



# CX163 STEREO ZONE MIXER

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Cloud Electronics Limited

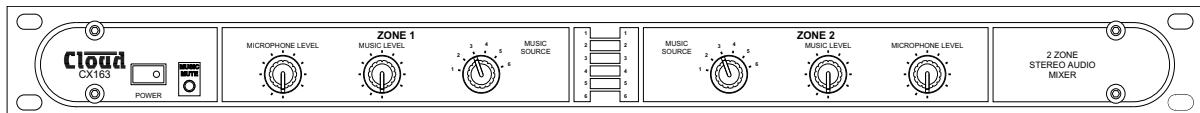
# CX163 Installation & Setup Guide



CLOUD ELECTRONICS LIMITED

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# 1 Safety Notes

For more detailed information refer to the rear of the manual.

- ◆ **Do not expose the unit to water or moisture.**
- ◆ **Do not expose the unit to naked flames.**
- ◆ **Do not block or restrict any air vent.**
- ◆ **Do not operate the unit in ambient temperatures above 35°C.**
- ◆ **Do not touch any part or terminal carrying the hazardous live symbol () while power is supplied to the unit.**
- ◆ **Do not perform any internal adjustments unless you are qualified to do so and fully understand the hazards associated with mains operated equipment.**
- ◆ **The unit has no user serviceable parts. Refer any servicing to qualified service personnel.**
- ◆ **If the moulded plug is cut off the lead for any reason, the discarded plug is a potential hazard and should be disposed of in a responsible manner.**

# 2 General Description

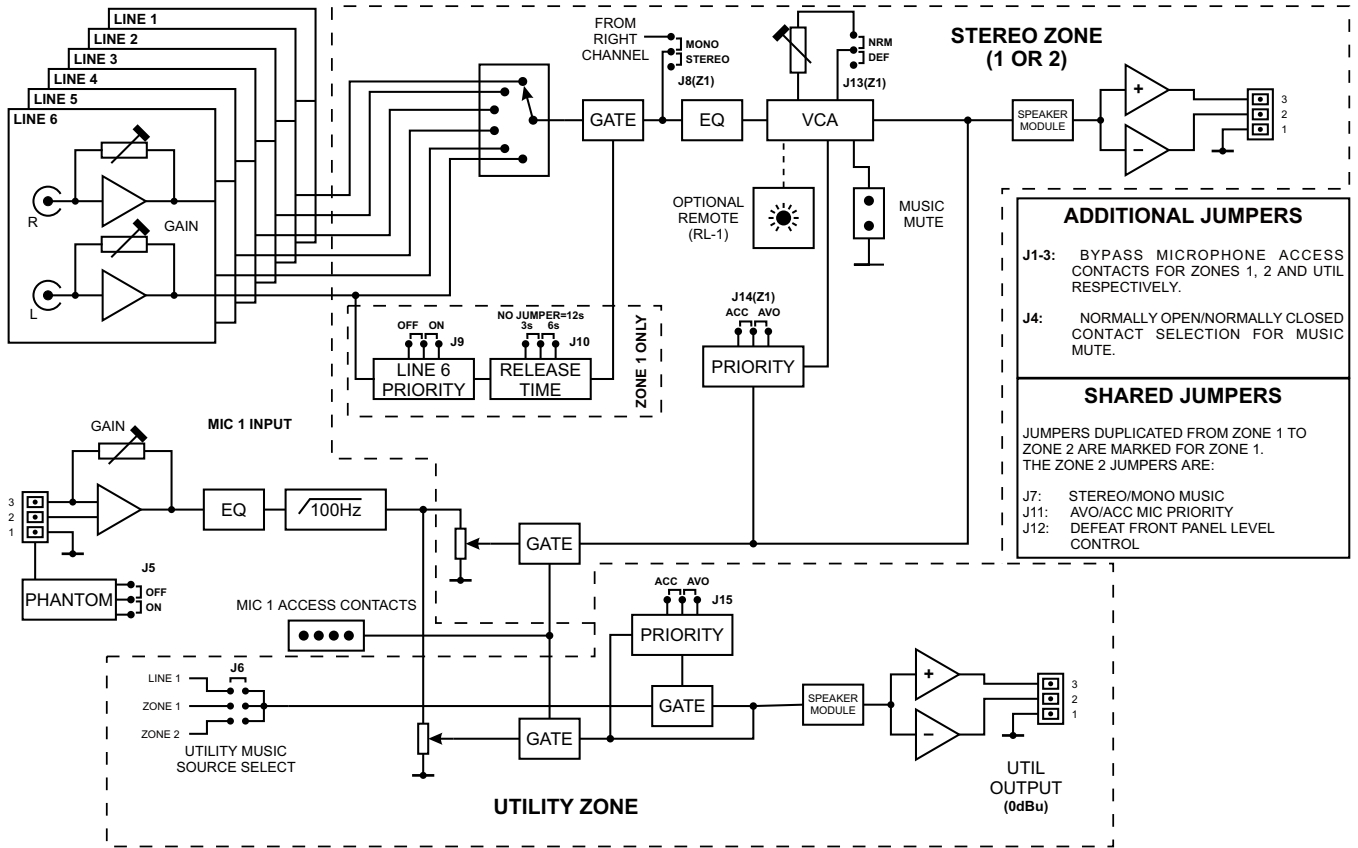
The Cloud CX163 is a stereo mixer zoner with two stereo zone outputs and a mono, fixed level utility output. It has applications where up to six line level music signals and one microphone are required to feed two separate zones (both stereo) and a utility zone (such as toilet areas etc.). The CX163 provides microphone priorities, fire alarm music mute, paging microphone facilities and the possibility for Line 6 to take priority over other music signals in Zone 1.

