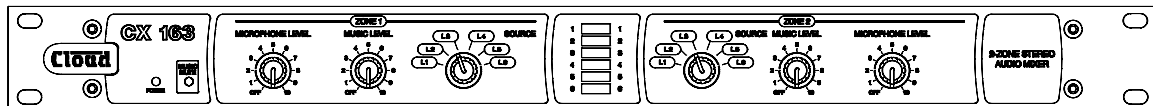


CXI63 ZONE MIXER



Installation and User Guide

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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.




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**




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  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 250 V
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 CX163 is a 1U rack-mounting audio mixer suitable for use in leisure sector venues - such as licensed premises - where easy control of stereo background music in two separate areas needs to be combined with a microphone or paging system.

The CX163 independently mixes any one of six stereo line inputs with a microphone input for each stereo zone output. Separate controls for music and mic levels in each zone are provided, and music 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.) The zones may be configured for mono operation if wished.

In addition to the two primary zone outputs there is also a Utility Output, suitable for secondary areas such as corridors and toilets. The music source for the Utility Output is determined by internal jumper settings; the mic input is mixed with the music signal in a similar manner to the other zone outputs. There are no front panel controls for the Utility Output.

The mixer may be configured to operate with most paging systems: the mic input may be activated by voice (VOX) or short-to-ground access connections. Additionally, in Zone 1, Line Input 6 may be set to have priority over any other selected to facilitate connection of a juke box, digital sound store or similar device.

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.

Optional plug-in EQ cards may be fitted to any or all zone outputs to optimise the CX163 for use with various installed-audio loudspeakers.

What's in the box

Unpack the CX163 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.

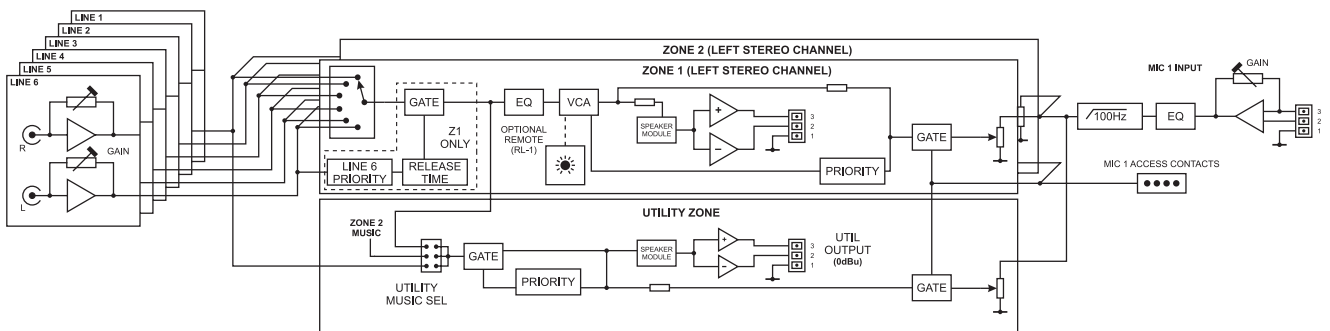
As well as this manual, the shipping carton should contain the items listed below. Please contact your Cloud dealer immediately if any of them are missing or damaged.

- Cloud CX163 Zone Mixer
- Anti-tamper cover for front panel Mic EQ controls
- IEC mains lead (AC cord) with moulded plug appropriate to the territory
- Set of mating connectors for all rear panel screw-terminal connectors

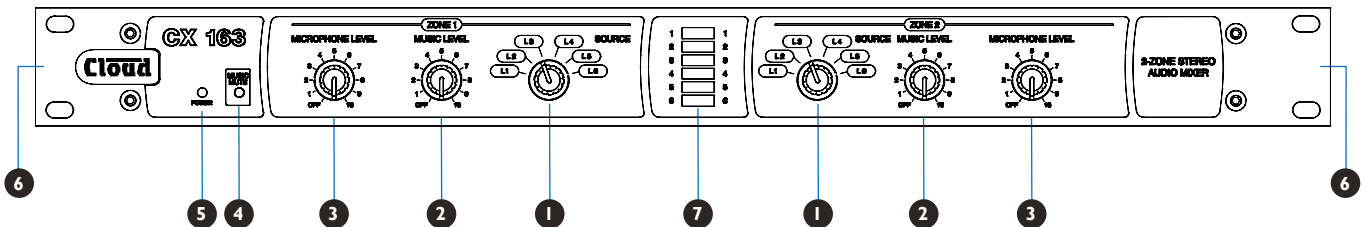
Main Features

- Provides mixed music and paging in two primary zones and a separate Utility Output
- Front panel controls for music source, music level and mic level in each primary zone
- Six (unbalanced) stereo line inputs with individual gain controls
- Balanced mic input; 12V phantom power available
- 100 Hz hi-pass filter on mic input
- Sensitivity and HF/LF EQ adjustment (rear panel) for mic input
- Two stereo, electronically-balanced zone outputs (Zones 1 and 2)
- Mono, electronically-balanced Utility Output
- HF/LF music EQ adjustment for Zones 1 and 2
- Paging priority control on mic input via short-to-ground access connection or VOX triggering
- Selectable Line Input 6 priority in Zone 1, with choice of release times
- Music Mute control input (N/O or N/C) for interface to emergency system
- Compatible with standard Cloud RL-1 Series remote control panels (music level)
- Optional Loudspeaker EQ cards per-zone (including the Utility Output)
- 1U 19" rack mounting unit

