthed. Ensure that the mains power supply provides an effective earth connection using a three-wire termination.

CAUTION – High Voltages

Do not touch any part or terminal carrying the hazardous live symbol ϟ while power is supplied to the unit.

Terminals to which the hazardous live symbol refers require installation by a qualified person.

CAUTION - Mains Fuse

Replace the mains fuse only with the same type and rating as marked on the rear panel.

Fuse type:	T1AH 250V
Fuse rating:	1 A
Fuse Size:	20 mm x 5 mm.

CAUTION – Servicing

The unit contains no user serviceable parts. Refer servicing to qualified service personnel. Do not perform servicing unless you are qualified to do so.

Disconnect the power cable from the unit before removing the top panel and do not make any internal adjustments with the unit switched on.

Only reassemble the unit using bolts/screws identical to the original parts.

OVERVIEW

Introduction

The Cloud CX261 is a 1U rack-mounting stereo audio mixer intended for use in multi-use areas where simple control of high-quality background music needs to be combined with a flexible range of paging options.

The CX261 mixes any one of six stereo line inputs with one or two microphone inputs. Separate controls for music and mic levels are provided, and music source selection and level may be controlled remotely if wished, either using standard Cloud remote control plates, or from an AV control system (e.g., Crestron, AMX, etc.). As well as the main output, there is a transformer-isolated mono auxiliary output which is suitable for providing a MOH (Music On Hold) output to a telephone system.

The mixer may be configured to operate with most paging systems: either mic input may be activated by voice (VOX) or short-to-ground access connections, and MIC 1 may have priority over MIC 2 if wished. Also, one line input may have priority over any other selected to facilitate connection of a digital sound store or similar device.

A front panel 3.5 mm jack input permits easy connection of a portable MP3 player, laptop or similar, with independent level control.

A switchable isolating transformer configures MIC 1 input for direct connection to a telephone system, enabling paging messages to originate from an extension.

EQ cards to suit various installed-sound loudspeakers may be fitted to either or both channels.

A Music Mute input is provided to allow external systems such as fire alarm panels to disable background music in the event of an emergency. This is a function that may be required by Local Authority regulations.

What's in the box

Unpack the CX261 and its accessories with care. It is always a good idea to store all packaging (if practical), in case you ever need to return the unit to your Cloud dealer for any reason.

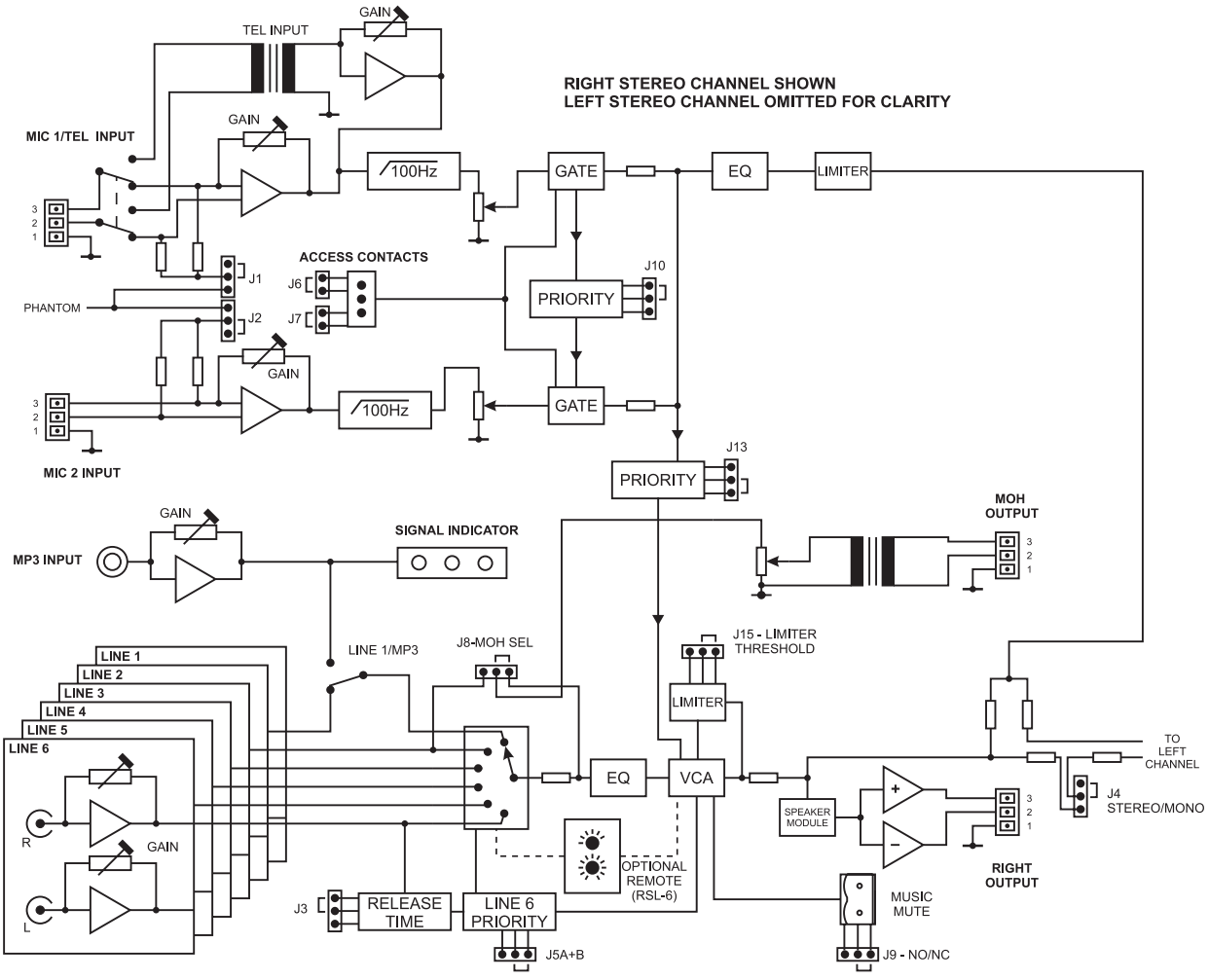
As well as this manual, the shipping carton should contain the items listed below. Please contact your Cloud dealer immediately if any of them are missing or damaged.

- Cloud CX261 Zone Mixer
- IEC mains lead (AC cord) with moulded plug appropriate to the territory
- Set of mating connectors for all rear panel screw-terminal connectors