Front panel controls have been kept to a minimum. Most behavioural controls can be found close to their respective inputs on the rear panel.

There are various optional accessories that extend the flexibility of the CX163:

- ◆ **Optional remote plates which control music level on the two stereo zones.**
- ◆ **A dedicated four zone paging mic with pre-announcement chime.**
- ◆ **Equalisation Modules for Bose® Speakers.**

### 3 Schematic Diagram



### 4 Installation

The Cloud CX163 occupies one unit of standard 19" equipment rack. The microphone input and all zone outputs are balanced. The CX163 is 150mm deep but a depth of 250mm should be allowed to clear connectors and cables. Ventilation holes on the base of the unit should not be obscured.

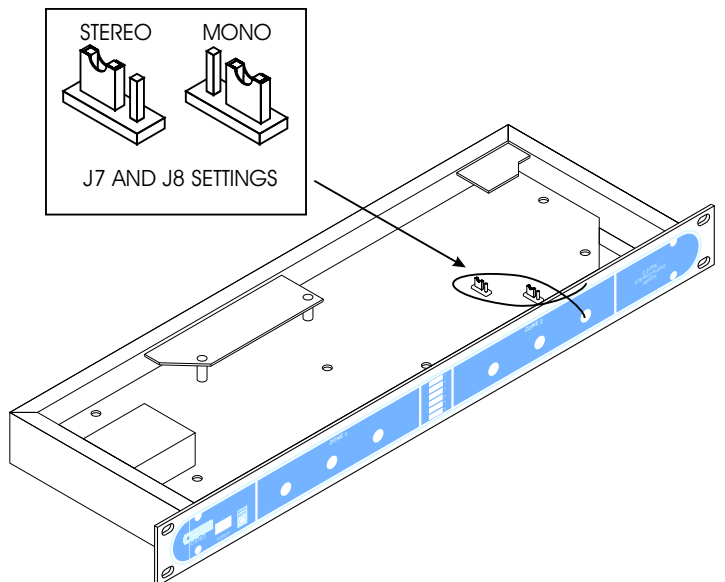
### 5 Stereo/Music Inputs

The line inputs are suitable for most music sources such as compact disc players, tape players and receivers etc.. All inputs are unbalanced and use RCA type phono sockets. Input impedance is 48kΩ. Each zone on the CX163 can operate in either mono or stereo mode; the default setting for each zone is stereo. The mode of each zone is determined by the position of their internal jumpers.

**J8:** Zone 1

**J7:** Zone 2

Self-adhesive labels (supplied) can be affixed to the front panel to identify the available input sources.



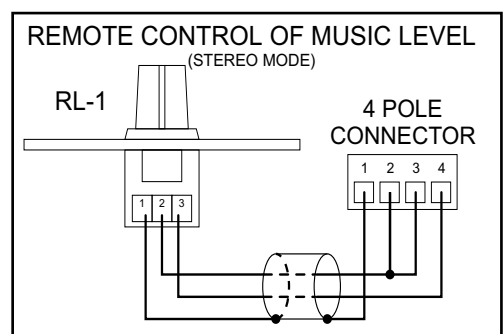


## 5.1 Sensitivity and Gain Control

All six line inputs have pre-set gain controls which are accessible on the rear panel, adjacent to their respective input sockets. The input sensitivity can be varied from -18dBu (100mV) to + 6dBu (1.5V). The pre-set gain controls should be set so that all the input signals operate at the same level (0dBu) within the CX163 to give the music level controls an optimum control range.

