



## CX242 Zone Mixer Installation & User Guide

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# CX242 Zone Mixer

## Installation and operation manual

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# 1 Introduction

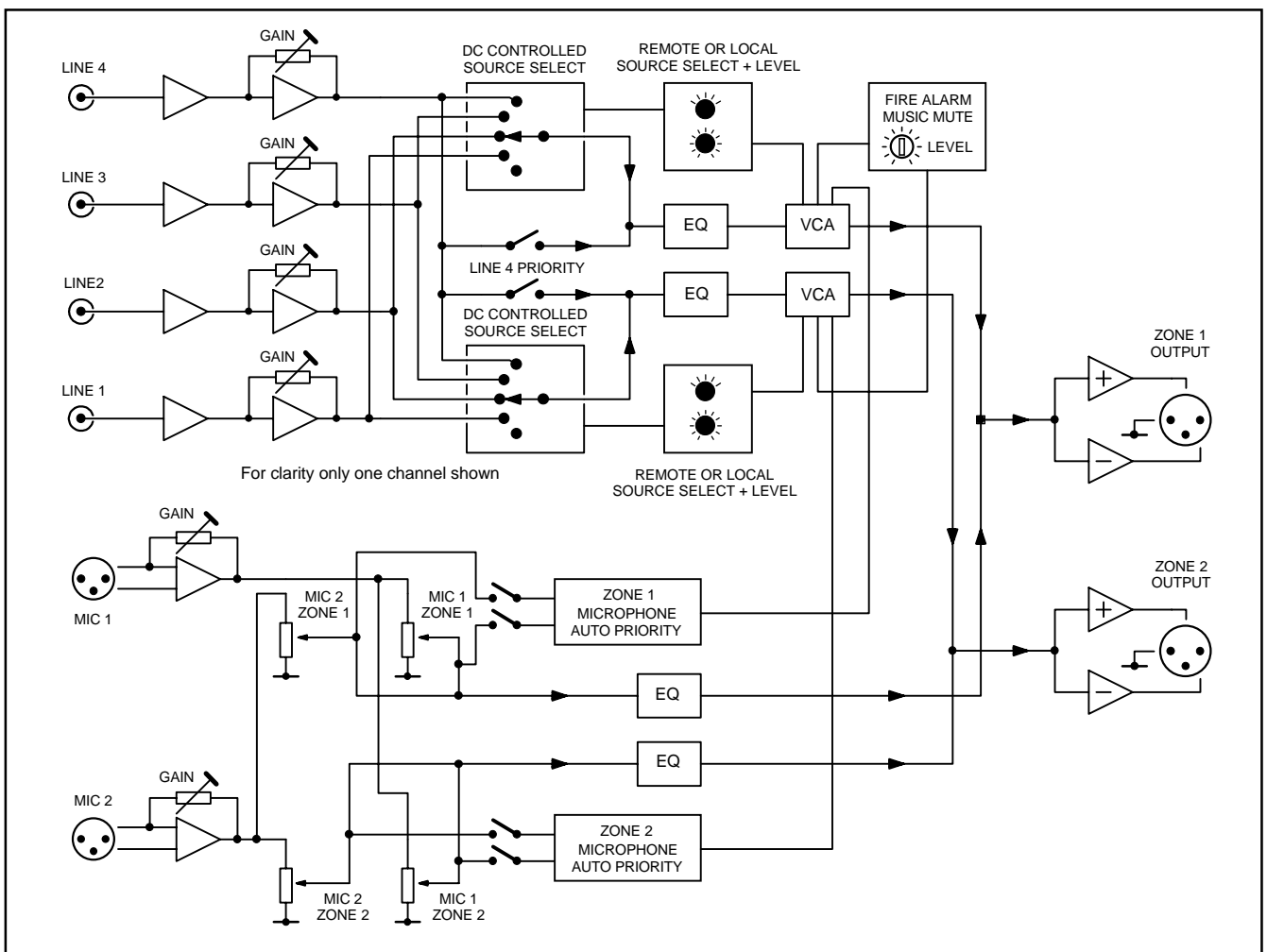
The Cloud CX242 is a versatile multi-source two zone mixer. The unit has applications where two microphone and four stereo line inputs are required to feed two areas. Each zone has a front panel mounted music source select switch and adjacent music level control and both these functions can be controlled remotely if required.