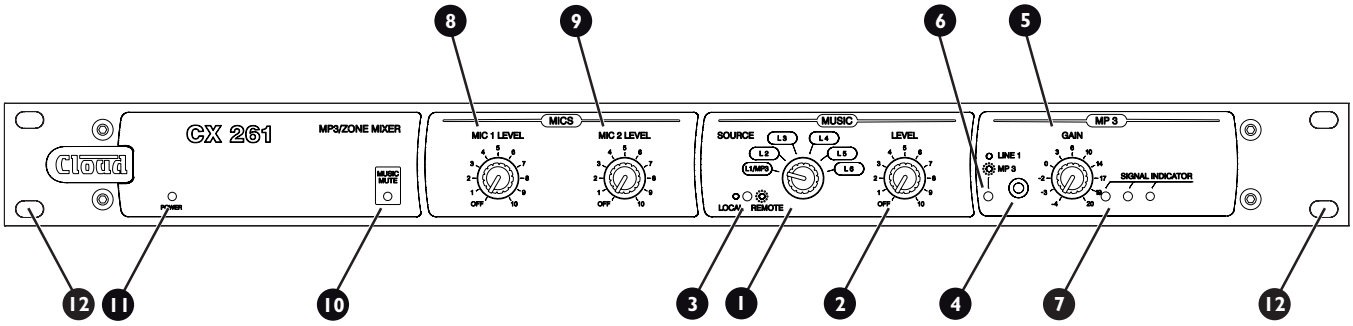
Main Features

- Stereo mic/line mixer for installed audio applications
- Six (unbalanced) stereo line inputs with individual gain controls
- Two electronically balanced mic inputs
- Front panel control of music source/level and both mic levels
- Front panel input (3.5 mm jack) for MP3 player, etc., with gain control (overrides rear panel LINE 1 input) and LED level indication
- Separate HF & LF EQ adjustments for music and mic sources
- Bi-colour LEDs to aid mic gain adjustment
- MIC 1 input configurable as transformer-isolated line input (with separate gain control) for connection to phone system
- MIC 1 priority over MIC 2 (selectable)
- Short-to-ground access connector or VOX-triggered voice-over-music priority on both MIC 1 and MIC 2 inputs
- Selectable LINE 6 priority with choice of release times
- Music Mute control input (N/O or N/C) for interface to emergency system
- Compatible with standard Cloud remote control plates: RL-1 Series (music level) and RSL-6 Series (music level and source selection)
- Electronically-balanced stereo main output
- Mixer can be configured by internal jumper for mono operation
- Transformer-isolated mono auxiliary output for use with telephone MOH systems
- Aux output source selection (internal jumper) – follows main output or always LINE 2
- Optional speaker EQ cards available
- 1U 19" rack mounting unit

Block Diagram

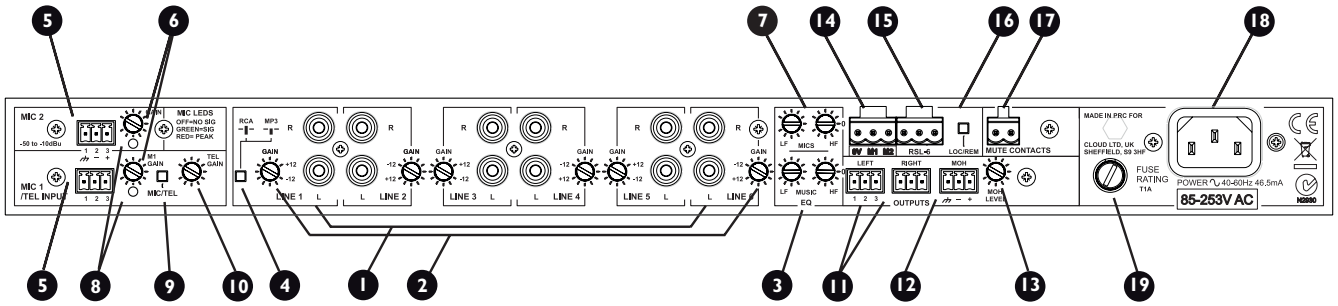


Description of front panel



1. **MUSIC SOURCE** – selects one of Music inputs L1 to L6.
2. **MUSIC LEVEL** – adjusts level of selected Music input.
3. **LOCAL/REMOTE** LED – indicates (green) when remote source selection is enabled.
4. **MP3** input – 3.5 mm stereo jack socket for connection of non-permanent external source.
5. **MP3 GAIN** – adjusts gain of the MP3 input.
6. **LINE 1/MP3** LED – indicates (green) when the MP3 input is enabled.
7. **SIGNAL INDICATOR** – 3 LEDs (green/yellow/red) indicating level of MP3 input.
8. **MIC 1 LEVEL** – adjusts level of Mic input 1.
9. **MIC 2 LEVEL** – adjusts level of Mic input 2.
10. **MUSIC MUTE** – indicates (red) when external Music Mute is active.
11. **POWER** – green LED, confirms power is applied to the unit.
12. Rack mounting ears – the unit may be rack-mounted in a standard 19" equipment rack. It requires 1U of rack height.

Description of rear panel



1. **LINE 1 to LINE 6** – stereo line inputs for music sources.
2. **GAIN** – gain trims for each line input.
3. **LF** & **HF MUSIC EQ** – low and high frequency EQ adjustment for music channel.
4. **RCA/MP3** – push-button switch: press in to replace LINE1 RCA connectors with front panel MP3 input.
5. **MIC 1 and MIC 2** – balanced mic inputs.
6. **GAIN** – gain trims for each mic input.
7. **LF & HF MICS EQ** – low and high frequency EQ adjustment for mic channel.
8. **MICS** LEDs – bicolour LEDs to aid mic level adjustment.
9. **MIC/TEL** – push-button switch: press in to reconfigure MIC 1 input for use with telephone system.
10. **TEL GAIN** – MIC 1 input gain adjustment in TEL mode.
11. **LEFT** & **RIGHT OUTPUTS** – balanced main L & R outputs.
12. **MOH OUTPUT** – balanced auxiliary output for use with MOH systems.
13. **MOH LEVEL** – level control for MOH output.
14. Access control connector – external paging control inputs for MIC 1 (**M1**) and MIC 2 (**M2**)
15. **RSL-6** – remote music control connector for RL-1 or RSL-6 remote control plates.
16. **LOC/REM** – disables front panel controls when remote control is in use.
17. **MUTE CONTACTS** – emergency control input for muting music source.
18. IEC mains input.
19. Mains fuse.

INSTALLATION

Hardware Considerations

The CX261 Zone Mixer is built in a 1U-high 19" rack mount enclosure. It is recommended that the Zone Mixer is installed in a 19" rack wherever possible. The unit is approx. 150 mm deep, but 250 mm of rack depth should be available to allow for rear connectors and cabling.

The CX261 has low power consumption and there should be no thermal problems. Other equipment may be installed above or below the CX261.

The choice of location will be dictated by the specifics of the system and building layout. It is recommended that wherever possible, the CX261 should be mounted in an equipment rack along with as many of the music sources (CD players, music servers, TV receiver boxes, etc.) and audio power amplifiers (driving the zone loudspeakers) as practical.

When deciding the Zone Mixer's location, bear in mind that access to it will probably be required even if a full complement of remote controls is being fitted as part of the system, as some adjustments can only be made on the mixer itself.

Power Supply

The CX261 is fitted with a Universal power supply which can operate on mains voltages from 85 to 253 V. An IEC mains cable with a plug appropriate for your country is supplied. The unit's power consumption is 10.1 W.

Fuses and ratings

The only user-accessible fuse is an AC mains fuse on the rear panel. **Only replace a fuse with one of exactly the same type.** The fuse rating is 1 A; the type is a T1AH, size 20 x 5 mm, with high breaking capacity.

System Connections

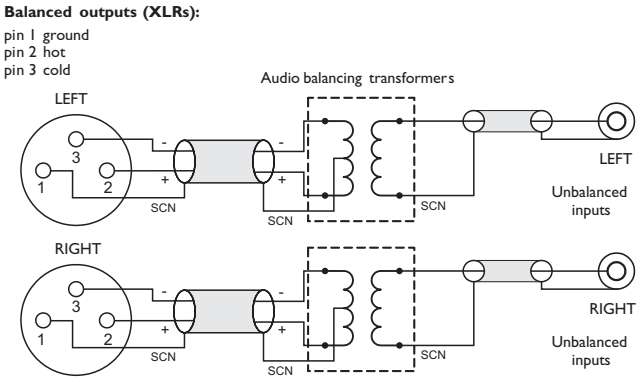
Music Sources

Connect the system's various music sources to inputs **LINE 1** to **LINE 6**. The inputs are unbalanced, on standard RCA jacks (phono sockets). All six inputs are stereo, with separate L and R connectors. The left and right channels remain separate for the main stereo output but are summed to mono for the Aux/MOH output. If connecting a mono source with only a single output, it may be connected to either the left or the right input (but see "Stereo/mono operation" on page 16 re configuring main output for mono operation). The sensitivity range available should allow most standard items of audio equipment such as computers/tablets, music servers and media receivers, etc., to operate at a satisfactory level.

