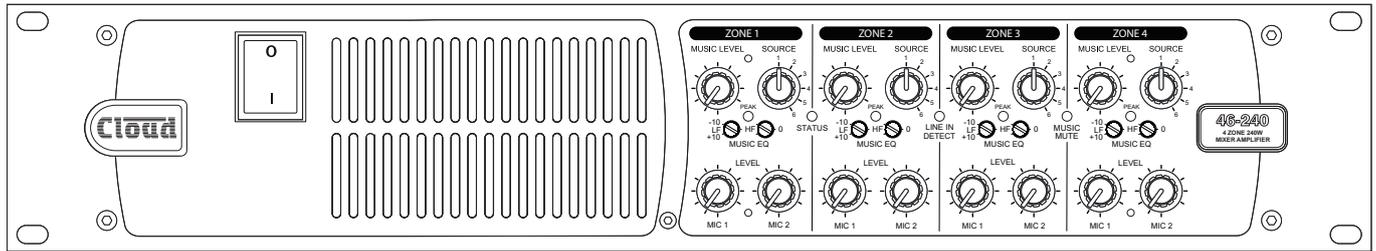
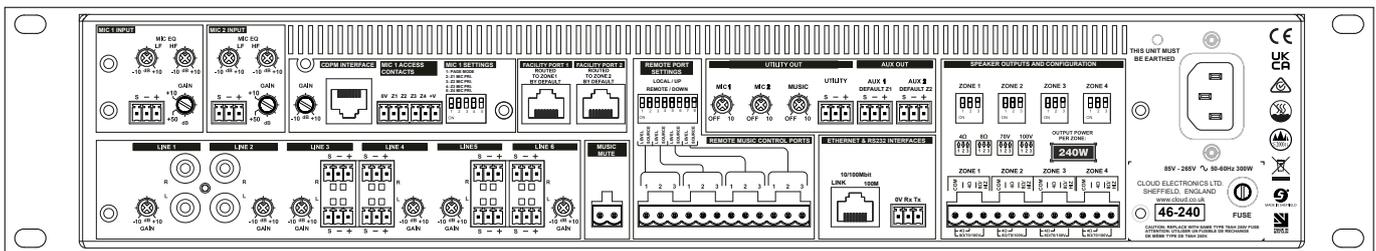


# CLOUD 46 Series Four Zone Mixer-Amplifiers

Models: 46-120MK2 and 46-240



Front panel view (46-240 illustrated; 46-120MK2 is functionally identical)



Rear panel view (46-240 illustrated; 46-120MK2 is functionally identical)

## General Description

The Cloud 46 Series is a four zone mixer-amplifier intended to provide a complete audio solution for Houses of Worship, retail outlets, hotels, licensed premises and other spaces where music, announcements and/or flexible paging are required. Catering for up to six music sources, it provides independent source and level control of music in each zone with microphone mixing as required, with full paging facilities. Each zone includes a mono power amplifier and the unit occupies only 2U of rack height.

There are two models in the 46 Series, with different output power ratings:

- 46-120MK2: 4 x 120 watts
- 46-240: 4 x 240 watts

Cloud 46 Series mixer-amplifiers have six stereo line inputs for music sources, two unbalanced and four balanced, plus two balanced microphone inputs. Each microphone input has its own rear panel sensitivity and EQ controls; the front panel has per-mic gain controls for each zone. Each line input has a rear panel sensitivity control; the required music source and music level in each zone being adjusted by front panel rotary controls. In each zone, the selected music source is mixed with the mic signals before being fed to the power amplifier stage. The front panel also provides a PEAK LED for each zone to warn of excessive signal level; further LEDs indicate power status, line input signal presence and Music Mute activity (see below). The power status LED is bi-colour and also indicates various fault states.

The 46 Series is compatible with the Cloud PM1 single-zone paging microphone, and may also be used for four of the zones supported by the Cloud PM4/8/12/16/4-SA/8-SA multizone paging

microphones via the analogue or Cat 5-based CDPM digital paging interfaces. Alternatively, the mic input may be configured to suit most OEM paging systems; paging is activated by a per-zone short-to-ground access connection. The mic inputs may be selected to have automatic priority over the selected music source, and additionally Line Input 6 may be set to have priority over any other input selected, to facilitate connection of a digital sound store or similar device.

The power output stages are entirely independent for each zone. They are transformerless, and are capable of driving 70/100 V-line loudspeaker distribution systems directly. Rear panel DIP switches allow the output voltage and impedance for each zone to be selected, permitting the amplifier to be used to either drive low-impedance (4 or 8 ohm) loudspeakers or 70/100 V-line systems. Additionally, Model 46-120MK2 utilises the "power sharing" concept introduced in Cloud's CV Series amplifiers: in high-impedance mode (70/100 V-line operation) the maximum power output of 240 W (2 x 120 W nominal) may be shared unequally between the two zone outputs, allowing the amplifier's power capability to be shared between zones of significantly different sizes more efficiently. The mixed signal in Zones 1 and 2 may also be routed to the power output stages of Zones 3 and 4, giving further flexibility of per-zone power capability.