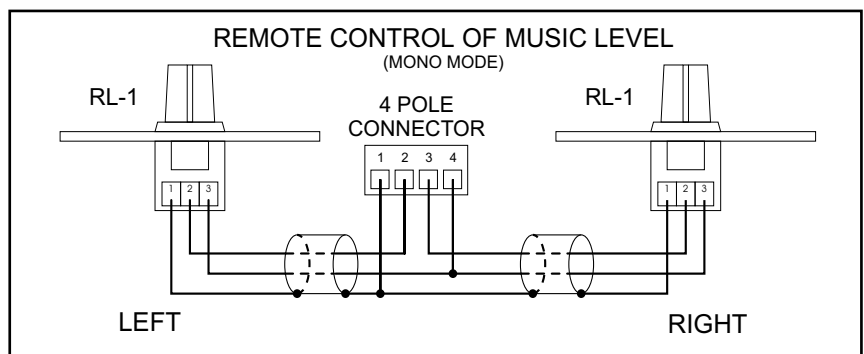
## 5.2 Music level control - Local or Remote

The music level in a zone can be controlled from either the front panel, or a remote control plate located up to 100m from the CX163. The CX163 is compatible with the RL-1 remote level control plate. RL-1 remote control plates can be mounted onto a standard British flush or surface mounted 25mm deep back box. Each RL-1 needs to be connected using two-core screened cable. Connection details are shown in the adjacent diagram. Remote controls will be operational once correctly connected to the unit, there are no further operations required.



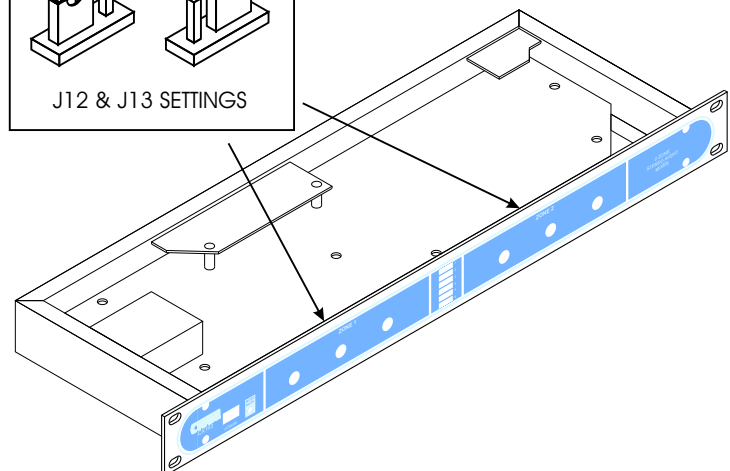
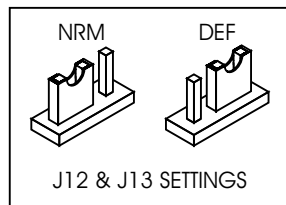
**Stereo mode connection of an RL-1**

When a zone is in the mono mode, it is possible to connect two RL-1 plates to that zone and use them to independently control the levels of the left and right outputs of the zone. In order to do this, the RL-1 plates should be connected as shown adjacently.



**Mono mode connection of two RL-1s**

The CX163 can be configured to bypass the front-panel level controls by setting internal jumpers J13 (Zone 1) and/or J12 (Zone 2) to the 'DEF' position.



## Music Level Control continued

The RL-1A is available for the American market. The operation of the RL-1A is identical to the RL-1 but it has been designed to fit a single gang US electrical outlet box. Front panel dimensions are 4½" x 2¾".

When setting the jumper(s) please ensure that you:

- **Remove the mains cable from the rear of the product before removing the top panel.**
- **Only reassemble the unit using screws identical to the original parts.**