Block Diagram

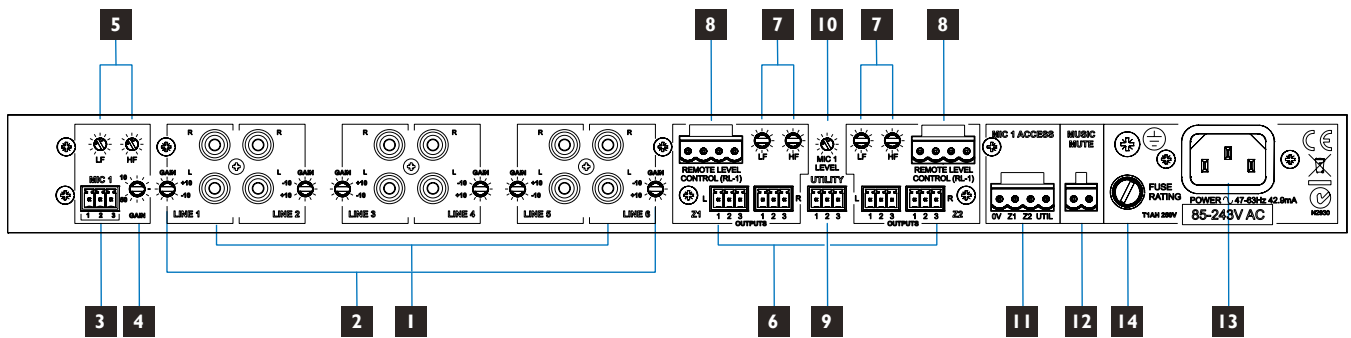


Description of front panel



1. **SOURCE** – selects one of the Music Inputs (Line 1 to Line 6) for each Zone. See “Music Inputs” on page 12.
2. **MUSIC LEVEL** – adjusts the level of the selected Music input in each Zone. See “Gain & level” on page 12.
3. **MICROPHONE LEVEL** – adjusts level of the mic input in each Zone. See “Gain & level” on page 12.
4. **MUSIC MUTE** – indicates (red) when external Music Mute is active. See “Music Mute” on page 11.
5. **POWER** – green LED, confirms power is applied to the unit.
6. Rack mounting ears – the unit may be rack-mounted in a standard 19” equipment rack. It requires 1U of rack height. See “Hardware Considerations” on page 9.
7. Ident area for listing music sources.

Description of rear panel



1. **LINE 1** to **LINE 6** – six pairs of RCA (phono) sockets for connection of stereo music sources with unbalanced outputs. See “Music Sources” on page 9.
2. **GAIN** – gain trim adjustments for Line Inputs 1 to 6.
3. **MIC 1** – balanced mic input. Mic 1 can be used for connection of paging microphones. See “Paging Access Control” on page 12.
4. **GAIN** – gain trim adjustment for the mic input. See “Gain & level” on page 12.
5. **LF** and **HF** – preset EQ controls for the mic input. See “Mic EQ” on page 13.
6. **OUTPUTS Z1** and **Z2** – balanced Left and Right Zone outputs for Zone 1 and Zone 2. See “Zone Outputs” on page 10.
7. **ZONE LF** and **HF** – preset controls for EQ adjustment in Zone 1 and Zone 2. See “Zone EQ” on page 13.
8. **REMOTE LEVEL CONTROL** – for connection of RL-I remote control plates to allow remote control of music level in Zone 1 and Zone 2. See “Music Control” on page 11.
9. **UTILITY** – balanced mono Utility Output. See “Utility Output” on page 10.
10. **MIC 1 LEVEL** – preset control adjusting microphone level at the Utility Output.
11. **MIC 1 ACCESS** – external paging control input for the mic input. See “Paging Access Control” on page 12.
12. **MUSIC MUTE** – Emergency control input for muting music source. See “Music Mute” on page 11.
13. IEC mains input
14. Mains fuse

INSTALLATION

Hardware Considerations

The CX163 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 CX163 has low power consumption and there should be no thermal problems. Other equipment may be installed above or below the CX163.

The choice of location will be dictated by the specifics of the system and building layout. It is recommended that wherever possible, the CX163 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.

Power Supply

The CX163 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 4.18 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 T1A, size 20 x 5 mm, with high breaking capacity.

System Connections

Music Sources

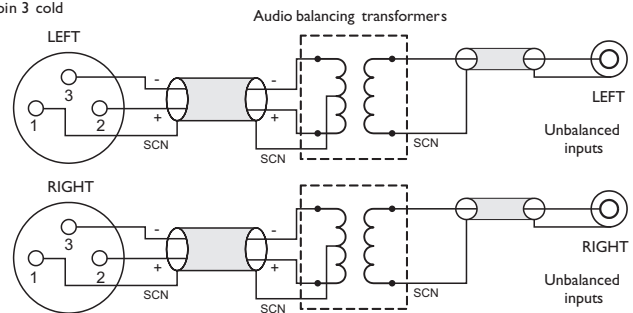
Connect the system's various music sources to inputs **LINE 1** to **LINE 6**. The inputs are unbalanced, on standard RCA jacks (phono sockets). All six inputs are stereo, with separate L and R connectors. The music inputs remain in stereo throughout the Zone Mixer for Zone Outputs 1 and 2, but are summed internally to mono for the Utility Output. If any music sources are mono, with only a single output, they can be connected to either the left or right input, but the primary Zones should be reconfigured for mono operation. (see "Stereo and mono operation" on page 13). 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.