In addition to the main Zone outputs, 46 Series mixer-amplifiers also have a balanced Utility output, which carries its own mix of mic and music signals, set with rear panel controls. This is ideal for driving a hearing loop amplifier. The music source at this output can be configured (by internal jumper) to follow that currently selected for Zone 1, or to be Line Input 1 at all times. There are two further Auxiliary outputs: by default, these are taken from the

All Cloud products are exclusively designed in the UK.

Every Cloud product is exhaustively tested for electronic performance and sonic perfection in Sheffield, England.

## General Description (*continued*)

input to the power stages of Zones 1 and 2, but may be configured to take their source from the outputs of Zone 3 and Zone 4 instead, and may be derived pre- or post- the zone music level controls. They are balanced at line level (0 dBu) and may be used to connect additional, external power amplifiers or for any other purpose.

A particularly useful feature of the 46 Series are the Facility Ports; these allow remote input modules from the Cloud LM-2 Series (for wired sources) or BT-1 Series (for Bluetooth wireless sources) to be connected via easy-to-install screened Cat 5 cables. Microphones, and/or line sources such as radio mics, DJ mixers, MP3 players, laptops or other audio sources - including Bluetooth-equipped laptops, tablets and smartphones - can then be connected at remote locations, simplifying the use of the area for presentations where portable audio sources are in use. By default, Facility Port 1 routes audio to Zone 1 and Facility Port 2 routes audio to Zone 2, but alternative routing options of "Zone 1 & Zone 3" and "All Zones" are available for Facility Port 1, and "Zone 2 & Zone 4" for Facility Port 2 by moving internal jumpers. The Facility Ports are equipped with fixed threshold noise gates to eliminate background noise in the absence of an input signal. Note that LM-2 modules also provide remote control of music level and music source selection.

The mixer-amplifiers are compatible with standard Cloud RL-1 and RSL-6 Series remote control plates: the RL-1 provides control of music level in each zone; the RSL-6 provides both music level and source selection in each zone. More extensive remote controls options are available via the RS-232 serial and Ethernet ports, allowing the mixer-amplifiers to be integrated with third-party AV control systems. The serial protocol offers both global functions such as global mic muting, Music Mute and unit power down, and per-zone functions such as mic muting, music level, and music source selection.

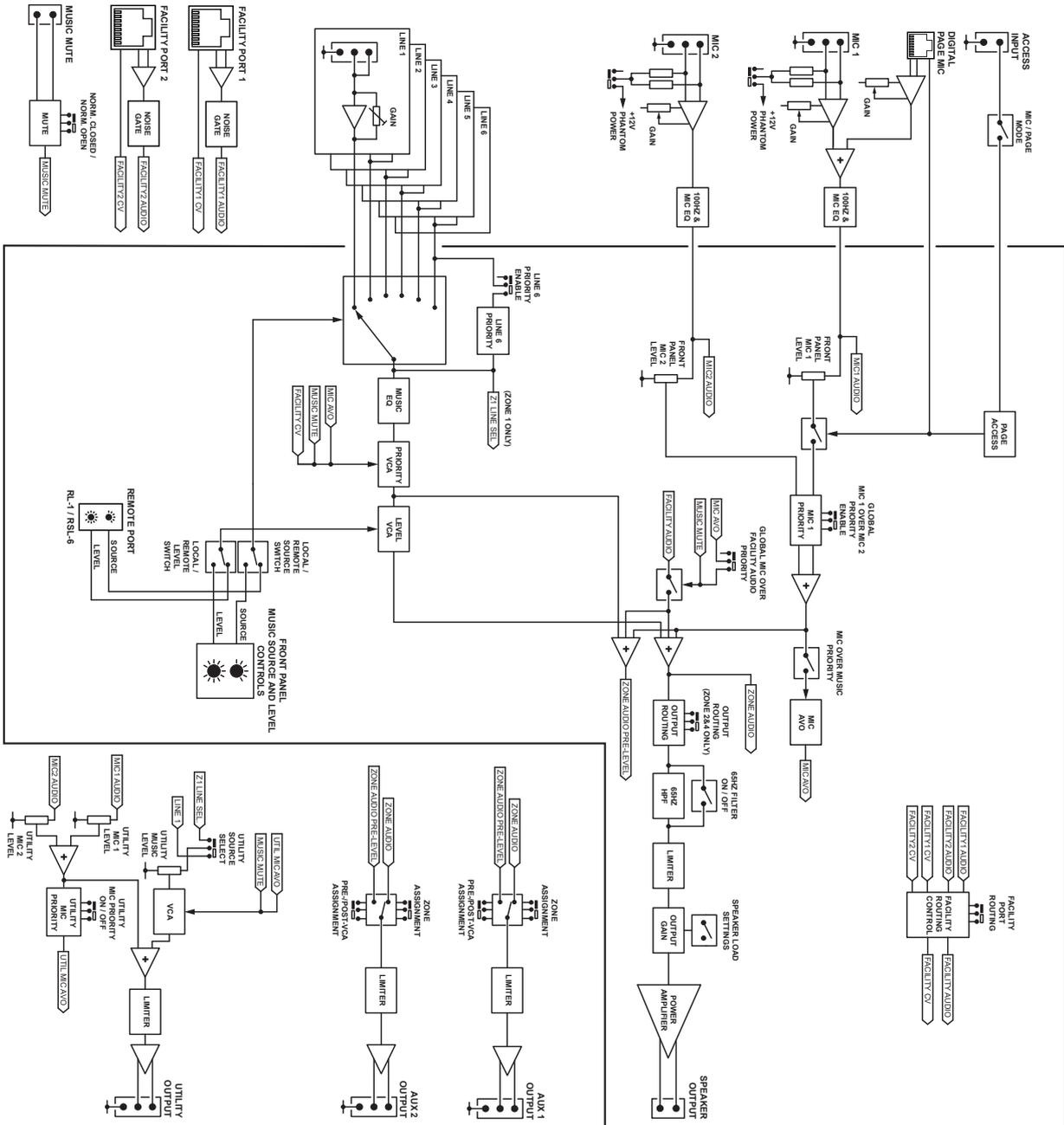
In common with most Cloud products, a Music Mute Input is provided, which may permit compliance with local Fire Authority regulations; the microphone inputs remain active when the Music Mute is applied.