Note that Line 6 input can be configured to have priority over any other music source, see "Line 6 priority" on page 16; Line 1's rear panel input can be disabled in favour of the front panel MP3 input, see "Front panel MP3 input" on page 11.

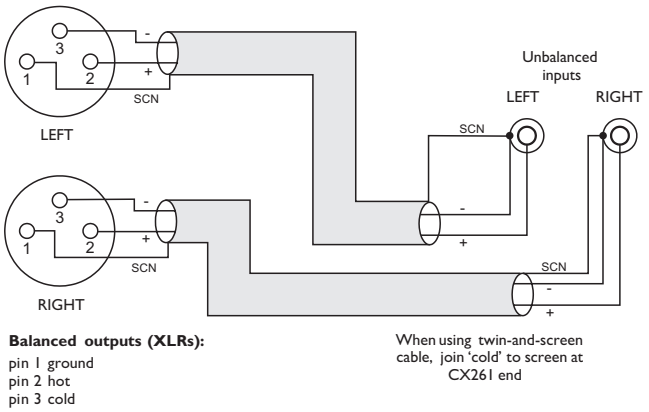
Provided the music source is adjacent to the Zone Mixer, normal phono-phono (or 3.5 mm jack-to-phono leads can be used). Always avoid using pre-made leads of an unnecessary length.

If it is necessary to connect an item of source equipment with a balanced output, the ideal method is to use a balancing transformer between the source and the unbalanced input. Suitable audio transformers, which should have a ratio of 1:1, are readily available from major audio component suppliers. The transformer(s) should be mounted as close to the Zone Mixer as practical, and housed in a screened enclosure if they are not individually screened. The preferred connection method is shown below.



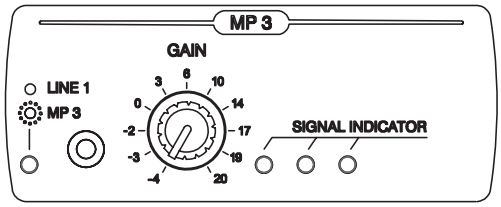
If transformers are not available, a balanced source may feed an unbalanced input directly as long as care is taken over how the connections are made. A variety of design techniques are in use to implement balanced outputs in audio equipment, and some designs require different wiring protocols to others. Installers are advised to check the manuals with each item for guidance on how the outputs should be connected to an unbalanced input.

However, the wiring methods shown below will work in a large number of cases:



Front panel MP3 input

To facilitate easy connection of digital audio devices such as portable MP3 players or laptop computers, a 3.5 mm stereo jack socket is provided on the CX261's front panel ([4] at "Description of front panel" on page 8).



The MP3 input replaces Line input 1, and will only operate if the **MUSIC SOURCE** switch is set to L1/MP3. The front panel **MP3** jack socket is selected instead of the rear panel **LINE 1** phono sockets by setting the **RCA/MP3** switch on the rear panel ([4] at "Description of rear panel" on page 9) to MP3. A green LED on the front panel ([6] at "Description of front panel" on page 8) illuminates to confirm the selection. When the MP3 input is selected, the music source connected to **LINE 1** will no longer be available.

Microphone inputs

MIC 1 and **MIC 2** inputs are intended for the direct connection of microphones. They are electronically balanced and transformerless with an input impedance of greater than 2 kohms and optimised for use with microphones of 200 to 600 ohms impedance. The screw terminal input connectors should be wired thus:

PIN	CONNECTION
1	Screen
2	Signal '-' (cold)
3	Signal '+' (hot)

Unbalanced microphones may be used by connecting pin 2 to pin 1 (cable screen) in the mating (male) screw-terminal connector. 12 V phantom power is available, see "Phantom Power" on page 15.

Each mic input may be routed to the main output at any level. All microphone announcements automatically reduce the music level in that zone while the announcement is in progress; MIC 1 input also has priority over MIC 2 input (see "Microphone Over Music Priority" on page 17 for full details.)

Use of Mic 1 input with telephone system

MIC 1 input on the CX261 may be reconfigured to accept an audio input directly from a compatible telephone system. This permits announcements to be made from some (or any) internal telephone extensions in a building. Not all telephone systems are suitable for this application, and the system documentation should be consulted in detail to ensure compatibility.

In TEL mode, full galvanic isolation is provided between the CX261 and the telephone system. The audio (or "paging") output of the phone system should be connected to the **MIC 1** input in the normal way. The impedance of the input in TEL mode is 600 ohms; this should be suitable for the majority of telephone systems. If the telephone system requires a high input impedance, internal jumper J16 may be removed to provide an input impedance of 48 kohms. See page 20 for location of internal jumpers.

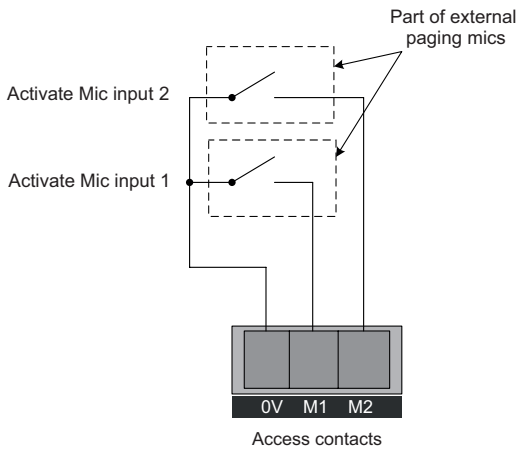
The **TEL GAIN** preset gain control ([10] at page 9) should be adjusted with a test call from the telephone system. Note that the front panel **MIC 1 LEVEL** control is still operational.

Paging Access Control

Access control for both microphone inputs is provided to allow the CX261 to be interfaced to single-zone paging mics such as the Cloud PM1. The access contacts work on the short-to-ground system, which is compatible with the majority of paging microphones.

The CX261 is shipped with the access control input disabled for both microphone inputs. This allows immediate use with standard microphones not fitted with PTT (Press-to-Talk) switches. If external access control is required, the internal jumpers J6 (Mic 1) and J7 (Mic 2) must first be removed. See page 20 for location of the jumpers.

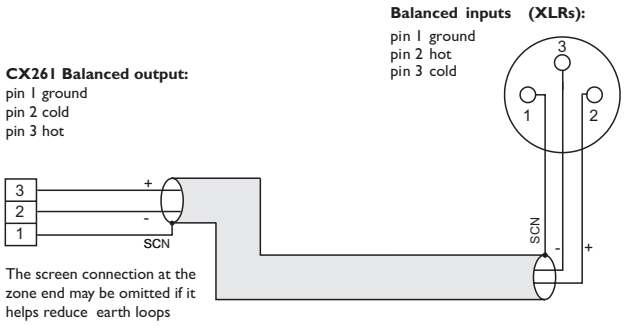
The access control input is a 3-pin 5 mm-pitch screw terminal connector on the rear panel ([14] at page 9). Mic input 1 becomes active when **M1** is connected to **0V**; Mic input 2 becomes active when **M2** is connected to **0V**.



See also the section "Priorities" for further information on the use of the CX261 with paging microphones.