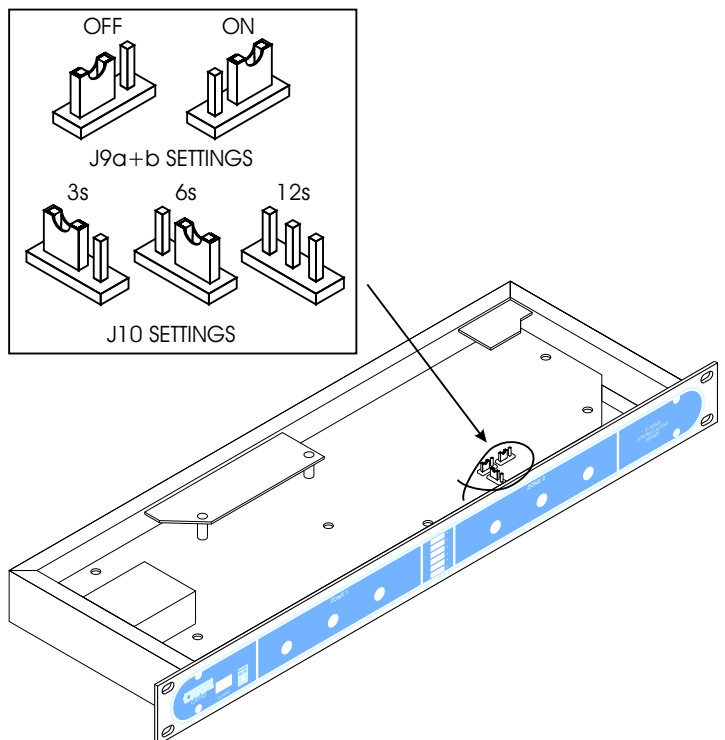
NOTE: The CX163 does not allow remote source selection, so it is incompatible with the RSL-6 remote wallplates.

## 5.3 Music Equalisation

Equalisation for the music signals treble and bass is provided via the rear panel pre-set controls in order to allow the installer to tailor the response of the music signals to suit the acoustics and speakers of each individual zone. The equalisation controls are located to the right of the Line 6 input and above the zone outputs; they are clearly marked 'HF' (High Frequency) and 'LF' (Low Frequency). A flat frequency response can be achieved by positioning the slots on the control shafts in the horizontal plane; the HF control has a range of ±10dB at 10kHz and the LF control has a range of ±10dB at 50Hz.

## 5.4 Line 6 Priority

In Zone 1, the line 6 music input can be given priority over other music signals. This is intended for use with sources such as jukeboxes or spot announcement players. Priority is only enforced when a signal is detected at line 6, at which point the selected music source will mute, making way for the line 6 signal. Once the signal on line 6 ceases, the selected music source in Zone 1 will smoothly restore to its former level. The time taken for this restoration can be 3, 6 or 12 seconds depending on the setting of internal jumper J10; the factory default restoration time is 3 seconds. In order to switch priority on or off, the internal jumpers J9a+b can be set. Both jumpers will need to be set in the same position; failing to do so will result in only one of the stereo audio channels being prioritised.



**Line 6 Priority continued**

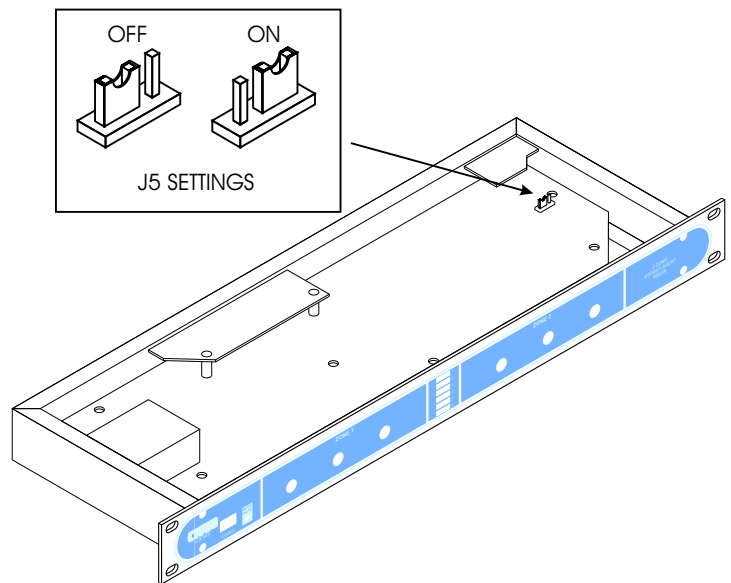
When setting the jumper(s) please ensure that you:

- **Remove the mains cable from the rear of the product before removing the top panel.**
- **Only reassemble the unit using screws identical to the original parts.**

NOTE: This feature is only available in Zone 1. If the utility zone audio is linked to Zone 1 audio, the line 6 priority setting will effect the utility output audio as well as Zone 1.

**6 Microphone Input**

One microphone input is provided with electronically balanced, transformer-less circuitry configured for optimum low noise performance. The input impedance is greater than  $2k\Omega$  and suitable for microphones in the  $200\Omega$  to  $600\Omega$  range. Input is via the 3-pin plug in screw terminal type connector (Phoenix type) located on the rear panel. A facility to provide 15V phantom power is included that is activated by setting the internal jumper J5 to the 'ON' position.