Provided the music source is adjacent to the Zone Mixer, normal phono-phonon (or 3.5 mm jack-to-phonon 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.

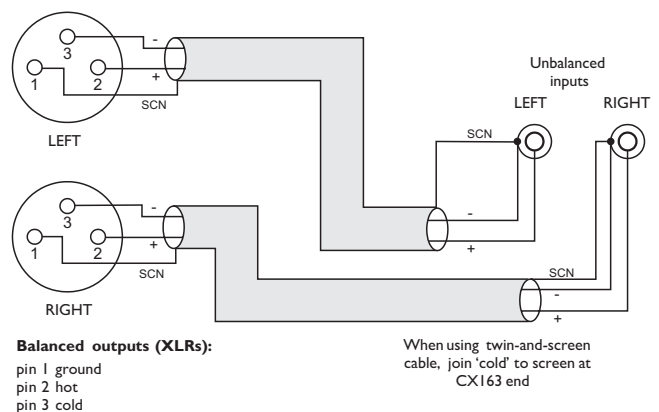
Balanced outputs (XLRs):

pin 1 ground
pin 2 hot
pin 3 cold



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:



Balanced outputs (XLRs):

pin 1 ground
pin 2 hot
pin 3 cold

When using twin-and-screen cable, join 'cold' to screen at CX163 end

Microphone inputs

MIC 1 input is intended for the direct connection of a microphone. It is 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 connector 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 12.

The mic input may be routed to Zone 1, Zone 2 and the Utility Output, at any level in each zone. All microphone announcements automatically reduce the music level in that zone while the announcement is in progress (see “Microphone priority” on page 14 for full details.)

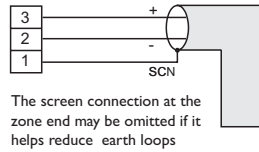
Zone Outputs

Connect the inputs of the power amplifiers feeding the loudspeakers for each zone to the **Z1 OUTPUTS (L & R)** and **Z2 OUTPUTS (L & R)** connectors. Note that these outputs are stereo but may be reconfigured to operate in mono by moving internal PCB jumpers J7 (Zone 2) and/or J8 (Zone 1); see “PCB jumper location and settings” on page 17 for locations). The outputs are balanced and will drive input impedances down to 600 ohms. The connector pinout is as follows:

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

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 in the next column. Note that the screen can be left unconnected at the source end if earth loops are a problem.

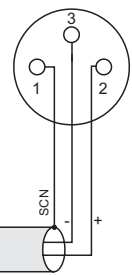
CX163 Balanced output:
pin 1 ground
pin 2 cold
pin 3 hot



The screen connection at the zone end may be omitted if it helps reduce earth loops

Balanced inputs (XLRs):

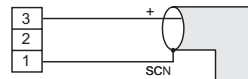
pin 1 ground
pin 2 hot
pin 3 cold



Amplifiers with unbalanced inputs:

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

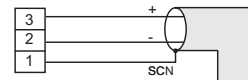
CX163 Balanced output:
pin 1 ground
pin 2 cold
pin 3 hot



When using single-core cable, don't connect 'cold' at the CX163

Unbalanced input (e.g., phono)

CX163 Balanced output:
pin 1 ground
pin 2 cold
pin 3 hot



When using twin-and-screen cable, don't connect the screen at the amplifier end.

Unbalanced input (e.g., phono)

Utility Output

The mono Utility Output provides most of the functionality of Zones 1 and 2, but has no front panel controls and the output level cannot be controlled remotely. It is however useful for, e.g., routing background music to secondary areas such as corridors and circulatory areas, or toilets, etc.

The Utility Output is balanced, uses the same connector type and pinout as Zones 1 and 2, and has the same electrical characteristics. The music source at the Utility Output may be configured by moving internal jumper J6; see “Utility Output” on page 10 for full details and “PCB jumper location and settings” on page 17 for jumper locations.

Music Control

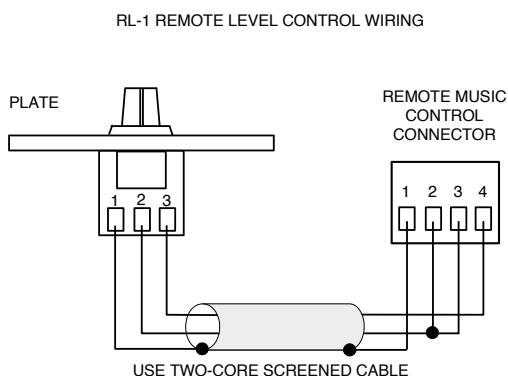
Like other Cloud products, the CX163 allows remote control of music level in Zone 1 and Zone 2. Cloud remote control plates from the RL-I Series provide an elegant solution, though control via a DC voltage from third-party systems is also possible (see “Control of music source and level via external DC” on page 15).

NOTE: Cloud RSL-6 Series remote control plates are NOT compatible with the CX163.