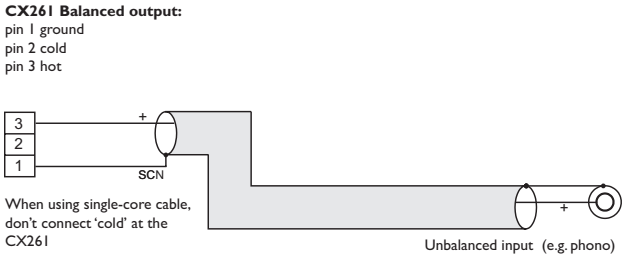
Main Output

Connect the inputs of the power amplifiers feeding the loudspeakers for each zone to the **LEFT** and **RIGHT OUTPUT** connectors. Note that the main output is stereo by default; it may be reconfigured to operate in mono by moving internal PCB jumper J4 (see page 20). The outputs are balanced and will drive input impedances down to 600 ohms. Nominal output level is 0 dBu (775 mV). The output is designed to drive professional/industrial power amplifiers with balanced inputs (typically on XLRs). In this case, wire as the diagram below. Note that the screen can be left unconnected at the source end if earth loops are a problem.

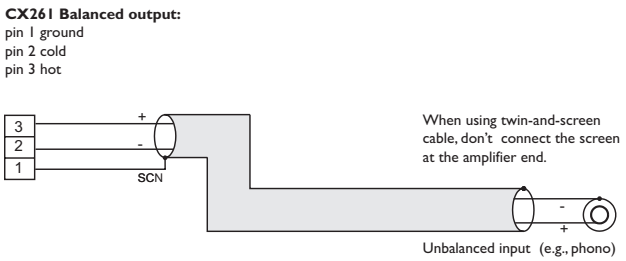


Amplifiers with unbalanced inputs:

If audio amplifiers with unbalanced inputs are being used (e.g., hi-fi amplifiers), the following wiring should be adopted:



Using single-core cable.



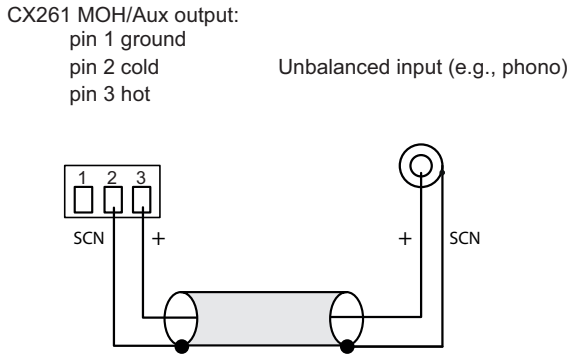
Using twin-core cable.

MOH/Auxiliary Output

The MOH (Music On Hold), or auxiliary output, provides a transformer-isolated L+R mono sum of the music channel. This is intended to provide a continuous music feed for use with a telephone system. If it is not required for this, it may be used as a auxiliary mono output for another suitable purpose. However, it should be noted that a fixed LF filter reduces bass frequencies from this output to optimise it for use with telephone systems. The microphone inputs are not mixed into this output, so that internal paging announcements are not heard by telephone callers. This fact should be borne in mind if the output is used for some other purpose.

The output is a 3-pin 3.5 mm-pitch screw terminal connector on the rear panel ([12] at page 9). The output level is -6 dBu (nominal) and is suitable for driving 600 ohm loads.

The output is transformer-coupled to provide full galvanic isolation from a telephone system. Because of this, pin 2 (cold/-) must always be connected. If wiring to an unbalanced input, the convention shown below should be followed:



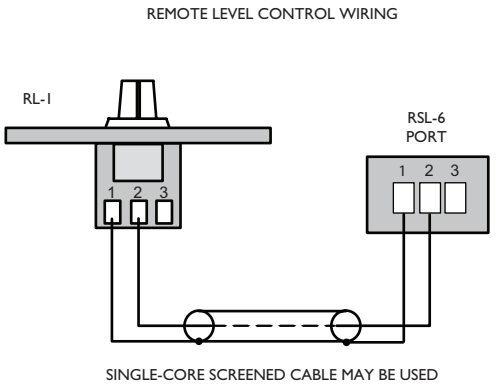
Music Control

Like many other Cloud products, the CX261 allows remote control of music level and source selection. Cloud remote control plates from the RL-1 Series (music level only) and RSL-6 Series (music level and source selection) provide an elegant solution, though control via a DC voltage from third-party systems is also possible (see "Control of music source and level via external DC" on page 18).

Both types of remote control plate connect via the RSL-6 port (see [15] on "Description of rear panel" on page 9). This connector is a 3-pin 5 mm-pitch screw terminal type.

Connecting an RL-1 Series remote control plate

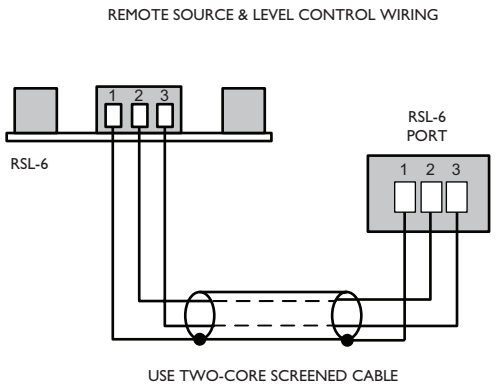
Wire the remote control plate as shown below. Either single-core screened or twin-and-screen cable may be used; in the case of the latter, ignore one of the cores. Maximum reliable cable run is 100 m.



Before the RL-1 will operate, the **RSL-6** port must be enabled by setting the adjacent **LOC/REM** push-button switch ([16] on page 9) to REM (i.e., pressing it in). In this setting, the front panel **MUSIC LEVEL** and **SOURCE** controls become inoperative. As music source selection will still be required from the mixer's front panel when an RL-1 is in use, the REM setting may be overridden for the source selection control only by moving internal jumper J14 to FR on the internal PCB. See page 20 for location of internal jumpers.

Connecting an RSL-6 Series remote control plate

Wire the remote control plate as shown below. Twin-and-screen cable should be used. Maximum reliable cable run is 100 m.



Before the RSL-6 will operate, the **RSL-6** port must be enabled by setting the adjacent **LOC/REM** push-button switch ([16] on page 9) to REM (i.e., pressing it in). In this setting, the front panel **MUSIC LEVEL** and **SOURCE** controls become inoperative.

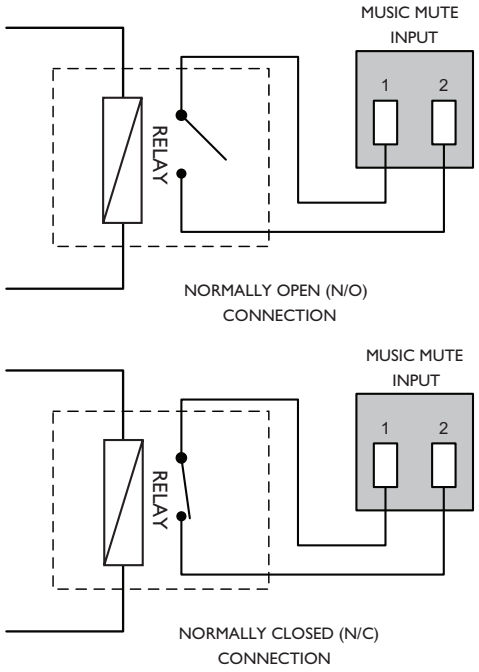
Music Mute

External muting of music is available at the **MUTE CONTACTS** connector ([17] at "Description of rear panel" on page 9). National or Local Authority regulations governing such systems may require that normal programme material (i.e., music) should be muted in an emergency, to ensure that any emergency messages are clearly audible.

The Music Mute input is on a 2-pin 5 mm-pitch screw-terminal connector. It should be connected to the appropriate alarm output on whichever building management system registers the alarm (typically the Fire System). The alarm output must be volt-free; if no such output is available, an intermediate relay or other isolation device must be installed between the alarm output and the Music Mute input.