Cloud 46 Series mixer-amplifiers are very energy-efficient and draw very little power in a quiescent state. A user-selectable automatic power-down function puts the mixer-amplifier into an ultra-low-current standby mode after a preset period with no signal. The bicolour front panel STATUS LED indicates this mode.

## Key features

- Provides amplification for four zones, with simple per-zone control of music, mic sources and paging in a single unit
- Available in two versions, with output power ratings of 120 or 240 W
- Transformerless output stages: can be configured to drive either 70/100 V-line systems directly, or low impedance loudspeakers (4/8 ohms)
- Model 46-120MK2 permits power sharing in Hi-Z mode: maximum available power of 240 W may be shared as required between Zones 1 & 3, and/or Zones 2 & 4
- Front panel controls for music source, music level and mic level in each zone
- Two unbalanced and four balanced stereo line inputs, with individual gain trim controls
- Two balanced mic inputs; 12 V phantom power available
- Fixed 100 Hz hi-pass mic channel filters
- Separate microphone limiter circuit to prevent power stage limiter from ducking music signal in the presence of high mic levels
- Separate HF/LF EQ adjustments for mic signals and music source
- Paging control via CDPM Digital Paging Port or short-to-ground access for routing of Mic 1 to any Zone(s)
- Selectable VOX mic-over-music priority
- Selectable LINE 6 priority
- Music Mute control input (N/O and N/C) for interface to an emergency system
- Two Facility Ports for connection of LM-2, L-1 or M-1 remote input modules via screened Cat 5 cable; LM-2 also allows remote control of music level and line input selection
- Facility Ports support BT-1 Bluetooth input module
- Compatible with standard Cloud remote control plates: RL-1 Series (music level) and RSL-6 Series (music level and source selection)
- RS-232 serial and Ethernet control ports; protocol includes global and pre-zone functions
- Power amplifier protection circuitry
- Power amplifier input limiters
- Switchable 65 Hz high-pass filter (per-zone): reduces transformer saturation in 70/100 V-line systems
- Balanced Utility output with separate rear panel controls for music/mic mix: music source can follow Zone 1 selection or be permanently LINE 1
- Two assignable auxiliary outputs from pre-amps (balanced, line level)
- Automatic power-down function (user-selectable)
- Thermostatically-controlled forced-air cooling
- 2U 19" rack mounting unit