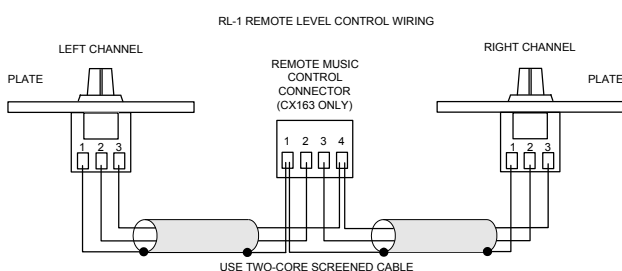
RL-I Series remote control plates connect via the **REMOTE LEVEL CONTROL** port for the relevant zone (see [8] on “Description of rear panel” on page 8). These connectors are 4-pin 5 mm-pitch screw terminal types, which permit separate level control of the left and right Zone outputs, if desired.

Connecting an RL-I Series remote control plate

There are two methods of connecting an RL-I Series remote control plate to a CX163. In most installations, it will be desirable to control both the left and right channels of the stereo Zone output together. In this case, wire the remote control plate as shown below, using twin-and-screen cable. Maximum reliable cable run is 100 m.



If the Zone has been reconfigured for mono operation, it may suit the installation to connect the left and right outputs to separate power amplifiers (or amplifier channels), to drive loudspeakers in different areas of the Zone. In this case, two RL-I Series remote control plates may be connected, one controlling the level at the left output, the other the level at the right output. In this case, wire the plates as shown below:



RL-I remote control plates will operate once connected; however, it may then be desirable to disable the front panel **MUSIC LEVEL** controls. This can be accomplished by moving the internal PCB jumpers J13 (Zone 1) and/or J12 (Zone 2) from NRM to DEF. See “PCB jumper location and settings” on page 17 for location of internal jumpers.

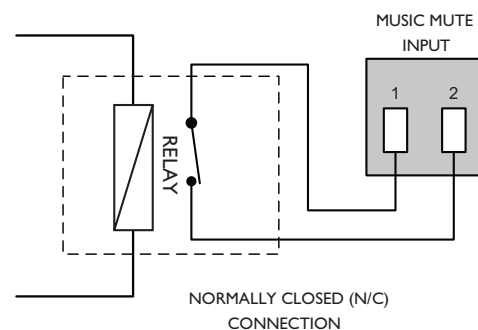
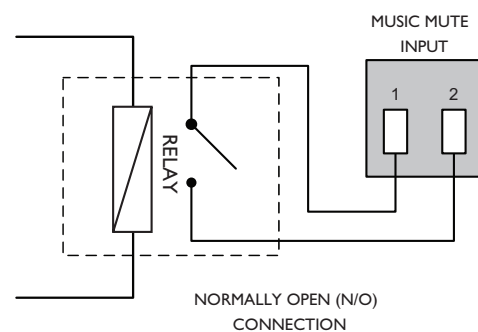
Music Mute

External muting of music is available at the **MUSIC MUTE** connector. 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 17). 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 CX163's music inputs are provided with preset gain trim controls ([2] on "Description of rear panel" on page 8). These vary the input sensitivity from -17.8 dBu to +6 dBu (approx. 100 mV to 1.5 V). When setting the system up, play audio from all the sources in use and listen to them one at a time in one of the zones (preferably the one in which the mixer is located) 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 in each zone is set with the **MUSIC LEVEL** control on the front panel ([2] on "Description of front panel" on page 7). This control will not be operative if the corresponding internal jumper J13 (Zone 1) or J12 (Zone 2) is set to DEF (see below). When setting the audio system up, set the gain controls (if any) on the power amplifiers for each zone 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.

Local/remote control

If a zone has an RL-1 Series remote control plate connected, the corresponding internal jumper - J13 (Zone 1) or J12 (Zone 2) - may be set to DEF for the corresponding front panel controls to be disabled. Zones without such plates should have the jumper left at the default position of NRM.

Music EQ

Treble and bass equalisation for the music signal in Zone 1 and Zone 2 is provided via rear panel pre-set controls ([7] at "Description of rear panel" on page 8). 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.

Note that a flat frequency response is achieved by positioning the slots on the controls in the horizontal plane.

Microphone Input

Phantom Power

The 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 input, the internal PCB jumper J5 should be moved to its ON position. See "PCB jumper location and settings" on page 17 for jumper locations.

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

Gain & level

The microphone input is provided with a rear panel preset **GAIN** control ([4] at "Description of rear panel" on page 8). 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.

The mic **GAIN** control should be adjusted by speaking normally into a microphone of the correct type. Start with it at minimum gain (fully anticlockwise), turn the corresponding front panel **MIC LEVEL** control up to maximum and listen in a convenient zone; the rear panel **GAIN** control should then be carefully advanced until the mic volume is as loud as it is ever likely to be needed, and then reduced slightly. There should be no audible distortion. The use to which the microphone is to be put should be borne in mind – karaoke is more likely to overload the mic preamplifier than spoken announcements, if the gain is not set correctly.

In normal operation, the mic level in each zone is set with the **MICROPHONE LEVEL** controls on the front panel ([3] on "Description of front panel" on page 7).