When setting the jumper please ensure that you:

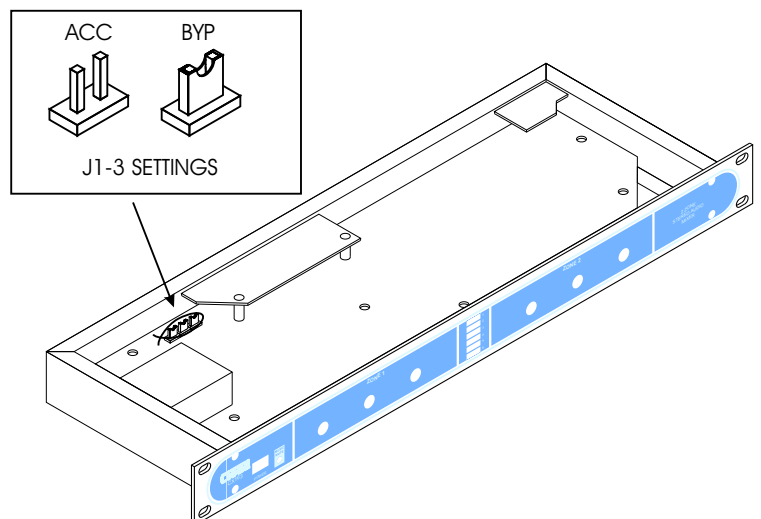
- **Remove the mains cable from the rear of the product before removing the top panel.**
- **Only reassemble the unit using screws identical to the original parts.**

**6.1 Paging Access Contacts**

Paging contacts for each individual microphone input are provided on the rear panel. These contacts control which zones the microphone will be active in. This provides the facility for paging microphones, such as the Cloud CPM-4, to be connected to the CX163. The access contacts work on a short-to-ground system, which is compatible with the majority of paging microphones. These contacts can be bypassed via the configuration of the internal jumpers detailed below:

**J1-2:** Zones 1-2 respectively

**J3:** Utility zone



## Paging Access Contacts continued

Note: We advise that when you remove a jumper you leave it connected to one pin of the header so it remains with the apparatus for future use.

Upon leaving the factory, the unit is configured to bypass the microphone access contacts. In order to activate the access contact for a particular zone, the appropriate link will need to be removed.

When setting the jumper(s) please ensure that you:

- **Remove the mains cable from the rear of the product before removing the top panel.**
- **Only reassemble the unit using screws identical to the original parts.**

## 6.2 Microphone Gain Control

A pre-set gain control is provided adjacent to the microphone input. The gain can be adjusted from 10dB to 50dB. A high overload margin is maintained at all gain settings.

## 6.3 Microphone Level Controls

Front panel microphone level controls are provided for each stereo zone. Microphone level to the utility zone of the CX163 is varied by using the pre-set level control located above the utility zone output on the rear panel. Rotating any microphone level control fully anti-clockwise effectively turns the microphone off in that zone. In addition the microphone can be muted on a zone basis via the paging access contacts.

## 6.4 Microphone Equalisation

Two-band equalisation is provided for the microphone input. The pre-set controls to adjust the equalisation are located directly above the microphone input socket. The characteristics of the equalisation are optimised for the tonal correction of speech signals. The HF control provides  $\pm 10\text{dB}$  at 5kHz whilst the LF control provides  $\pm 10\text{dB}$  at 100Hz.

To effectively bypass the microphone equalisation section, both pre-set controls should be set to 0dBu (mid-position/vertical).

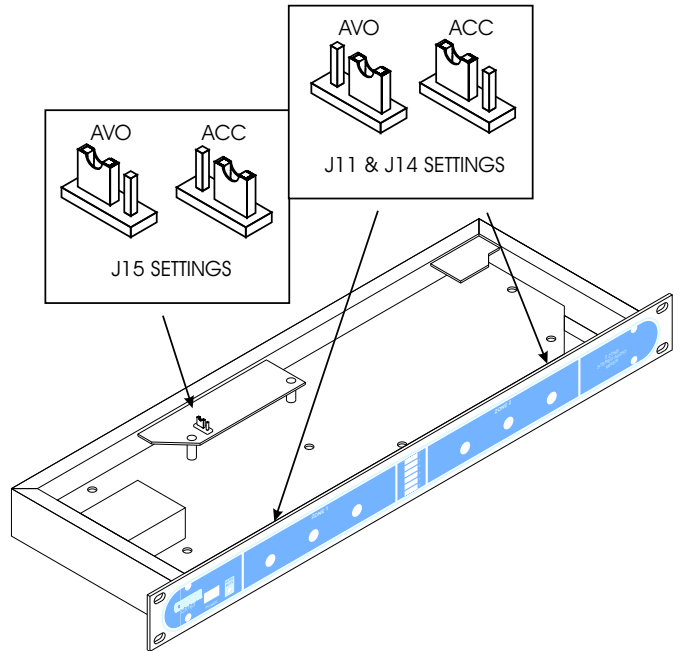
## 6.5 High Pass Filter

The microphone signal passes through a 100Hz high pass filter. This is to reduce breath blasts and handling noise on the microphone audio.