Front panel mounted level controls for Mic 1 and Mic 2 are provided for both Zone 1 and Zone 2. All pre-set switches and equalisation controls are located behind a anti-tamper panel.

The CX242 is ideal for installations where all the equipment is centrally located in a protected environment with operator controls limited to the remote music source and level.

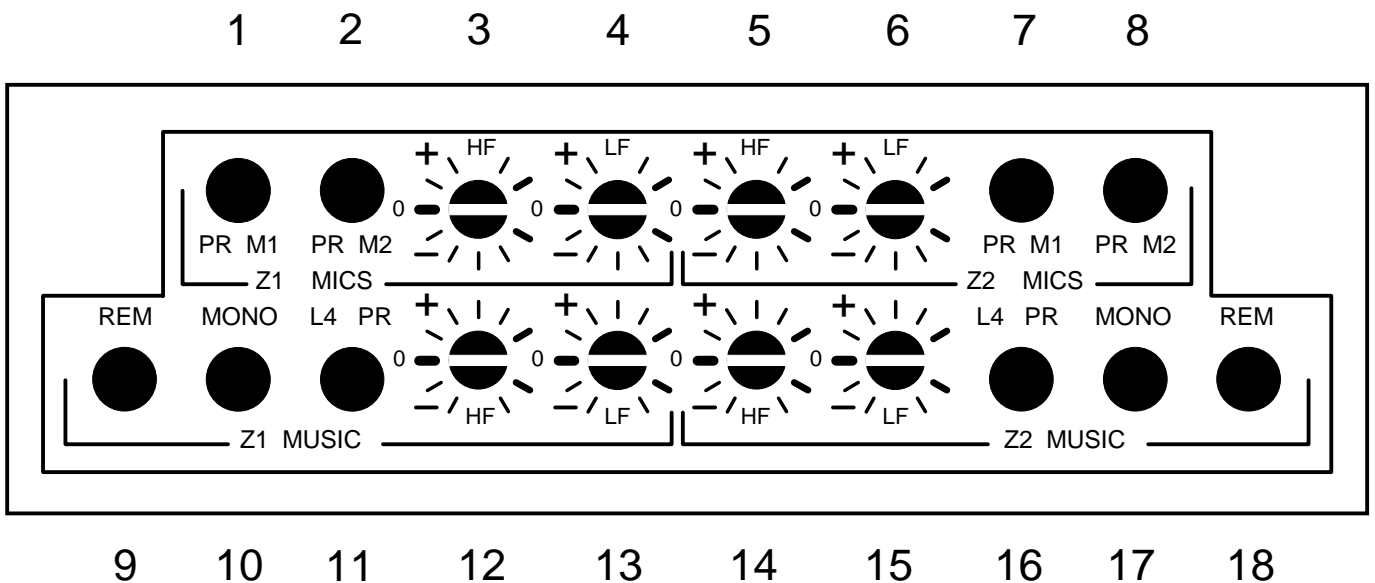
A remote music mute function is provided and a multicore interconnection facility is available to link two CX242's to control four stereo zones.

# 2 Schematic Diagram



### 3 Zone Configuration Controls

Pre-set switches and controls protected by the anti-tamper panel:



- 1 Mic 1 priority on/off in Zone 1 - Button out = off, button in = on
- 2 Mic 2 priority on/off in Zone 1 - Button out = off, button in = on
- 3 Treble control for Zone 1 mic signals - Horizontal position gives flat a response.
- 4 Bass control for Zone 1 mic signals - horizontal position gives a flat response.
- 5 Treble control for Zone 2 mic signals - horizontal position gives a flat response.
- 6 Bass control for Zone 2 mic signals - horizontal position gives a flat response.
- 7 Mic 1 priority on/off in Zone 2 - Button out = off, button in = on.
- 8 Mic 2 priority on/off in Zone 2 - Button out = off, button in = on.
- 9 Remote/local control of Zone 1 music signals. Button out = local, button in = remote.
- 10 Stereo/mono switch for Zone 1 music signals. Button out = stereo, button in = mono.
- 11 Line 4 priority switch for Zone 1. With button in, line 4 overrides other signals.
- 12 Treble control for Zone 1 music signals. Horizontal position gives flat response.
- 13 Bass control for Zone 1 music signals. Horizontal position gives flat response.
- 14 Treble control for Zone 2 music signals. Horizontal position gives flat response.
- 15 Bass control for Zone 2 music signals. Horizontal position gives flat response.
- 16 Line 4 priority switch for Zone 2. With button in, line 4 overrides other signals.
- 17 Stereo/mono switch for Zone 2 music signals. Button out = stereo, button in = mono.
- 18 Remote/local control of Zone 2 music signals. Button out = local, button in = remote.

## 4 Music Inputs

The unit has four stereo line inputs which are suitable for most music sources such as compact disc players, tape players and tuners etc. All inputs are unbalanced and use RCA phono sockets. The input impedance is 100k ohms.

### 4.01 Sensitivity & Gain Control

All four stereo line inputs have a pre-set gain control on the rear panel adjacent to the respective input sockets. The nominal input sensitivity is 0dBu (775mV) and this can be varied from -12dBu (195mV) to +12dBu (3.08V). The pre-set gain controls should be set so that all the input signals are operating at the same level and the front panel level control has an optimum range of control.

### 4.02 Music Control - Local or Remote

The music source and music level control functions can be operated from the front panel or remotely by using the optional remote source/level plate RSLC-1. This plate can be positioned up to 100 metres from the CX242 and two core cable with overall screen should be used. The front panel mounted anti-tamper panel should be removed by using the allen key provided; depress the switch marked 'REM' to select remote control operation of the desired zone (see Figure 1). Self adhesive labels are provided to identify the signal source on the front panel.

### 4.03 Priority

When a Juke Box or Spot Announce Player is connected to the CX242, fully automatic priority over any selected line input can be achieved by using the Line 4 input and activating the 'L4 PR' switch concealed behind the anti-tamper panel.