Paging Access Control

On the CX163, the microphone input may be used for paging purposes. Paging microphones from the Cloud PM Series (and also the older CDPM Series) are fully compatible; OEM paging microphones using the "contact-closure" (short-to-ground) method of zone selection will also be suitable.

It should be noted that Cloud PM Series paging microphones will need to be connected using the "analogue" interface; the CX163 does not support the Cloud Digital Paging Interface also implemented on these models. Note also that PM or CDPM Series microphones cannot be powered from the CX163; an external PSU will be required. Full details can be found in the PM Series Installation Guide.

Zone selection is made using the **MIC I ACCESS** connector ([11] at “Description of rear panel” on page 8). This is a 4-pin 5 mm-pitch screw terminal connector with pinout as follows:

PIN	LABEL	FUNCTION
1	0V	0V
2	Z1	Enable Paging to Zone 1
3	Z2	Enable Paging to Zone 2
4	UTL	Enable Paging to Utility Output

To enable the microphone input for paging, pin 2, 3 or 4 (or any combination thereof) should be connected to pin 1 (0 V). When the CX163 is shipped from the factory, the access contacts are bypassed by internal PCB jumpers; in order for the access port to operate correctly, these jumpers need to be removed. The jumpers are: J1 (Zone 1), J2 (Zone 2) and J3 (Utility Output); see “PCB jumper location and settings” on page 17 for their locations. It is recommended that when removed, the jumpers are stored on one pin of the PCB header in case the unit needs to be reconfigured in the future.

See also the manual section “Priorities” (page 14) for further information regarding configuring the CX163 for use with a paging microphone.

Mic EQ

Two-band equalisation adjustment is provided for the microphone signal; these are pre-set controls on the rear panel ([5] at “Description of rear panel” on page 8). The equalisation is optimised for the tonal correction of speech signals: the HF controls provide ± 10 dB at 5 kHz whilst the LF controls provide ± 10 dB at 100 Hz.

To achieve a “flat” response for either microphone input, set the controls for that input to 0 dB (the ‘12 o’clock’ position).

High-pass filter

The 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.

Zone Outputs

In normal operation, the music level in each zone will be set by the front panel **MUSIC LEVEL** control ([2] at “Description of front panel” on page 7), or by a corresponding control on a remote plate. Follow the procedure described previously (“Gain & level” on page 12) to adjust the music level in each zone.

Stereo and mono operation

Zone 1 and Zone 2 in the CX163 are stereo, with separate left and right channels and output connectors. Stereo programme material from sources connected to the music inputs will be reproduced in stereo in these Zones.

If a mono mix of stereo mix is required – as might be the case if loudspeaker locations within the zones make effective stereo imaging impractical – the outputs may be converted to mono operation by moving internal PCB jumpers J8 (Zone 1) and/or J7 (Zone 2) from the factory default STEREO position to MONO. With mono mode selected in a zone, the left and right outputs carry identical signals (but see “Connecting an RL-I Series remote control plate” on page 11 regarding the use of dual RL-I remote control plates)

Zone EQ

The various zones in a building often have different acoustic properties, and may also have different models of loudspeaker installed. The CX163 is fitted with HF and LF EQ adjustments ([7] on “Description of rear panel” on page 8) for the music signal at each zone output, to enable the audio frequency response to be best matched to each zone. The controls should be adjusted by listening; up to 10 dB of cut or boost at 10 kHz (**HF**) and 50 Hz (**LF**) is available. Note that these EQ adjustments do not affect the frequency response of microphones or paging.

Utility Output

In addition to Zones 1 and 2, the CX163 has an additional, fixed level, balanced output for use in utility areas such as toilets and foyers, where it is often preferable to have background music which remains constant whatever sources and levels are set in Zones 1 and 2.

Music source selection

Music source selection for the Utility Output is determined by the position of internal PCB jumper J6. The music feed at the Utility Output can be a) the music source connected to Line 1, b) the same music source currently selected for Zone 1 or c) the same music source currently selected for Zone 2. See “PCB jumper location and settings” on page 17 for locations of PCB jumpers.

Because the feeds from Zones 1 and 2 are taken from before the **MUSIC LEVEL** controls in the signal path, the Utility Output music level is unaffected by them. However, the Zone 1 feed is taken from after the Line 6 priority circuitry. Thus if the Utility Output source is set to Zone 1, the source connected to Line Input 6 will be routed to the Utility Output as well as to Zone 1 when Line 6 priority is active. See “Line 6 priority” in the next column for more details of Line 6 Priority.

Mic level

The microphone signal is routed to the Utility Output by a similar signal path to that in Zones 1 and 2, so that any paging or other announcements will be heard in the areas fed by this output. The level of the microphone signal at the Utility Output can be adjusted by the rear panel pre-set **MIC I LEVEL** control ([10] at “Description of rear panel” on page 8). The front panel **MICROPHONE LEVEL** controls have no effect on the mic level at the Utility Output.

Note that if the jumper J6 is removed altogether, the Utility Output becomes a “mic-only” output.

Priorities

The CX163 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 “PCB jumper location and settings” on page 17 for location of the internal jumpers.

Line 6 priority

It may sometimes be necessary for one music input to have priority over all the others; for example, a jukebox in a bar, or a digital sound store programmed to make automatic announcements in a public space. Line Input 6 may be set to have priority in Zone 1 over whichever source is selected for the zone by its **SOURCE** control.