## 6.6 Microphone over Music priority

The CX163 provides a facility whereby the microphone signal can be given priority over music signals in any particular zone. When a signal is detected on the mic input, all music signals are attenuated by 30dB. Once the microphone channel is clear, the music will restore to the previous settings.

Microphone priority can be triggered by the appropriate zone access contacts, or it can be triggered when a signal is detected on the microphone input. The triggering mechanism can be selected on the respective jumpers for each of the zones: J11 (Z2), J14 (Z1), J15 (UTIL). Leaving the jumper disconnected disables microphone priority in that zone.



Jumper positions:

**AVO:** Priority is triggered when a signal is detected on the microphone input and the zone is being accessed.

**ACC:** Priority 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:** When removing a jumper link, we advise that the link be left connected to one pin of the jumper header to prevent accidental loss.

J15 jumper positions are reversed from J11 and J14.

## 7 Output Details

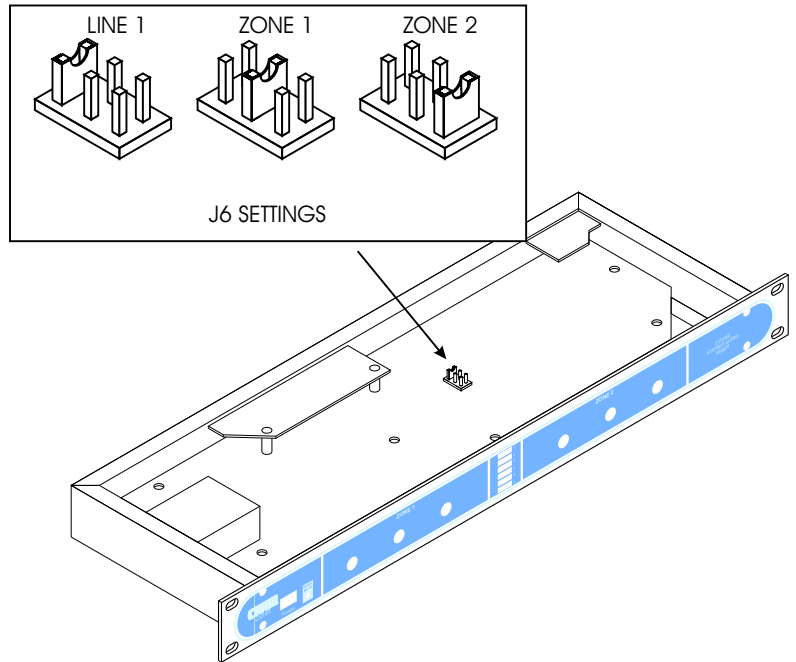
Each output terminal is balanced, using a 3 pole 'Phoenix' type connector. The outputs can operate into loads as low as  $1k\Omega$ . The nominal output level is 0dBu (775mV) but the mixer can operate with a wide range of signals up to a maximum output level of +20dBu (7.75V). For balanced interconnections, 2-core screened cable should be used. Connect the screen to pin 1, the reverse phase signal (normally blue or black) to pin 2 and the in-phase signal (normally red) to pin 3. If you wish to connect any zone output to an unbalanced input, connect the cable screen to pin 1 with the hot connection (inner core) to pin 3 and make no connection to pin 2.

Note that unbalanced signals should not be run over long distances. It is recommended that you only use unbalanced connections between pieces of equipment that are in the same rack.