# Block Diagram



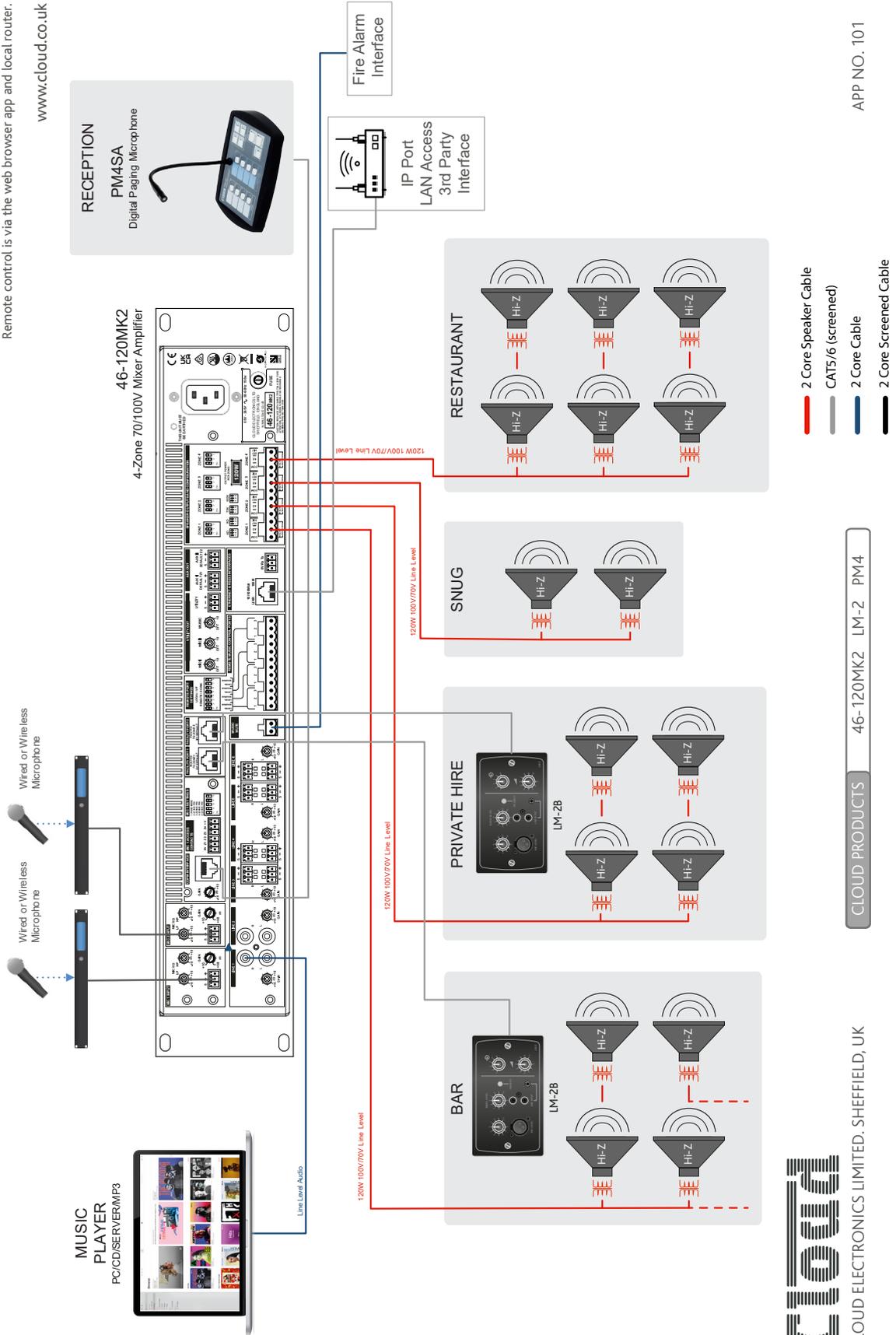
**SINGLE ZONE SHOWN ONLY**  
RS232 & ETHERNET INTERFACES OMITTED FOR CLARITY

# Application Example

## 4 Zone Sports Bar / Restaurant

4-Zones utilising the 46-120MK2's power sharing across zones 1-3, allowing for unused output power to serve PRIVATE HIRE & SNUJG. Remote control is via the web browser app and local router.

www.cloud.co.uk



CLOUD PRODUCTS 46-120MK2 LM-2 PM4

APP NO. 101

## Technical Specifications

Line Inputs				
Frequency Response	20 Hz to 20 kHz, $\pm 1$ dB			
Sensitivity	195 mV (-12 dBu) to 2.0 V (+8 dBu)			
Input impedance	>10 kohm (balanced/unbalanced)			
Headroom	12 dB			
Noise	<-90 dB (22 kHz bandwidth)			
Equalisation	HF: $\pm 10$ dB @ 10 kHz; LF: $\pm 10$ dB @ 50 Hz			
Microphone Inputs				
Frequency Response	-3 dB @100 Hz (fixed filter) to 20 kHz, $\pm 1$ dB			
Sensitivity	2.45 mV (-50 dBu) to 245 mV (-10 dBu)			
Input Impedance	3.3 kohms (balanced)			
Phantom Power	12 V, selectable by jumper			
Headroom	18 dB			
Noise (EIN)	<-126 dBu			
Equalisation	HF: $\pm 10$ dB @ 5 kHz LF: $\pm 10$ dB @ 100 Hz			
Facility Inputs				
Frequency Response	20 Hz to 20 kHz, $\pm 1$ dB			
Sensitivity	0.775 V (0 dBu)			
Input impedance	10 kohms (balanced)			
Headroom	18 dB			
Noise Gate	-60 dB			
Main Outputs				
Output Power (1 kHz continuous sine wave)	46-120MK2	120 watts per zone nominal; 240 W total available in Power Sharing mode using odd/even pairs		
	46-240	240 watts per zone maximum		
Minimum load	Low-Z output	4 or 8 ohms		
		High-Z output	70 V-line	46-120MK2
	100 V-line		46-240	20.5 ohms
		46-120MK2	66 ohms	
46-240	33 ohms			
Frequency response	Low-Z output	20 Hz to 20 kHz, $\pm 1$ dB		
	High-Z output	20 Hz to 20 kHz, $\pm 1$ dB (65 Hz filter off)		
THD + N	< 0.05% @ 1 kHz			
Protection	Fixed level signal limiter: DC, over-current and over-temperature protection. Internal and external 20 mm cartridge fuses			
Utility and Auxiliary Outputs				
Nominal output level	0 dBu (0.775 Vrms), balanced			
Noise	<-90 dB, 22 kHz bandwidth			
General				
Power Input	Universal type, 85 to 265 VAC, 45 to 65 Hz			
Fuse details	46-120MK2	5 x 20 mm, time delay, T5A		
	46-240	5 x 20 mm, time delay, T8A		
Normal operating temperature	0 °C to 35 °C (Note: performance and specifications cannot be guaranteed outside of this range)			
Cooling	Forced air cooling (front to back)			