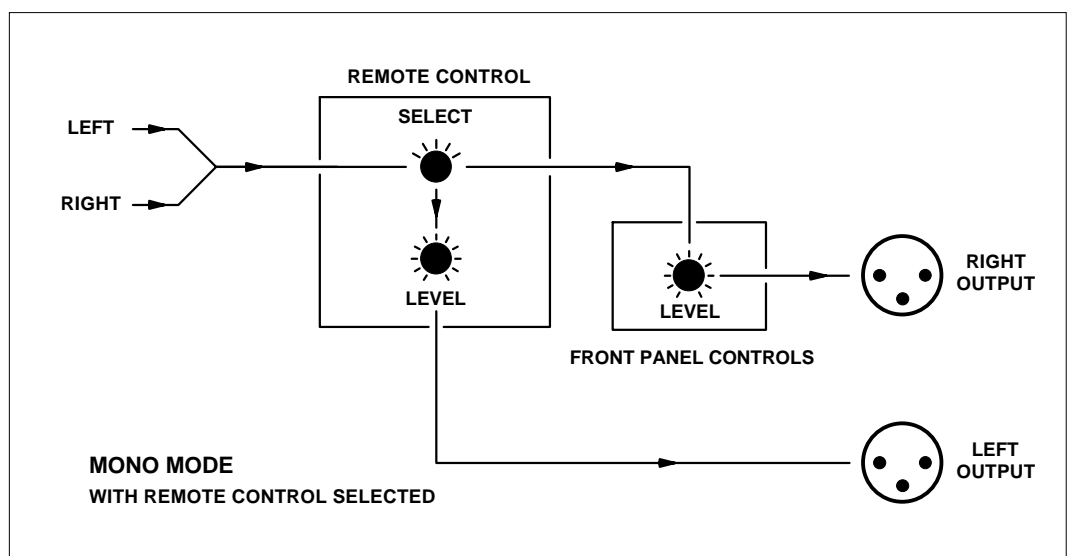
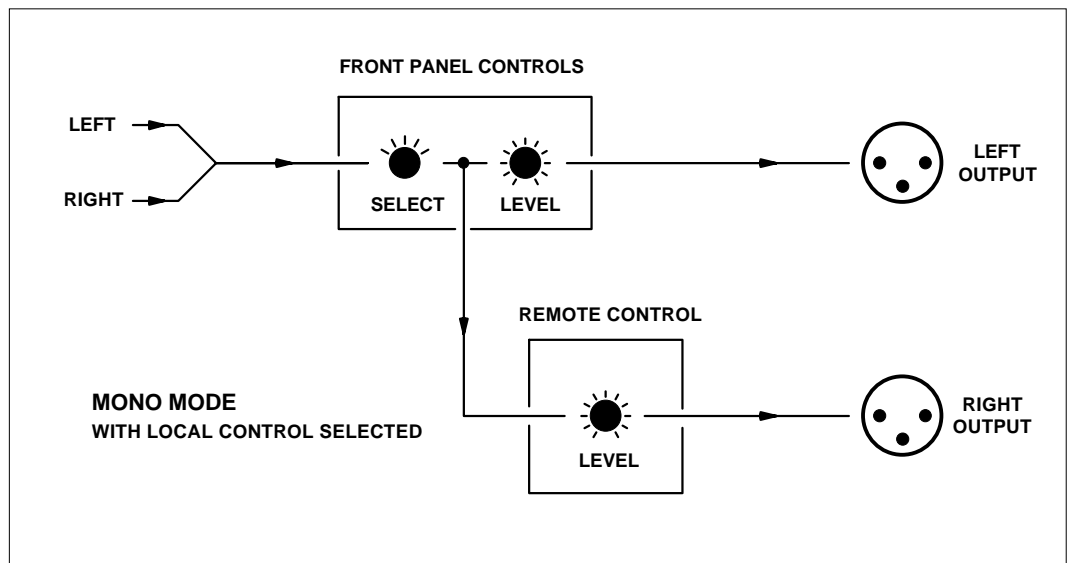
When this mode of operation is selected, the unit will operate normally until a signal is detected on channel 4 and this causes the selected signal (usually background music) to mute, allowing the signal on line 4 to operate with priority.

Once the signal on line 4 ceases, the selected music signal will smoothly restore to its former level. The time taken for the selected signal to be restored can be set at 3, 6 or 12 seconds by fitting the appropriate jumper (J1) on the printed circuit board. The factory default release time is 3 seconds. The line 4 priority option can be switched to operate on either or both zone outputs.

### 4.04 Mono Operation

When the mono mode of operation is selected, use the left output socket. A mono music signal is present on both the left and right output sockets but the signal level of the two outputs is controlled independently.

When local control is selected, the front panel signal source switch is operative and the front panel music level control adjusts the level of the left output socket; the signal level of the right output socket can be controlled by a remote level control plate. With no plate fitted, the right output operates with mic signals only. When the remote mode of operation is selected, the source select control on the remote plate is operative and the remote level control adjusts the signal level of the left output socket; in this mode, the front panel level control adjusts the music signal level on the right output. See the illustrations below for more details:



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## 5 Microphone Inputs

### 5.01 Mic Inputs

Two microphone inputs are provided and the microphone amplifier is an electronically balanced, transformerless design configured for optimum low noise performance.

The input impedance is greater than 2k and is suitable for microphones in the 200 to 600 ohm range. Inputs are via gold plated 3 pin XLR type connectors with latch, which are positioned on the rear panel. For balanced microphones, connect the cable screen to Pin 1, the in phase signal to pin 2 and reverse phase to pin 3.