Line 6 priority can be enabled by moving internal PCB jumpers J9a & J9b - note that there are two physical jumpers which must be moved as a pair. The jumpers should be set to the ON position for Line 6 priority; the default setting is OFF.

When Line 6 priority is enabled, a signal present at the **LINE 6** input will force Zone 1’s source selection to that input; when the signal disappears, the previously-selected source will be gradually restored over a period of 3, 6 or 12 seconds, as selected by internal PCB jumper J10.

Microphone priority

The microphone input on the CX163 is automatically configured to take priority over the music signals. When the priority circuit is triggered, music signals in the respective zones are attenuated by 30 dB until the priority circuitry is released.

Microphone priority can be triggered either by signal detection (AVO) or the zone access contacts on the rear panel (ACC). Access-triggered priority should only be selected when a paging microphone is in use with the CX163. To configure Microphone priority, internal PCB jumpers J14 (Zone 1), J11 (Zone 2) and J15 (Utility Output) should be set as required. (Note that J15 is on a sub-board at the rear of the chassis.)

Jumper positions:

- AVO: the priority action is triggered when the access contact for that zone is shorted to ground *and* a signal is detected at the microphone input.
- ACC: the priority action is triggered as soon as the access contact for that zone is shorted to ground.
- OFF: This position is not marked, but can be achieved by removing the jumper altogether.

NOTE: It is recommended that if removed, the jumpers are stored on one pin of the PCB header in case the unit needs to be reconfigured in the future.

Once priority has been released, the music signal will be smoothly restored to its former level, over the time period defined by the setting of J10 (see “Line 6 priority” on this page). Note that J10 defines the time constant for both Line 6 priority and Microphone priority.

OPTIONS AND ADDITIONAL INFORMATION

RL-I Series remote control plates – general considerations

Cloud RL-I 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 **REMOTE LEVEL CONTROL** port of the relevant zone using twin-core screened cable as described at “Music Control” on page 11. The plate terminations are conventional screw terminals and the **REMOTE LEVEL CONTROL** port on the mixer is a 4-pin 5 mm-pitch screw terminal connector. A single plate may be wired for conventional stereo operation, or two plates may be wired to control the left and right channels of a zone independently.

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 in one or more zones from an external control system (e.g., Crestron, AMX, etc.). If the **REMOTE LEVEL CONTROL** ports are not required for RL-I Series remote control plates, they may be used to receive DC voltages from the external system to effect these adjustments.

Music level can be controlled over its full range with a DC voltage of 0 to +10V. The pinout of the **REMOTE LEVEL CONTROL** port is as follows:

PIN	USE
1	0V ref.
2	Music level control – Left channel
3	Music level control – Right channel
4	+12V ref.

To control music level in a zone, apply a DC voltage of between 0 and +10V to pins 2 and/or 3, with the 0V reference connected to Pin 1. 0V on pins 2 or 3 corresponds to full level and +10V will produce maximum attenuation. Between these two voltages, the rate of attenuation is approximately 165 mV/dB.

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 (0V) to the ground (0V) 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.

Fitting loudspeaker EQ cards

The CX163 is compatible with various popular installed-sound loudspeakers; a single-channel loudspeaker equalisation module may be fitted to either zone output or to the Utility Output, to optimise the frequency response of the channel to the loudspeaker type being used.

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

To install equalisation modules, first remove the top cover from the CX163 (6 screws). The modules plug into the empty, white 12-pin connectors on the main PCB. Note that as Zones 1 and 2 are stereo, they have two connectors each, while the Utility Output has one.