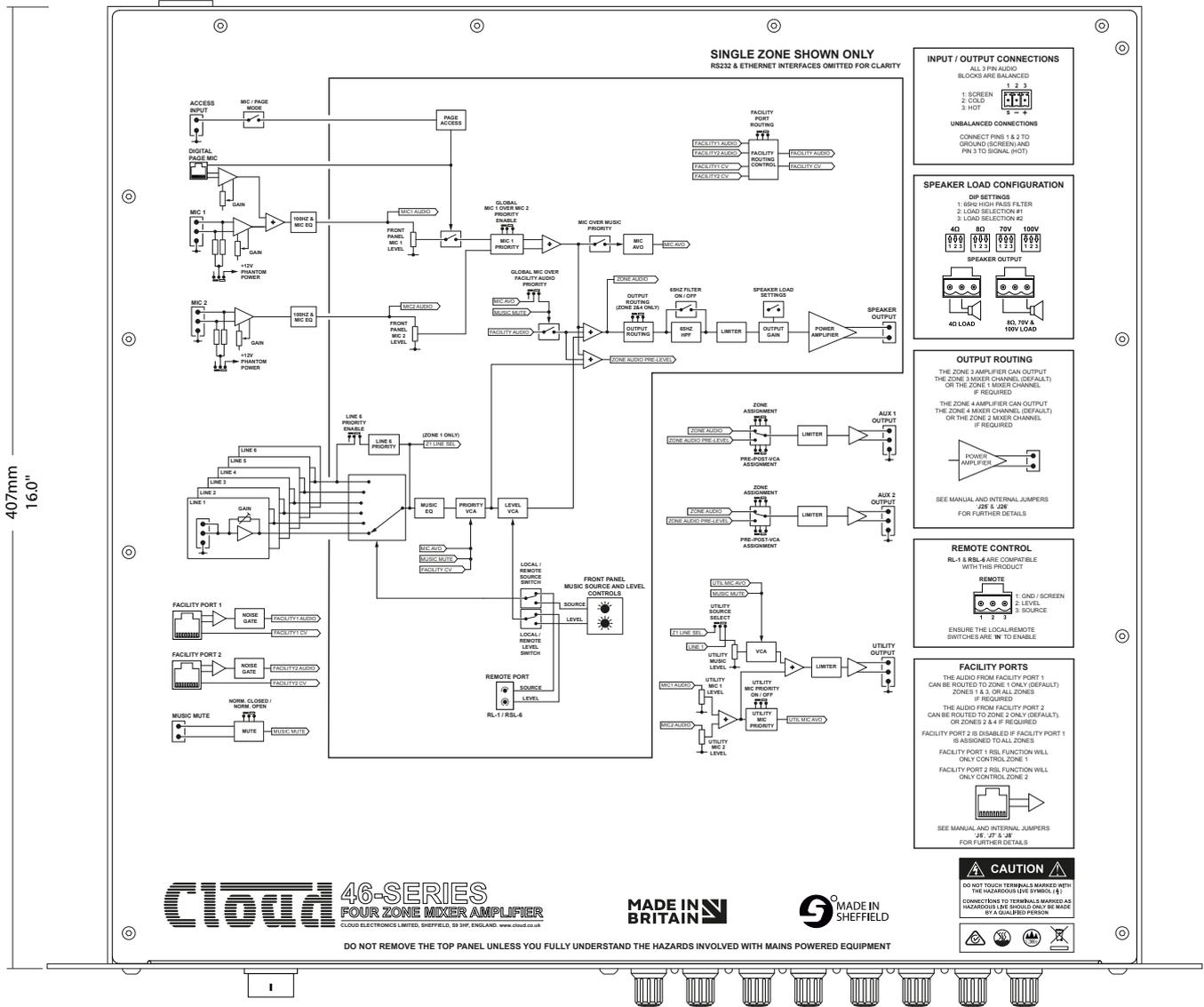
## Technical Specifications (continued)