To operate the channel in the unbalanced mode, connect pin 3 to pin 1 (ground) inside the XLR cable plug. Use pin 2 as hot and pin 1 as screen (ground).

### 5.02 Gain Control

Pre-set gain controls are provided adjacent to the respective XLR input connector. The gain can be adjusted from 0dB to 60dB and this wide range of gain allows direct connection of high output devices such as radio microphones without the need for additional attenuation. A high overload margin is maintained at all gain settings.

### 5.03 Front Panel Level Controls.

Separate controls for Mic 1 level and Mic 2 level are provided for both Zone 1 and Zone 2 and these provide the user with a convenient means to operate either microphone at a suitable level in the zone of their choice.

The microphone signals are routed directly to the respective output stage and are unaffected by the operation of the music controls. The gain control on the rear panel should be set at a level where it is not possible to have excessive gain even when the front panel level controls are fully clockwise.

Self adhesive labels are provided to customise the controls.

### 5.04 Microphone Priority

Fully automatic, voice operated priority is provided for both microphone inputs on both zones. Priority on/off switches are positioned behind the anti-tamper panel. With the priority function selected, when a microphone signal is detected, the music signal is attenuated by 20dB allowing the message to be clearly heard; normal music operation is restored smoothly after the announcement has been made. See Figure 1 for priority switch location details.

## 6 Zone Outputs

The two output zones have balanced output stages using 3 pin XLR type connectors and can operate into loads as low as 600Ω. The nominal output level is 0dBu (775mV) but the CX242 can operate with a wide range of signal levels up to a maximum output of +20dBu (7.7V). A 3 pin XLR connector is required for each output. For balanced interconnections, 2 core screened cable should be used. Connect the cable screen to pin 1. Pin 2 is the in phase signal (normally red) and pin 3 is the reverse phase signal (normally blue or black).

If you plan to connect any zone output to an unbalanced load, see section 9.02 'Unbalanced Mode'.

### 6.01 Equalisation

Both Zone 1 and Zone 2 have separate treble and bass controls for the music signals and the microphone signals. These pre-set controls are protected by the front panel mounted anti-tamper panel. The music treble control has a range of  $\pm 10\text{dB}$  at 10kHz and the music bass control operates with a range of  $\pm 10\text{dB}$  at 50Hz. The microphone tone controls operate at  $\pm 10\text{dB}$  at the frequencies of 8kHz and 100Hz.

### 6.02 Switch-on Mute

When the CX242 is switched on, a two stage mute circuit operates. The music signals are fully muted for a period of two seconds, followed by a five second period when the music level smoothly changes to the level set by the controls. During this switch-on mute cycle, the red 'Music Mute' LED will illuminate.

### 6.03 Remote Control Requirements

The CX242 is fitted with VCA control of the music level as standard but if remote control of the signal source and level is required, then the optional 'Remote Source/Level Plate' (RSL-1) is required. Both Zone 1 and Zone 2 can be operated remotely or by local control as required.

The RSL-1 can be fitted directly onto a standard UK electrical single gang mounting box (recessed or surface) with a minimum depth of 25mm (not supplied). Two core screened cable must be used to link the remote plate to the CX242. Connect the cable screen to terminal 1 on both the mixer connector and the remote plate. Terminals 2 & 3 on the mixer connector should connect to terminals 2 & 3 respectively on the remote plate.

When the mono mode is selected and the front panel source select switch is used, a remote plate with a level control only is available (RLC- 1) for installations where separate control of the mono signal present on the right output socket is required. Single screened cable can be used for the RL-1, connect the screen to terminal 1 and the core to terminal 2, with no connection to terminal 3.

## 7 Remote Music Mute - Fire Alarm Interface

In certain circumstances, 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 CX242 provides a facility to attenuate the music signals only, by using a fully isolated pair of contacts (usually a relay mounted close to the CX242 which is powered by the fire alarm control panel) which should close during an alarm condition.