## 7.1 Utility Output

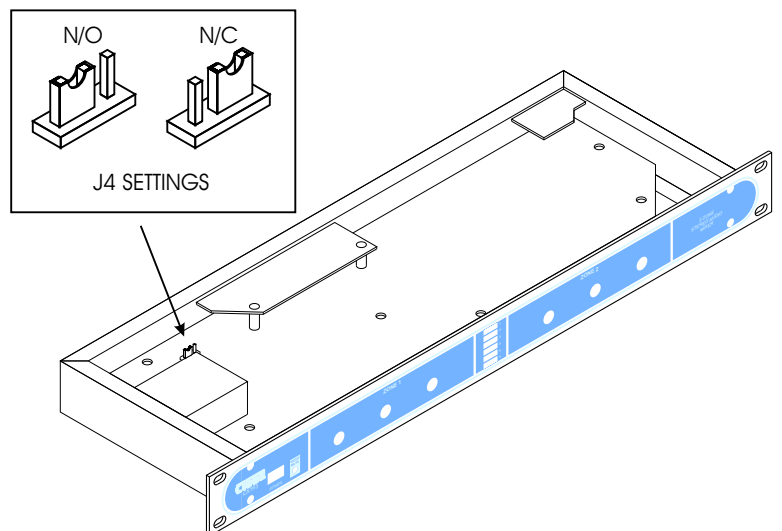
The CX163 is fitted with a fixed level, balanced output for utility areas such as toilets and foyers, where it is desirable to have a fixed level signal which operates independently from the variable outputs of Zones 1&2.

Source selection for the utility output is achieved by moving internal jumper J6 to the required position. Music can be sourced from Line 1, Zone 1 or Zone 2. Both zone feeds are taken before any level controls, and the Zone 1 feed is taken after the line 6 priority circuitry. This means that if Zone 1 line 6 priority is selected and the utility source is from Zone 1, line 6 priority will also be effective in the utility zone. Removing the link from jumper J6 will turn the utility output into a fixed level, mic only output.



## 8 Remote Music Mute - Fire Alarm interface

In certain installations, such as licensed premises or retail outlets within a shopping mall, there may be a local authority or fire service requirement to mute the music signals via a fire alarm control panel in an alarm condition. The CX163 provides a facility to mute the music signals only, by using a fully isolated pair of contacts. This is usually a relay mounted close to the CX163, which is powered by the fire alarm control panel. The relay can either be closed or opened in an alarm condition, but the internal jumper J4 *must* be set to the corresponding position:



- **N/C:** Normally closed means that alarm condition is when the relay opens.
  - **N/O:** Normally open means that alarm condition is when the relay closes.
- Upon leaving the factory, the unit is configured for a normally open relay connection.

When setting the jumper(s) please ensure that you:

- **Remove the mains cable from the rear of the product before removing the top panel.**
- **Only reassemble the unit using screws identical to the original parts.**

## 9 Bose® Active Equalisation Modules

Each output channel has the facility to connect a plug-in Bose® equaliser module. See the table below for details of the connector for each output.

### Installation:

1. Switch off the mains supply and remove the CX163's power lead.
2. Remove the unit's top panel
3. Fit the Bose® EQ module to the connector. The EQ card should be perpendicular to the main board.
4. Apply moderate pressure to the Bose® EQ module until it locates with a click.
5. Replace the top panel.

### Current Consumption:

The CX163 can provide 90mA of power to internal equalisation modules. If this limit is exceeded, the unit will eventually overheat and then shutdown. Below is a table detailing the types of available equalisation module and their relative current consumption.

MODEL OF EQUALISATION MODULE	CURRENT REQUIRED
M8, M32, MA12, 402, 502A, 802, MB4, MB24, 502B, 502BEX	12mA
LT3302, LT4402, LT9402, LT9702	17mA
M16	24mA

**Current Consumption of Active Equalisation Modules by Model**

## 10 Technical Specifications

### Line Inputs

Frequency Response	20Hz-22kHz, 0 -0.5dB
Distortion	20Hz-22kHz, <0.05% Typical
Sensitivity	100mV (-17.8dBu) to 1.5V (+6dBu)
Input Gain Control	24dB range
Input Impedance	48k $\Omega$
Headroom	>20dB
Noise	20Hz-22kHz (0dB gain), <-84dBu rms typical
Equalisation	LF: $\pm$ 10dB 50Hz, HF: $\pm$ 10dB 10kHz

### Microphone Inputs

Frequency Response	100Hz -3dB (filter), 20kHz <-0.5dB
Distortion	<0.05% between 20Hz-22kHz Typical
Gain Range	10dB to 50dB
Input Impedance	>2k $\Omega$ (balanced)
Common Mode Rejection	1kHz >70dB
Headroom	>20dB
Noise	20Hz-22kHz (150 $\Omega$ ), -128dB EIN
Equalisation	LF: $\pm$ 10dB 100Hz, HF: $\pm$ 10dB 5kHz

### Outputs

Output	0dBu (775mV) via 3.5mm phoenix type, plug-in, screw terminals
Minimum load impedance	1k2 $\Omega$
Maximum output level	+20dBu

## 11 General Specifications

Power Input	230V/115V $\pm$ 10%
Fuse Rating	T100mA 230V, T200mA 115V
Fuse Type	20mm x 5mm 250V
Dimensions	482.60mm x 44.00mm(1U) x 152.5mm
Weight(kg)	2.15



# 12 Troubleshooting

## 12.1 Ground/Earth Loops

Despite your best efforts, if the completed sound system 'hums' you probably have a 'ground loop'; the offending signal source can be found 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 CX163.