Power consumption	Standby <sup>1</sup>	46-120MK2	9.35 W (29.33 VA)
		46-240	9.70 W (51.6 VA)
	Idle <sup>2</sup>	46-120MK2	31.05 W (52.27 VA)
		46-240	35.20 W (72.58 VA)
	1/8th Power <sup>3</sup>	46-120MK2	105.7 W (124.65 VA)
		46-240	187.95 W (226.45 VA)
	1/3rd Power <sup>4</sup>	46-120MK2	169.73 W (185.09 VA)
		46-240	309.90 W (350.17 VA)
Heat Loss	Standby <sup>1</sup>	46-120MK2	33.7 kJ/hr (31.9 BTU/hr)
		46-240	34.9 kJ/hr (33.1 BTU/hr)
	Idle <sup>2</sup>	46-120MK2	111.8 kJ/hr (106.0 BTU/hr)
		46-240	126.7 kJ/hr (120.2 BTU/hr)
	1/8th Power <sup>3</sup>	46-120MK2	176.6 kJ/hr (167.5 BTU/hr)
		46-240	243.1 kJ/hr (230.5 BTU/hr)
	1/3rd Power <sup>4</sup>	46-120MK2	219.2 kJ/hr (207.9 BTU/hr)
		46-240	348.1 kJ/hr (330.1 BTU/hr)
Dimensions (w x h x d)	Net	46-120MK2 and 46-240	482.6 mm x 88 mm (2U) x 407 mm 19" x 3.5" (2U) x 16.0" (less connectors & knobs)
	Shipping (Gross)	547 mm x 210 mm x 544 mm (21.5" x 8.3" x 21.4")	
Weight	Net	46-120MK2	6.9 kg (15.46 lb)
		46-240	7.1 kg (15.9 lb)
	Shipping	46-120MK2	9.15 kg (20.5 lb)
		46-240	9.35 kg (20.9 lb)

Notes re Power Consumption and Heat Loss measurements:  
All measurements at 230 VAC 50 Hz power input

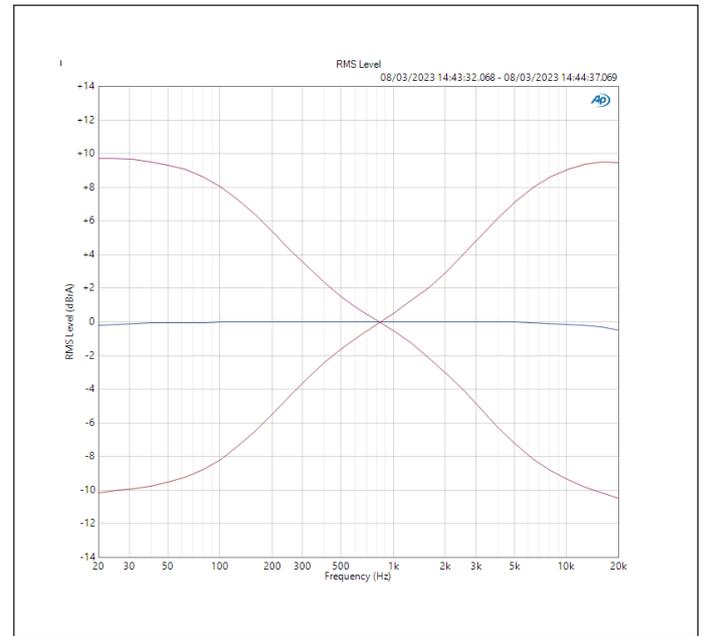
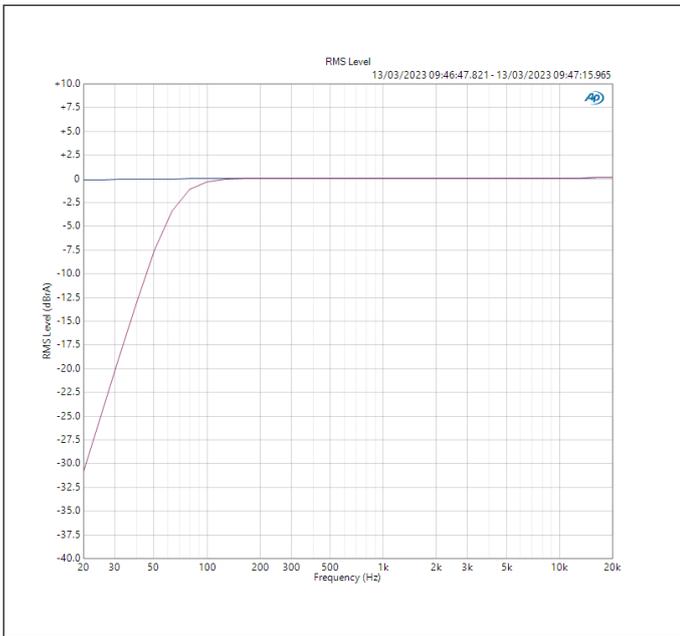
1. Standby: amplifier in standby state (**STATUS** LED steady red)
2. Idle: amplifier not in standby state (**STATUS** LED steady green), but no audio output
3. 1/8<sup>th</sup>. Power: constant sound level at one-eighth rated power output (audio mainly clean, only occasional clipping)
4. 1/3<sup>rd</sup>. Power: constant sound level at one-third rated power output (audio beginning to become compressed, limited or heavily clipped)