In the mute mode, a music gain reduction of between 20dB and 70dB (full mute) is effective and the desired mute level can be set by adjusting the small pre-set level control adjacent to the 2 pole remote music mute connector on the rear panel. The front panel mounted 'Music Mute' LED will illuminate to indicate the operation of the mute circuit.



## 8 Expansion Connector

Two CX242's can be linked by fitting the optional 'Expansion Connector Kit'. The multi-core link duplicates the two mic and four line signals derived from the source CX242 onto the respective input stages of a second CX242. This simplifies the interconnection of two units which are required to control the same input signals and distribute these to four stereo zones.

It is possible by utilising a custom interconnection cable to link more than two CX242's together. If required only the signals that are to be shared can be linked and other signal sources or microphones can be connected directly, to achieve the desired configuration; refer to the following wiring chart for further details:

When using a customised interconnecting cable the appropriate number of 15 way D connector cable assemblies (part number wj960319) should be obtained from our spares department. One cable assembly fits inside each CX242 in the system to facilitate the connection of the link cable.

Pin 1	Line 2 – left	Pin 2	Line 2 - right
Pin 3	Line 1 – right	Pin 4	Line 1 - left
Pin 5	0V	Pin 6	0V
Pin 7	0V	Pin 8	Mic 2
Pin 9	Line 3 – left	Pin 10	Line 3 - right
Pin 11	Line 4 – right	Pin 12	Line 4 - left
Pin 13	0V	Pin 14	0V
Pin 15	Mic 1		

Installation of standard "Expansion Connector Kit":

The kit comprises two 15 way 'D' connector assemblies and a screened link cable. Fit the cable assemblies as follows:

Disconnect the power lead prior to commencing any work.

Remove the top panel from the mixer which will be connected to the signal sources.

Remove the blanking cover from the expansion connector mounting holes.

Fit one of the 15 way female connectors to the rear panel using the supplied retention pillars. The connector must be positioned on the inside surface of the rear panel.

Connect the ribbon cable connector to CON2 marked 'OUTPUTS'.

Replace the top panel and mark the unit so as to identify it as the signal source.

Remove the top panel from the destination mixer.

Remove the blanking cover from the expansion connector mounting holes.

Fit the second 15 way female connector to the rear panel.

Connect the ribbon cable connector to CON1 marked 'INPUTS'.

Replace the top panel and mark the CX242 so as to identify it as the destination unit.

The two units can now be connected together and the input signals from the source CX242 will be connected to the second unit. To achieve matching microphone signal levels, the rear panel mounted mic gain pre- set controls on the destination CX242 should be positioned fully anti- clockwise. The line input pre-set gain controls do not interact and should be set as required.

## 9 General Notes

### 9.01 Earthing

The 0V rail of the CX242 is coupled to the chassis ground by a parallel resistor/capacitor network and no interconnection problems should be encountered.

When several mains powered units are connected together via their signal cables, there is a risk of one or more earth loops which may cause an audible hum on the system even with the gain controls set to minimum.

The 'hum' can be remedied in several ways; the preferred method is to operate the output links to the power amplifiers in the balanced mode, with the cable screen only connected at the receiving end (amplifier input). The signal source units should be located as close as possible to the CX242 and the metal housing of the various units should not be electrically connected together through the equipment rack.

If this is a problem, rack isolating kits are available from specialist hardware suppliers. If the problem persists, try to connect all the interconnected units, including the power amplifiers to a common power source to ensure that a common ground is provided.

## 9.02 Unbalanced Mode

If the zone outputs are required to operate in the unbalanced mode, the unused pin of the XLR type connector should be left with no connection.

The nominal output signal in this mode is -6dBu (387mV). The input gain controls may require to be adjusted to provide the extra 6dB of gain.

# 10 Controlling the music functions using external DC control.

The CX242 can be used as part of an automated sound system by controlling the music level and music source by an external 0-10V DC voltage. The 3 pole connector normally used to terminate the RSL-1 control plate, can be used to feed two separate control voltages into the CX242. Pin 1 is a ground (0V) termination common to both control voltages; this should be connected to the technical ground (0V) of the voltage source. Pin 2 is the control voltage input for the music level and pin 3 is used to control the music signal source selection.