The Mute input can be set to operate on either normally open (N/O) or normally closed (N/C) contacts via an internal jumper (see "PCB jumper location and settings" on page 20). The factory default setting is N/O, thus requiring a short-circuit to be applied across the two pins of the connector for muting to occur.

Visual indication of muting being activated is given by the **MUSIC MUTE** LED on the front panel.



SETTING UP & OPERATION

Music Inputs

Gain & level

To avoid dramatic changes in volume when switching between sources, the CX261's music inputs are provided with preset gain trim controls ([2] on "Description of rear panel" on page 9). These vary the input sensitivity from -12 dBu to +12 dBu (approx. 200 mV to 3.1 V). When setting the system up, play audio from all the sources in use and listen to them one at a time at a reasonable volume. Taking a source of "average" volume as the reference, the gain controls of the others should be adjusted so that there is no appreciable difference in volume between any of the sources. (With a typical music source, setting the gain on its channel to mid-way is a good starting point.) Note that consideration may need to be given to the type of programme in use, particularly if one or more sources are TV sound.

In normal operation, the music level is set with the **MUSIC LEVEL** control on the front panel ([2] on "Description of front panel" on page 8). This control will not be operative if the rear panel **LOC/REM** push-button is set to REM. When setting the audio system up, set the gain controls (if any) on the power amplifier(s) to minimum, then turn the **MUSIC LEVEL** control on the mixer to maximum. Then increase the zone volume by turning up the power amplifier gain until it is as loud as will be required in normal use. This method ensures that excessive volumes will not be possible with the mixer's operational controls.

Note that the setting of the **MUSIC LEVEL** control has no effect on microphone or paging volume.

Front panel MP3 input

The MP3 input is enabled by setting the rear panel **LINE 1/MP3** switch to MP3, and then selecting **LINE 1/MP3** on the front panel **MUSIC SOURCE** selector switch. To allow for the wide range of signal levels which may be encountered from portable audio devices, the MP3 input is provided with its own level control and signal level LEDs ([5] and [7] respectively at page 8). The range of sensitivity adjustment is from -20 dBu (with the control fully clockwise, at "20") to +4 dBu (with the control fully anticlockwise at "-4").

Three LEDs are fitted to the front panel to aid level adjustment. The LEDs illuminate at the levels shown in the table:

LED	LEVEL
Green	-21 dBu
Yellow	-6 dBu
Red	+1 dBu

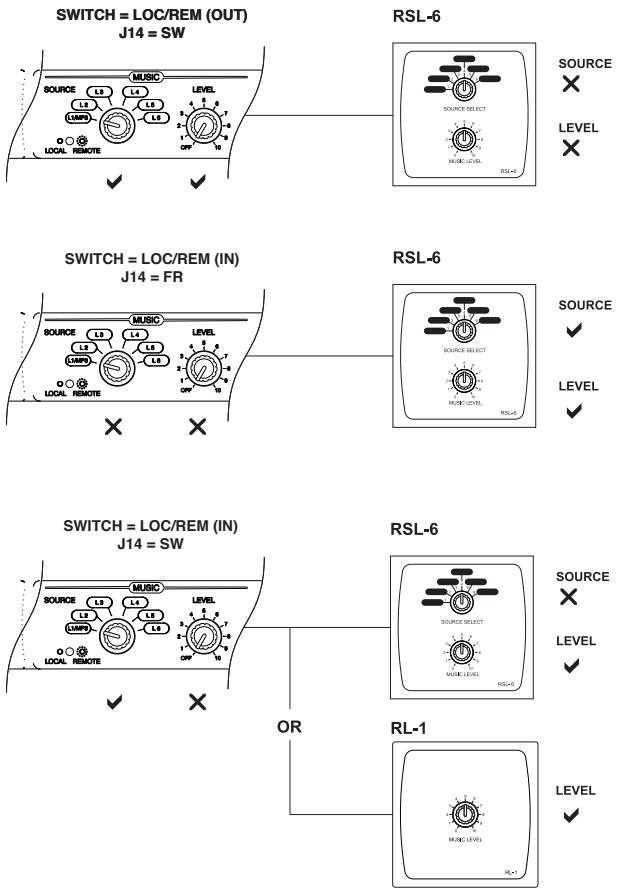
With an MP3 player (or other source) connected to the MP3 input and playing, and the MP3 input selected, the level control should be adjusted so that the green and yellow LEDs are on more or less continuously and the red LED only on during the louder passages.

Local/remote control

If an RL-1 or RSL-6 Series remote control plate is in use, the rear panel **LOC/REM** push-button must be set to REM (button in) for the remote control to be operative and for the corresponding front panel controls to be disabled. If remote control is not required, the switch should be left at LOC (button out).

The setting of the internal PCB jumper J14 is also relevant. The default setting for this jumper is SW. This means that music source selection for the zone will be determined by the zone's rear panel **LOC/REM** switch position: it will be via the front panel **MUSIC SOURCE** control when it is set to LOC and via a remote plate or other external control when it is set to REM. If J14 is moved to its alternative setting of FR, the source selection will always be made with the front panel control whatever is connected at the rear panel or the setting of the **LOC/REM** switch. If external control of music level only (i.e., not source selection) is required, the jumper should be set to FR and the **LOC/REM** switch to REM.

The diagrams below summarise the options:



Music EQ

Treble and bass equalisation for the music signal is provided via rear panel pre-set **MUSIC EQ** controls ([3] at "Description of rear panel" on page 9). This allows the installer to tailor the response of the Zone Mixer's music channels to suit the acoustics and loudspeakers in each zone. The EQ controls are marked **HF** and **LF**; the HF control has a range of +/-10 dB at 10 kHz and the LF control a range of +/-10 dB at 50 Hz. A flat frequency response is achieved by positioning the slots on the controls in the horizontal plane.

Note that the **MUSIC EQ** controls do not affect the music signal at the MOH/Auxiliary output.

Music Limiter

The music channel of the CX261 incorporates a limiter circuit to help prevent inadvertent overloading of subsequent power amplifier input stages and ultimately, the installed loudspeakers. The limiter has no external controls. If the music input gain and level controls are set correctly, the limiter action should be inaudible on normal programme material, with no compression artefacts.

The threshold of the music limiter is factory set at 0 dBu, thus signal peaks above this level will be limited. A higher threshold of +6 dBu can be set by moving internal jumper J15 (see "PCB jumper location and settings" on page 20 for jumper location); this will give improved fidelity, and may be appropriate if the installer is confident about the dynamic range of the programme material.

If there is dynamics control elsewhere in the system (e.g., in the form of an external compressor/limiter or within a DSP-based unit), or if limiting is considered undesirable, the limiter may be by-passed by removing J15 from the PCB header.

Microphone Inputs

Phantom Power

Each microphone input has 12 V phantom power available. This will be adequate to power a wide range of condenser microphones. (Some "studio quality" mics may require a higher phantom voltage and thus necessitate an external PSU.) To enable phantom power at the mic inputs, the internal PCB jumpers J1 (Mic 1) and/or J2 (Mic 2) should be moved to their ON positions. See "PCB jumper location and settings" on page 20 for jumper locations.

Phantom power should NOT be enabled if dynamic microphones are to be used.

Gain & level

Each microphone input is provided with a rear panel preset **GAIN** control ([6] at page 9). A wide range of gain is available (10 to 50 dB), and there should be no problem in obtaining a satisfactory level from any normal microphone.

Immediately below each **GAIN** control is a bi-colour (green/red) LED ([8] at page 9) which monitors input signal level. These can be used to adjust the **GAIN** preset. During an announcement made in a normal speaking voice, adjust the **GAIN** control so that the LED (for the mic input in use) illuminates green fairly steadily. An occasional red flash is acceptable, but If red shows persistently, turn the **GAIN** control down slightly. Note that a signal level of -24 dBu is required to trigger the green LED while a level of 0 dBu will initiate limiter action (see "Microphone Limiter" on page 16), which may have an audible effect on audio quality.