# Dimensions: 46 Series



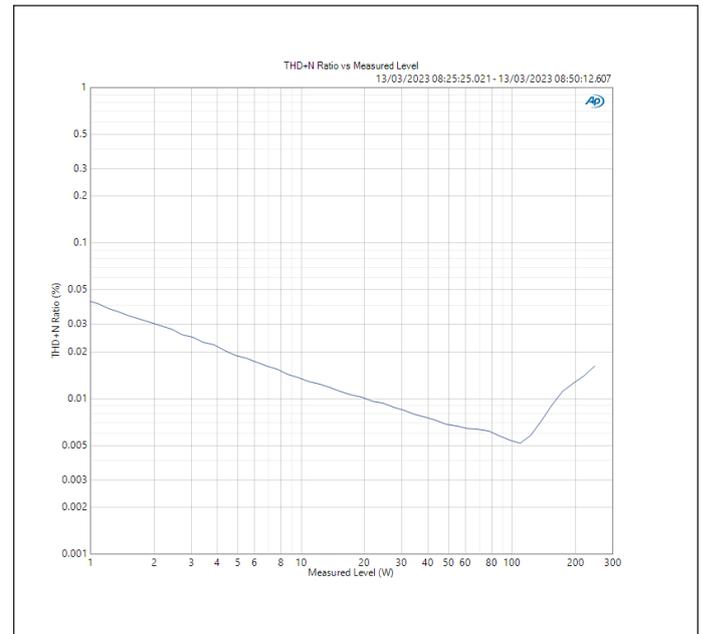
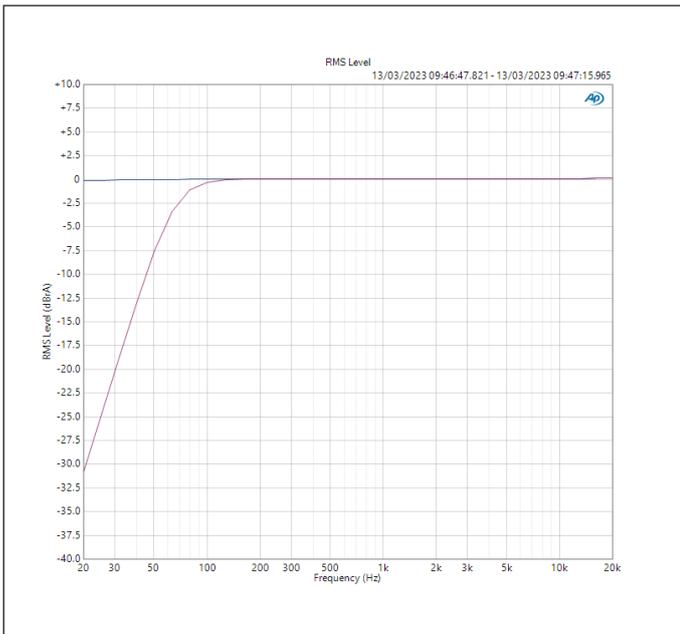
46-120MK2 and 46-240

## Performance Graphs (applicable both models)



Frequency response of the Mic inputs, including the maximum EQ adjustment available

Frequency response of the Line inputs, including the maximum EQ adjustment available



Frequency response of the 65 Hz high pass filter (available to speaker outputs only)

THD+N vs Output Power. Bandwidth limited to 10 Hz - 22 kHz

## Architect's and Engineer's Specification

The four-zone, mono mixer-amplifier shall be equipped with four balanced stereo music inputs, two unbalanced stereo music inputs and two balanced microphone inputs; all balanced inputs shall be via removable screw-terminal connectors and unbalanced inputs via phono sockets (RCA jacks). The music input to be used in each zone shall be selectable by a six-position front panel rotary switch. The music inputs shall be suitable for signals in the range -12 dBu to +8 dBu. The mic input shall be summed with a mono (L+R) sum of the selected music input. Each mic input shall have its own front panel level controls and it shall be possible to control the level of the music source independently of either mic level in each zone. Each music input and each mic input shall also have a rear panel gain control. Two-band equalisation adjustment shall be provided independently for each mic input and the selected music source; it shall be possible to adjust the music signal equalisation independently in each zone.