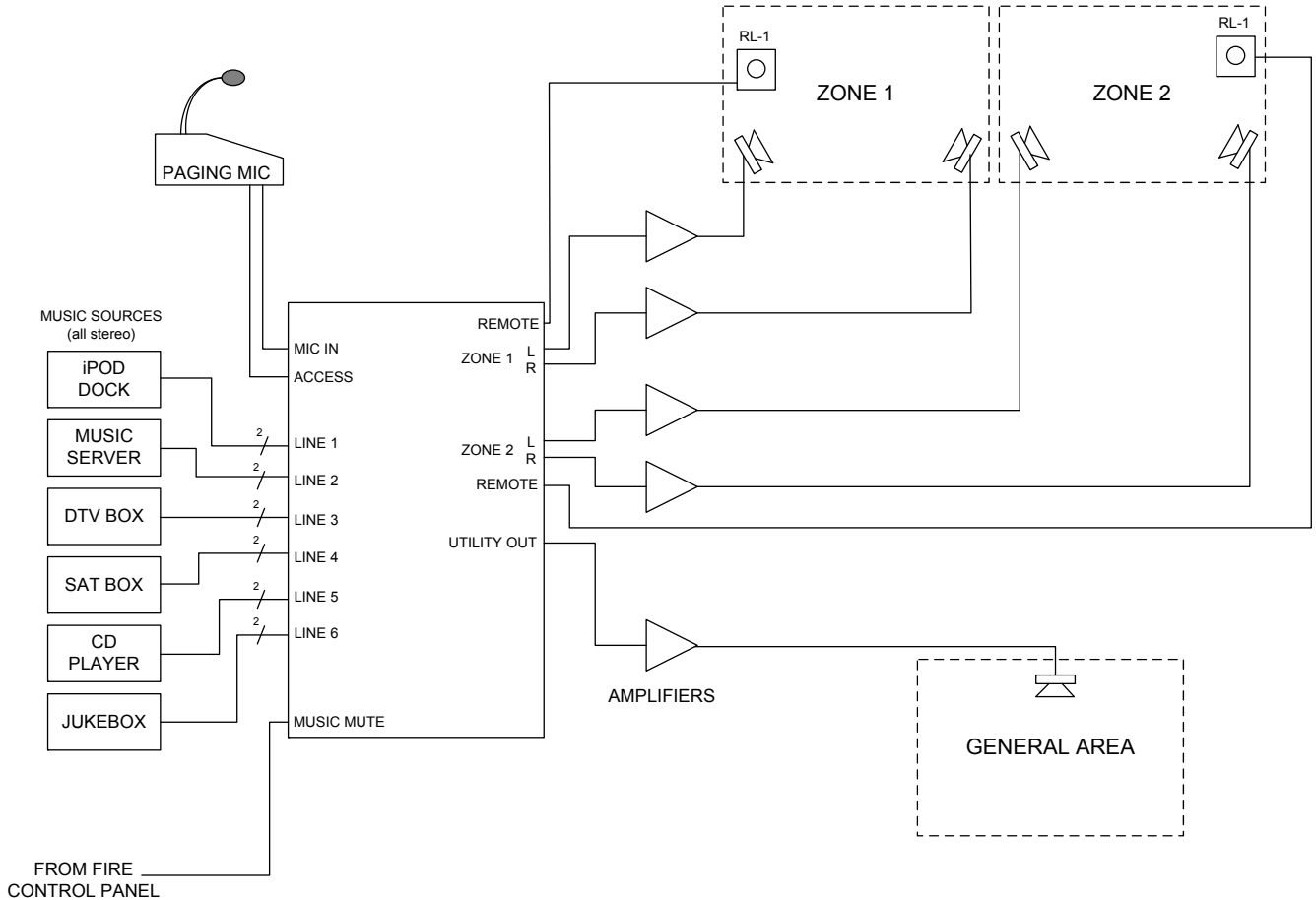
CONNECTOR	ZONE
CON5	Zone 1 Left
CON4	Zone 1 Right
CON7	Zone 2 Left
CON6	Zone 2 Right
CON3	Utility Output

The connectors on the main PCB have two notches on one side only; these engage with lugs on the equalisation module’s mating connector to ensure correct orientation. Note that unlike certain other Cloud units, it is not necessary to remove any “bypass” jumpers to enable the EQ cards.

See the Appendix section “PCB jumper locations and settings” at “PCB jumper location and settings” on page 17 for further details. Replace the top cover with the original screws after fitting.

APPENDIX

Application example



The example shows a CX163 used to provide music and paging in two separate areas of a pub or bar. Each area can set its own volume by means of the local RL-1 remote control panels (optional). Alternatively, it can be set from the front panel of the mixer itself. Music at a lower level could be made available to a third area, such as the lobby or toilets.

Paging to either or both zones is achieved using a paging mic (such as the Cloud PM4), which would typically be located somewhere other than either of the two zones.

Note that the jukebox is shown connected to Line input 6; If Line 6 Priority is enabled in the mixer, then whenever the jukebox is in use it will always be heard in Zone 1, regardless of the music source setting.

PCB jumper location and settings

The CX163 has various internal 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.