In normal operation, the mic level in each zone is set with the **MIC 1 LEVEL** and **MIC 2 LEVEL** controls on the front panel ([8] & [9] on "Description of front panel" on page 8).

EQ

Two-band equalisation adjustment is provided for the microphone signals: note that these affect both **MIC 1** and **MIC 2** inputs. The **MICS EQ** pre-set controls are on the rear panel ([7] at "Description of front panel" on page 8). The equalisation is optimised for the tonal correction of speech signals: the **HF** control provides +/-10 dB at 5 kHz whilst the **LF** control provides +/10 dB at 100 Hz. A flat frequency response is achieved by positioning the slots on the controls in the horizontal plane.

High Pass Filter

Each mic input has a fixed 100 Hz high-pass filter to remove the lowest frequencies. This helps to reduce the effects of breath blasts and microphone handling noise. The filter is always in circuit.

Microphone Limiter

The microphone channel incorporates a limiter circuit to prevent amplifier and speaker overloading and also to help maintain more constant speech volume when the system is used by different announcers. The limiter is set to restrict the mic signals to a nominal 0 dBu, and if the mic gain and level are set correctly, should be inaudible in operation on normal speech. There are no internal or external controls.

Use of Mic 1 input with a telephone system

MIC 1 input may be reconfigured to accept an audio input directly from a compatible telephone system.

The **MIC/TEL** button on the rear panel ([9] at page 9) should be in the TEL position (in) for this application. This inserts a transformer in series with the input connector to provide full electrical isolation from the telephone system, together with an independent gain control stage.

The **TEL GAIN** preset gain control ([10] at page 9) should be adjusted with a test call from the telephone system. Note that the front panel **MIC 1 LEVEL** control is still operational.

Main Outputs

In normal operation, the music level will be set by the front panel **MUSIC LEVEL** control, or by a corresponding control on a remote plate. Follow the procedure described previously (page 15) to adjust the music level in each zone.

Stereo/mono operation

The CX261 is a 2-channel device, and is intended to be used where full stereo reproduction of music sources is desirable. If the installation does not require full stereo operation (which will generally be dictated by room layout and loudspeaker placement), mono mode should be selected. Mono mode is enabled by moving internal jumper J4 from STEREO to MONO.

In mono mode, the **LEFT** and **RIGHT** outputs will carry identical programme at the same level. Either or both may be used as wished.

Note that stereo music sources should still be connected to both L and R line inputs in the normal way. However, when mono operation is enabled, any mono music sources may be connected to either L or R only.

MOH/Auxiliary Output

The signal level at the MOH/Aux output can be set independently, via the rear panel preset **MOH LEVEL** control ([13] at page 9). The output level is zero with the control fully anticlockwise. Note that the signal at this output is NOT altered by the front panel **MUSIC LEVEL** control or the rear panel **MUSIC EQ** preset adjustments.

Source Selection

If the output is to be used as an auxiliary mono feed, it will generally need to follow the normal music source selection. This is the factory default configuration. If Music Priority is enabled (see "Line 6 priority"), the MOH/Auxiliary output will switch to Line 6 along with the main outputs if the input becomes active.

However, when in use as an MOH source, it is generally more desirable for the music source (typically a CD jukebox or music server) to remain constant, and not vary with the front panel **MUSIC SOURCE** control. For this purpose, the source for the auxiliary/MOH output can be altered, by moving internal jumper J8 from **SEL** to **LINE 2**. The music source that is intended to provide the Music On Hold programme should be connected to **LINE 2**. See "PCB jumper location and settings" on page 20 for location of the internal jumper.

In either case no microphone signals are present at the MOH/auxiliary output, thus announcements made via the microphone inputs do NOT interrupt music programme at this output, regardless of any priority settings.

Priorities

The CX261 offers several options for determining what happens to music signals when announcements are made. The options are selected via internal jumpers, and should be set to suit the requirements of the installation when the system is installed. See page 20 for location of the internal jumpers.

Line 6 priority

Line input 6 can be set to have priority over other music inputs. When set, the CX261 will automatically switch the music source to Line 6 when the signal level at Line 6 input exceeds -30 dBu (approx.) The input set by the source selection switch is temporarily deselected until the signal at Line 6 input stops, when it resumes, smoothly increasing in level to its former volume. The restoration time is selectable, options are 3, 6 or 12 seconds.

This facility is useful with sources such as spot announcement players, jukeboxes, digital sound stores or similar, as audio from these sources will always automatically replace any previously selected programme for its duration.

Music Priority is set by moving internal jumpers J5A and J5B from OFF to ON. See page 20 for location of internal jumpers.

The factory default restoration time is 3 seconds. This may be too short in some cases; for example, if a jukebox was to take

more than 3 seconds between the end of one track and the start of the next. In such a case, longer restoration times of 6 or 12 seconds may be set to ensure that the CX261 does not revert back to the selected music source in between tracks.

Restoration time is set by internal jumper J3. Moving the jumper position on the 3-pin header changes the restoration time from 3 s to 6 s; removing the jumper altogether sets a time of 12 s. See "Microphone Over Music Priority" below for more information.

Note that Music Priority applies to both the main outputs and the MOH/Auxiliary output.

Microphone Priorities

The microphone inputs on the CX261 may be configured so that when they are in use, they take priority over the music programme; additionally, Mic input 1 may be set to take priority over Mic input 2.

There are two methods of triggering the microphone priority circuitry: signal detection (AVO) or via the zone access contacts on the rear panel (ACC). The choice is made by internal jumpers J11 (Mic input 1) and J12 (Mic input 2); note the two mic inputs may be set differently if wished. See page 20 for location of the jumpers.

The factory default is for both mic inputs to be set to AVO (Automatic Voice-Over). In this mode, the priority circuit is triggered by the presence of a signal at the microphone input. The alternative ACC jumper setting triggers the priority by contact closure when the access contacts are enabled. ACC priority should only be selected when a suitable paging microphone is used.

Note that priority detection may be disabled by removing J11/J12. In this state, the mic channels will still operate normally, but music programme will remain at full level, and the two mic inputs will be mixed together if both are active simultaneously.

Microphone Over Music Priority

The priority circuitry is configured at the factory to mute the music programme when an announcement is made. At the completion of the announcement, the music ramps back up to its original level over a time period of 3, 6 or 12 seconds, according to the setting of J3. The muting action can be overridden by moving internal jumper J13 from the ON position to the OFF. See page 20 for location of internal jumpers.

Mic 1 Over Mic 2 Priority

In installations where both mic inputs are being used, it is possible for announcements to clash if the mics are active simultaneously. By default, the CX261 allows both microphones to access the system simultaneously. **MIC 1** may be given priority over **MIC 2** by moving internal jumper J10 from the OFF position to the ON. (See page 20 for location of internal jumpers.) Then, if **MIC 1** is already making an announcement, **MIC 2** will not be able to access the system. Also, if **MIC 2** is making an announcement and **MIC 1** then becomes active, **MIC 2**'s announcement will be curtailed and **MIC 1**'s will take over.

RL-1 Series and RSL-6 Series remote control plates – general considerations

Cloud RL-1 Series and RSL-6 Series remote control plates are available in three form factors: two fit single-gang UK or American electrical back boxes respectively, while the third is a 50 x 50 mm "Media" module, suitable for "Euro-module" mounting frames available in most European countries. Back boxes of either the recessed type or surface-mounting type may be used, providing they are at least 25 mm deep.