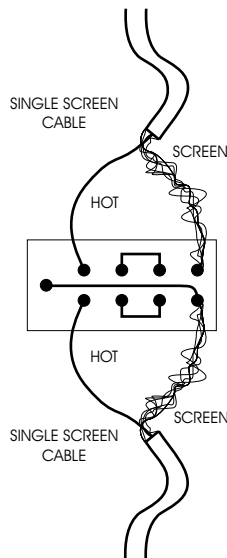
A good way of avoiding this potential problem is to use signal sources (CD players and the like) that are double insulated with no connection to the mains supply earth. If a signal feed is derived from a second device (a club or microphone mixer for example) it would be perfectly normal to expect this to be earthed; we suggest that a transformer be used to isolate the signal and prevent a noisy loop (see diagrams below)

## 12.2 Connecting balanced signals to unbalanced line inputs

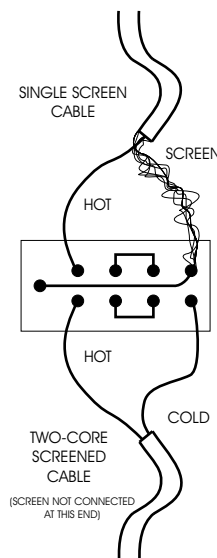
We recommend the use of a transformer to convert a balanced signal to an unbalanced signal suitable for direct connection to the CX163 line inputs. The transformer should be mounted close to the CX163 and the unbalanced output lead should be kept as short as possible. Where both the source and destination units are earthed, it is important to isolate the primary and secondary windings to avoid a potential ground loop; if there is any doubt about this, we suggest that the balanced cable screen is not connected at the transformer end. RS Components part 210-6447 is a suitable transformer for this application and we recommend that the screening can (part number 210-6469) also be fitted to the transformer; Canford Audio supplies a similar transformer (part number OEP Z1604). All transformers should be wired to give a ratio of 1:1.

AUDIO TRANSFORMER  
RS PART NUMBER: 210-6447  
FITTED WITH SCREENING CAN  
RS PART NUMBER: 210-6469

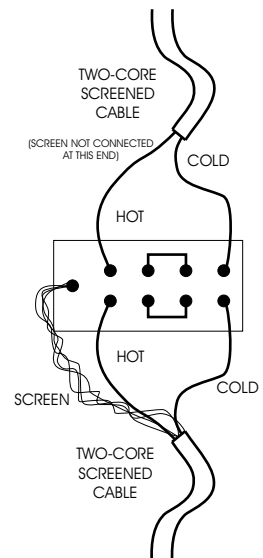
CONVERTING TWO PIECES OF UNBALANCED EQUIPMENT USING A 1:1 RATIO TRANSFORMER



CONVERTING UNBALANCED TO BALANCED USING A 1:1 RATIO TRANSFORMER



CONNECTING TWO PIECES OF BALANCED EQUIPMENT USING A 1:1 RATIO TRANSFORMER



## 12.3 Paging access switches not working correctly

The CX163 leaves the factory configured to bypass the microphone access contacts for all three zone outputs, so that when the product arrives, all inputs are enabled in all zones. Internal jumpers J1 to J3 bypass access contacts for Zones 1, 2 and Utility respectively. To enable the access contact for a particular zone, remove the link on the corresponding jumper.

NOTE: We advise that when you remove a jumper you leave it connected to one pin of the header so it remains with the apparatus for future use.

## 12.4 Connecting RSL remotes to the CX163

The CX163 does not support remote source selection so is incompatible with the RSL remote series. The only remote wallplate supported by the CX163 is the RL-1 remote level plate.

## **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.

When the mains switch is in the off 'O' position the live and neutral conductors of the mains transformer are disconnected.

### **CAUTION - Installation**

Do not expose the unit to water or moisture.


Do not expose the unit to naked flames.

Do not block or restrict any air vent.

Do not operate the unit in ambient temperatures above 35°C.

Do not place liquid filled containers on or close to the unit

### **CAUTION - Hazardous Live**

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.  
The fuse body size is 20mm x 5mm.

### **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 screws identical to the original parts.

In the interest of continuing improvements Cloud Electronics Limited reserves the right to alter specifications without prior notice.

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**Notes:**

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