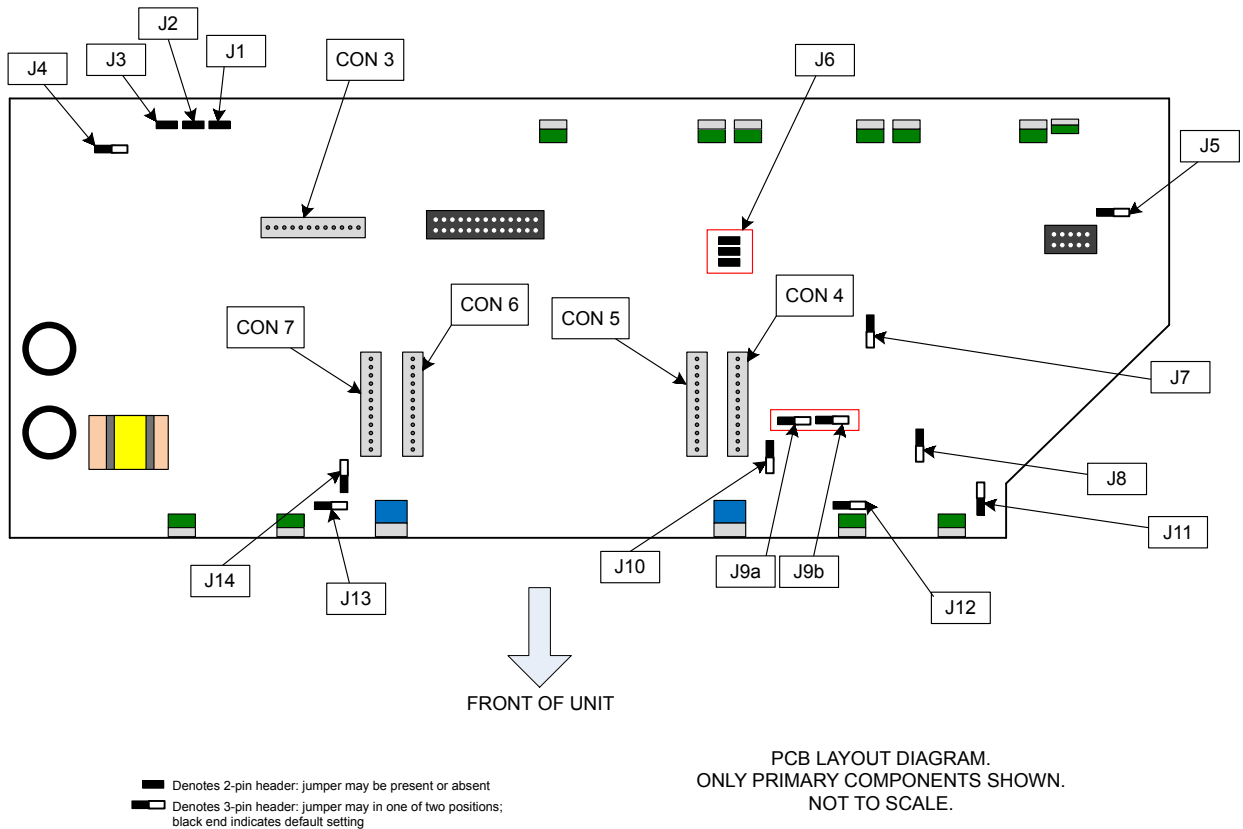
JUMPER	NAME	EFFECT	DEFAULT
Main PCB:			
J1	Bypass Zone 1 Access	PRESENT: Access port disabled for relevant zone ABSENT: Access port enabled for relevant zone	PRESENT
J2	Bypass Zone 2 Access		
J3	Bypass Utility Output Access		
J4	Music Mute configuration	N/O: contact closure required for muting N/C: contact opening required for muting	N/O
J5	Mic 1 phantom power	OFF: Mic phantom power OFF ON: Mic phantom power ON	OFF
J6	Utility Output music source	LINE 1 : Utility Output music source always Line 1 ZONE 1: Utility Output music source follows Zone 1 music source selection ZONE 2: Utility Output music source follows Zone 2 music source selection	ZONE 1
J7	Zone 2 mono/stereo operation	STEREO: Zone 2 stereo operation MONO: Zone 2 L & R channels summed	STEREO
J8	Zone 1 mono/stereo operation	STEREO: Zone 1 stereo operation MONO: Zone 1 L & R channels summed	STEREO
J9*	Line 6 priority – Zone 1	OFF: No priority in Zone 1 ON: Line 6 has VOX-triggered priority in Zone 1 over other sources	OFF
J10	Music ducking release time	3S: 3 seconds. release time 6S: 6 seconds release time ABSENT: 12 seconds release time	3S
J11	Mic 1 priority trigger - Zone 2	VOX: Paging mic signal triggers priority in Zone 2 SW: Contact closure at Access Port enables paging mic priority in Zone 2 ABSENT: Priority function disabled in Zone 2	VOX
J12	Music level defeat – Zone 2	NRM: Front panel MUSIC LEVEL control operative DEF: Front panel MUSIC LEVEL control disabled	NRM
J13	Music level defeat – Zone 1		
J14	Mic 1 priority trigger - Zone 1	VOX: Paging mic signal triggers priority in Zone 1 SW: Contact closure at Access Port enables paging mic priority in Zone 1 ABSENT: Priority function disabled in Zone 1	VOX
Rear sub-board:			
J15	Mic 1 priority trigger – Utility Output	VOX: Paging mic signal triggers priority at Utility Output SW: Contact closure at Access Port enables paging mic priority at Utility Output ABSENT: Priority function disabled at Utility Output	VOX

* J9 consists of two jumpers; they should be moved as a pair

The diagram below shows the locations of the CX163'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 ‘groundloop’. 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 9).

EMC considerations

The Cloud CX163 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, +/-0.5 dB
Distortion	<0.05% typical, 20 Hz to 22 kHz
Sensitivity	100 mV (-17.8 dBu) to 1.5 V (+6 dBu)
Input gain control range	24 dB
Input impedance	48 kohms
Headroom	>20 dB
Noise	<-84 dB, 20 Hz to 22 kHz @ 0 dB gain
Equalisation	LF: +/-10 dB @ 50 Hz; HF: +/-10 dB @ 10 kHz
Microphone Input:	
Frequency response	-3 dB @ 100 Hz (filter) to 20 kHz, +/-0.5 dB
Distortion	<0.05%, 20 Hz to 22 kHz
Gain range	10 dB to 50 dB
Input impedance	>2 kohms
Common mode rejection	>70 dB @ 1 kHz
Headroom	>20 dB
Noise	-128 dB EIN, 20 Hz to 22 kHz @ 0dB gain
Equalisation	LF: +/-10 dB @ 150 Hz; HF: +/-10 dB @ 5 kHz
Outputs:	
Output level (nominal)	0 dBu
Output level (max.)	+20 dBu
Minimum load impedance	1.2 kohms
General:	
Power input	85 V to 253 V AC, 50/60 Hz
Current consumption	42.9 mA at 240V
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	2.10 kg 4.63 lbs

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