Each plate should be connected to the rear panel **RSL-6** port using single- or twin-core screened cable as described at "Music Control" on page 12. The plate terminations are conventional screw terminals and the **RSL-6** port on the mixer is a 3-pin 5 mm-pitch screw terminal connector.

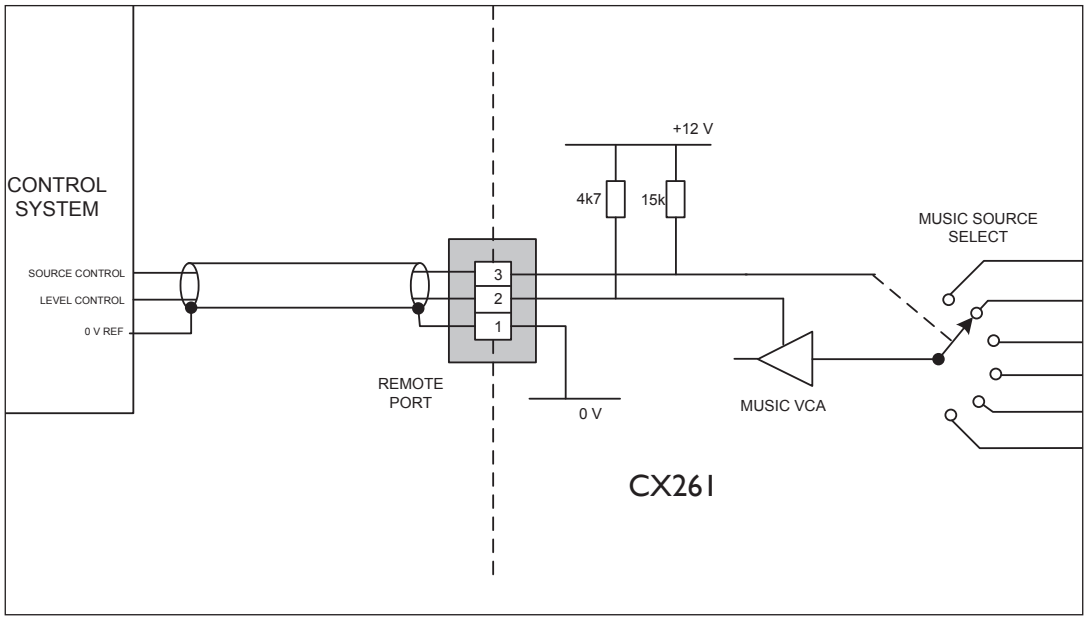
The remote control plates are passive and thus do not draw any significant current from the mixer.

Control of music source and level via external DC

It may be necessary in some installations to adjust the music level and select music source from an external control system (e.g., Crestron, AMX, etc.). If the **RSL-6** port is not required for an RL-1 or RSL-6 Series remote control plate, it may be used to receive DC voltages from the external system to effect these adjustments.

Both music source selection and level can be controlled over their full ranges with a DC voltage of 0 to +10 V. The pinout of the **RSL-6** port is as follows:

PIN	USE
1	0 V ref.
2	Music level control (0 to +10 V)
3	Music source selection (0 to +10 V)



NOTE: If the control voltage source is not isolated from the power earth, there is a small risk of creating a 'ground loop' by linking the mixer technical ground (0 V) to the ground (0 V) of the equipment supplying the control voltages. To minimise this risk, we suggest that all pieces of equipment be in close proximity, and supplied from the same power outlet.

Music level

Music level in a zone may be varied over its full range by applying a DC voltage of between 0 and +10V to pin 2, the 0V reference being connected to Pin 1. 0V on pin 2 corresponds to full level and +10V will produce maximum attenuation. Between these two voltages, the rate of attenuation is approximately 165 mV/dB.

Note that there is an internal 4k7 "pull-up" resistor between pin 2 and the internal +12V rail. If pin 2 is left "floating", this pull-up will result in full attenuation. The output impedance of the control voltage source should be low enough to overcome the effect of this resistor.

Music source

Music source for a zone may be controlled by applying various DC voltages of between 0 and +10V to pin 3, the 0V reference being connected to pin 1. 0V at pin 3 will select Line input 6 and between +7.5 and +9V will select Line input 1. The other line inputs will be selected with intermediate voltages. Taking pin 3 above +9V will deselect all inputs, making the zone effectively 'off' for music.

The table below lists the DC voltages required at pin 3 to select each line input. The third column is the value of a resistor which should be connected between pins 1 and 3 to permanently 'force' a zone to a particular line input.

INPUT	DC VOLTAGE	RESISTOR VALUE
OFF	>+9.0V	
Line 1	+7.5V	16k
Line 2	+6.0V	11k
Line 3	+4.5V	6k8
Line 4	+3.0V	3k9
Line 5	+1.5V	1k8
Line 6	0V	short-circuit

Note that there is an internal 15k "pull-up" resistor between pin 3 and the internal +12V rail. If pin 3 is left "floating", this pull-up will cause 'OFF' to be selected. The output impedance of the control voltage source should be low enough to overcome the effect of this resistor.

Fitting loudspeaker EQ cards

The CX261 is compatible with various popular installed-sound loudspeakers; a single-channel loudspeaker equalisation module may be fitted in the left or right channel of the main output (either or both) to optimise the frequency response of the channel to the loudspeaker type being used. Note that there is no provision for fitting an equalisation module to the MOH/Auxiliary output.

Please check the Cloud website (www.cloud.co.uk/accessories) for makes and models of loudspeakers for which EQ cards are available.

1. Switch off the power and isolate the CX261 from the mains.
2. Remove the top panel (6 screws).
3. Plug the equalisation module onto its connector; note that the connector has two notches on one side which engage with lugs on the module's mating connector to ensure correct orientation.
4. Replace the top panel.

See the Appendix section "PCB jumper locations and settings" at page 20 for further details. Replace the top cover with the original screws after fitting.

APPENDIX

PCB jumper location and settings

The CX261 has various internal PCB-mounted jumpers, the setting of which may require alteration during installation. The table below lists each switch and jumper and its purpose, together with the factory default setting.