## 10.01 Level Control

A maximum gain reduction of 60dB can be achieved with a control voltage of +10V; the rate of attenuation is approximately 165mV per dB. A control voltage of zero realises unity gain (full volume), however, with no external connection to pin 2, an internal 4k7 resistor connected to the +15V power will 'pull up' the control voltage to provide maximum attenuation. The output impedance of the control voltage source should be low enough to overcome the influence of this resistor.

## 10.02 Source Select

Here are details of the source select control voltages (pin 3) required to switch the four line input signals:

Line 1	+8.50V
Line 2	+7.00V
Line 3	+4.50V
Line 4	0.00V

With no external connection to pin 3, an internal 15k resistor connected to the +15V power will 'pull up' the source select control voltage and the 'off' position will be selected. The output impedance of the control voltage source should be low enough to overcome the influence of this resistor. If you require to fix the music signal to the Line 1 input, wire a 20k resistor between pins 1 & 3 on the remote control connector.

If the control voltages are not isolated, there is a small risk of creating a 'ground loop' by linking the CX242 ground with the ground of the equipment providing the control voltages; we suggest that all pieces of equipment be positioned in close proximity.

## 11 Technical Specifications

### Stereo Line Inputs

Frequency Response	20Hz-20kHz $\pm 0.5$ dB
Distortion	<0.05% 20Hz-20kHz
Nominal input level	0dBu/775mV
Input impedance	100k $\Omega$
Input gain	$\pm 12$ dB
Headroom	>20dB
Noise	-90dB A weighted (0dB gain)
Equalisation	HF $\pm 10$ dB 10kHz
	LF $\pm 10$ dB 50Hz

### Microphone Inputs

Frequency Response	100Hz-20kHz $\pm 0.5$ dB
Distortion	<0.03% 20Hz-20kHz
Gain range	0dB-60dB
Input impedance	>2k $\Omega$ (balanced)
Common mode rejection	>70dB 1kHz
Headroom	>20dB
Noise	-122dB EIN 22Hz-22kHz (150 $\Omega$ )
Equalisation	HF $\pm 10$ dB 5kHz
	LF $\pm 10$ dB 100Hz

### Zone outputs

Nominal output level	0dBu balanced, -6dBu unbalanced
Minimum load impedance	600 $\Omega$
Maximum output level	+26dBu balanced, +20dBu unbalanced

## 12 General Specifications

Remote music mute attenuation	Adjustable -20dB to -70dB
Remote music mute connection	2 core cable to isolated relay contacts
Line 4 priority release time	Adjustable 3, 6 or 12 seconds
Power consumption	15VA
Power requirements	230V $\pm$ 10% or 115V $\pm$ 10%
Fuse rating	T100mA for 230V input
	T200mA for 115V input
Fuse type	20mm x 5mm class 3 T 250V
Width	482.60mm
Height	44mm
Depth	160mm
Weight	3.50kg including packing

This product conforms to the following European Standards

EN 50081-1: 1992

EN 50082-1: 1992

EN 60065 : 1994



## SAFETY CONSIDERATIONS

### CAUTION - MAINS FUSE

TO REDUCE THE RISK OF FIRE REPLACE THE MAINS FUSE ONLY WITH THE SAME TYPE, WHICH MUST BE A CLASS 3, 240 VOLT, TIME DELAY TYPE, RATED AT 100mA WHERE THE MAINS INPUT VOLTAGE IS SET TO 230 Volts  $\pm$  10% AC. FOR A MAINS VOLTAGE OF 115 Volts  $\pm$  10% AC. THE FUSE SHOULD BE RATED AT 200mA  
THE FUSE BODY SIZE IS 20mm x 5mm.

### CAUTION - SERVICING

THIS UNIT CONTAINS NO USER SERVICEABLE PARTS. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL. DO NOT PERFORM ANY SERVICING UNLESS YOU ARE QUALIFIED TO DO SO.

### WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.