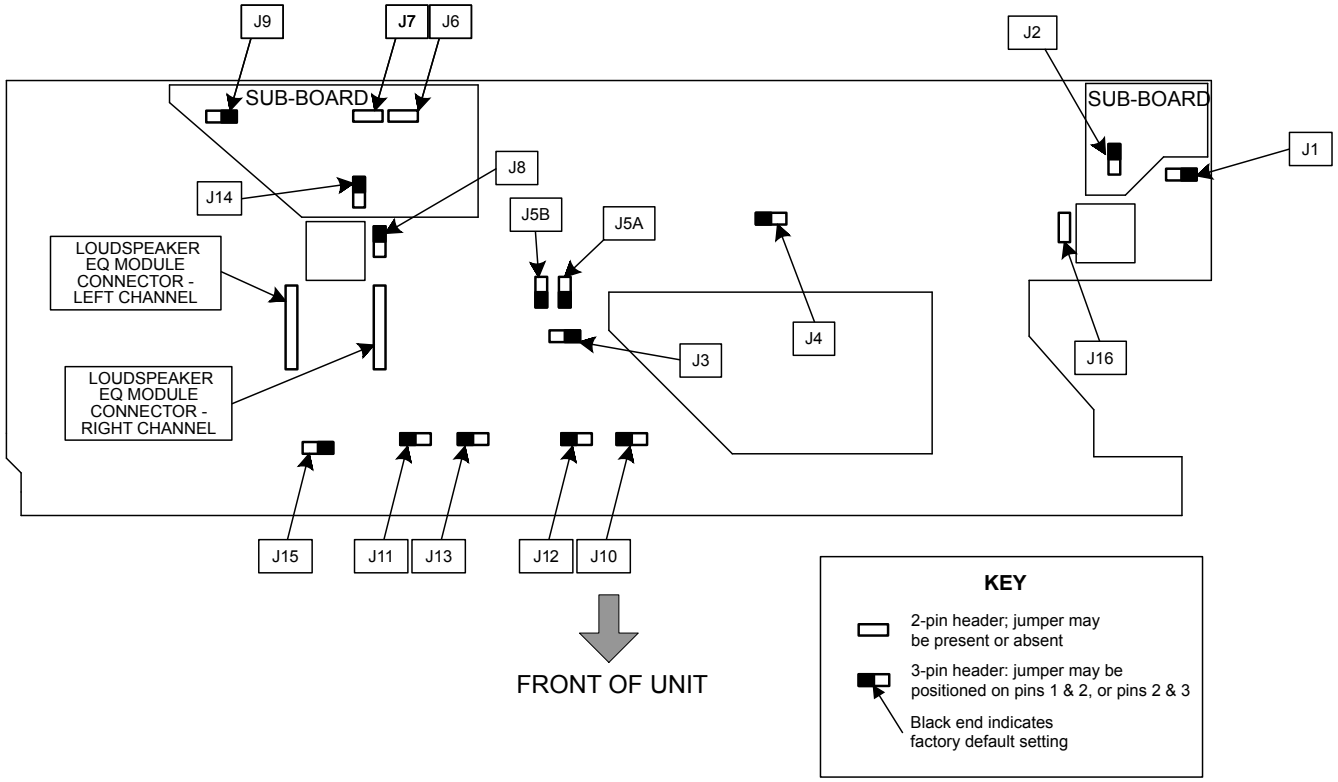
JUMPER	FUNCTION	SETTINGS	DEFAULT
J1	Mic 1 phantom power	OFF: Mic phantom power OFF ON: Mic phantom power ON	OFF
J2	Mic 2 phantom power		
J3	Priority release time	3S: 3 seconds. release time 6S: 6 seconds release time ABSENT: 12 seconds release time	3S
J4	Mono/stereo operation	MONO: L&R music inputs are summed STEREO: normal operation	STEREO
J5 (A&B)	L6 priority (left & right)	OFF: no priority – normal operation ON: L6 has VOX-triggered priority over other sources	OFF
J6	MIC 1 access bypass	PRESENT: MIC 1 always active ABSENT – use M1 pin on access port to activate MIC 1	PRESENT
J7	MIC 2 access bypass	PRESENT: MIC 2 always active ABSENT – use M1 pin on access port to activate MIC 2	PRESENT
J8	MOH source select	SEL: MOH/Auxiliary output follows music source selection L2: MOH/Auxiliary output is always LINE 2	SEL
J9	Music Mute configuration	NO: external contact closure required for muting NC: external contact opening required for muting	NO
J10	MIC 1 over MIC 2 priority	OFF: Mics have equal priority ON: MIC 1 has priority over MIC 2	OFF
J11	MIC 1 priority trigger	AVO: MIC 1 priority triggered by announcement (VOX) ACC: MIC 1 priority triggered by contact closure ABSENT: no MIC 1 priority: music remains at full level during announcements	AVO
J12	MIC 2 priority trigger	AVO: MIC 2 priority triggered by announcement (VOX) ACC: MIC 2 priority triggered by contact closure ABSENT: no MIC 2 priority: music remains at full level during announcements	AVO
J13	Mic over music priority	OFF: music remains during announcement ON: music mutes during announcement	ON
J14	REM mode source selection	FR: permits front panel source selection in REM mode SW: front panel source selection disabled in REM mode	SW
J15	Music limiter threshold	0dBu: music level limited to 0 dBu +6dBu: music level limited to +6 dBu ABSENT: No music limiting action	0dBu
J16	TEL input impedance	PRESENT: Mic 1 input impedance 600 ohms ABSENT: Mic 1 input impedance 48 kohms	PRESENT

* J5 consists of two jumpers; they should be moved as a pair

The diagram below shows the locations of the CX261's internal PCB jumpers (not to scale).

If any jumpers need to be changed, turn the Zone Mixer off and disconnect it from the mains. Undo the 6 screws securing the top cover of the unit and remove it. Use a pair of small pliers to gently remove the jumpers from the PCB headers and reposition them as required.

The diagram also shows the locations of the socket for the optional loudspeaker EQ cards.



Motherboard jumper locations

Ground loops

If, despite your best efforts, the completed sound system 'hums' you probably have a 'ground loop'. The offending signal source can often be identified by setting the volume control to minimum, then disconnecting the input leads (both left & right channels) on each line input until the 'hum' disappears. This problem is often caused by terminating a screened input cable into a signal source positioned a significant distance from the mixer. A good way of avoiding this potential problem is to use signal sources (CD players and the like) that are double insulated with no connection to the mains supply earth. If a signal feed were derived from a second mixer (a club or microphone mixer for example) it would be perfectly normal to expect this to be earthed; we suggest that a transformer be used to isolate the signal and prevent a noisy loop (see "Music Sources" on page 10).

EMC considerations

The Cloud CX261 fully conforms to the relevant electromagnetic compatibility (EMC) standards and is technically well behaved; you should experience no operational problems and under normal circumstances, no special precautions need to be taken. If the unit is to be used within close proximity to potential sources of HF disturbance such as high power communications transmitters, radar stations and the like, the performance of the mixer may be reduced; we suggest that the microphone cable screen be connected to the equipment chassis and the line input leads are kept as short as possible.

Technical Specifications

Line Inputs:		
Frequency response	20 Hz to 22 kHz, +0/-0.5 dB	
Distortion	<0.05% typical @ 1 kHz	
Sensitivity	0.775 V (0 dBu), +/-12 dB	
Input gain control range	24 dB	
Input impedance	48 kohms	
Headroom	>20 dB	
Noise	-88 dB typical, 20 Hz to 22 kHz	
Equalisation	LF: +/-10 dB @ 50 Hz; HF: +/-10 dB @ 10 kHz	
MP3 input:		
Frequency response	20 Hz to 20 kHz, +/-0.5 dB	
Distortion	<0.05% @ 1 kHz	
Sensitivity	-20 dBu to +4 dBu	
Input gain control range	24 dB	
Microphone Inputs:		
Frequency response	-3 dB @ 100 Hz (filter) to 20 kHz, +/-0.5 dB	
Distortion	<0.05%, 20 Hz to 22 kHz	
Sensitivity	-10 dBu to -50 dBu	
Gain range	40 dB	
Input impedance	>2 kohms (balanced)	
Common mode rejection	>70 dB @ 1 kHz	
Headroom	>20 dB	
Noise	-125 dB EIN, 20 Hz to 22 kHz, 150 ohms source	
Equalisation	LF: +/-10 dB @ 100 Hz; HF: +/-10 dB @ 5 kHz	
Telephone Input:		
Frequency response	-3 dB @ 100 Hz (filter); <-0.5 dB @ 20 kHz	
Distortion	<0.05%, 200 Hz to 22 kHz	
Sensitivity	-20 dBu to +4 dBu	
Input Gain control range	24 dB	
Outputs:		
	Main	**MOH/Auxiliary**
Output level (nominal)	0 dBu	-6 dBu
Output level (max.)	+20 dBu	0 dBu
Minimum load impedance	1.2 kohms	600 ohms
General:		
Power input	85 V to 253 V AC, 50/60 Hz	
Current consumption	46.5 mA at 240 V	
Fuse rating	1 A	
Fuse type	T1A, 20 x 5 mm	
Dimensions (WxHxD)	482.6 mm x 44 mm (1U) x 152.5 mm 19" x 1.73" (1U) x 6"	
Weight	2.13 kg 4.69 lb	