A control input shall be provided to activate one mic input by external contact closure and route it to any combination of zones; it shall be possible to configure the mixer-amplifier such that this function is overridden so that this mic input is always active. It shall be possible to configure the mixer-amplifier to perform the following additional functions: i) detection of a signal on this mic input will automatically reduce the music level by 25 dB, ii) one line input will automatically override all others, even if unselected.

Optional remote control panels shall be available to permit control of music level only or music level and input selection in any or all zones; it shall be possible to retrofit these to the mixer-amplifier at any time. An external control input shall be provided to allow muting of the music source by a fire alarm or other external emergency system.

The mixer-amplifier shall be equipped with control ports able to transmit and receive serial data (i) conforming to standard RS-232 protocols, (ii) conforming to TCP/IP protocols via 10/100 Mb/s Ethernet. The set of received commands shall include music level control, music source selection and level control and muting of either microphone input in each zone. This command set shall be regarded as a minimum requirement.

The microphone mixer stage shall include a high-pass filter to remove background LF noise below 100 Hz (-3 dB). A second high-pass filter shall be included to remove LF content below 65 Hz (-3 dB) from the mixed music and mic signals to minimise transformer saturation in 70/100 V-line systems; this filter shall be by-passable without removal of the unit's lid. Two separate internal fixed limiter circuits shall be fitted; these shall be located at i) the output of the microphone mixer stage and ii) at the input of the power amplifier stage. Operation of either limiter shall be indicated by a front panel LED. The mixer-amplifier shall incorporate protection circuitry that operates i) in the event of DC being detected at the amplifier output, ii) if excessive current is taken by the output load, or iii) if the temperature of either the power amplifier stage or power supply unit (PSU) exceeds 85°C (185°F).

The mixer-amplifier shall be available in two models, with output powers of 120 W or 240 W per zone. Each zone output shall be capable of driving either low impedance loads of four ohms or greater, or 70 V-line or 100 V-line systems: the output stage design shall be transformerless. It shall be possible to optimise the output stage in low-impedance mode for operation with four or eight ohm loads. It shall be possible to select any of the output options without removal of the unit's lid. There shall be a single output connector for each zone.

The 120 W version shall employ a power sharing principle when configured to drive 70 V-line or 100 V-line systems, such that a total amplifier power of 240 W may be intelligently shared between the two zones of each odd- and even-numbered zone pair to permit the connection of a different load in each zone.

The mixer-amplifier shall provide a balanced line level output taken from the output of the power amplifier input limiter stage; the signal at this output shall be a mix of music and mics and it shall be possible to configure the music component of the signal to be i) the music source selected on the front panel or via an external remote control, or ii) permanently set to one of the music inputs. The music level and the mic levels at this output shall be independently adjustable, the means of adjustment shall be external. There shall be two further balanced line level outputs, the source of which shall be assignable to be the same signals that are present at the main speaker outputs for two of the zones.

The mixer-amplifier shall be provided with two multi-function control ports using a connector of the RJ45 type. Optional active input modules shall be available which may be wired to these connectors using standard screened Category 5 cable. One version of active module shall enable external mic and/or line level signals to be routed to the zone from a remote location and also to select music source and music volume via this control port. An alternative version of module, which shall also connect using standard Category 5 cable, shall permit stereo audio to be routed to the control port using Bluetooth wireless connectivity. The multi-function control ports shall also permit the direct connection of a balanced audio source, and provide DC power for the remote modules. A signal applied to one control port shall be routed to Zone 1 by default, but it shall be possible to configure the mixer-amplifier so that the signal is routed to all zones or only Zones 1 and 3. A signal applied to the other control port shall be routed to Zone 2 by default, but it shall be possible to configure the mixer amplifier so that the signal is routed to Zones 2 and 4.

The mixer-amplifier design shall incorporate circuitry for protection of the power output stages and connected loudspeakers: the mixer-amplifier shall cease to pass audio and disconnect the loudspeakers in the event of excessive internal temperature or detection of DC or excessive current at the outputs. The mixer-amplifier shall automatically enter a quiescent mode if no input signals are received for either 15 minutes, and in this state the power consumption shall not exceed 10 W; the unit shall return to its normal operating state on the re-application of an input signal in less than 2 seconds. Quiescent mode shall be visually indicated on the front panel.

The mixer-amplifier shall be built in a 2U steel chassis for mounting in a standard 19" rack. Forced-air fan cooling with front-to-rear airflow shall be employed. The amplifier will be fitted with a front-panel power switch. The front panel shall provide visual indication of amplifier power status, with the following modes displayed: i) amplifier non-operational but power applied; ii) amplifier in normal operational state; iii) amplifier's protection mode triggered by a fault condition.

The mixer-amplifiers shall be the Cloud 46-120MK2 (120 W output per zone) and the Cloud 46-240 (240 W output per zone). The remote control plates shall be the Cloud RL-1 Series (music level only) and the Cloud RSL-6 Series (music level and source selection). The optional active modules shall be the Cloud LM-2 Series (mic/line input plus music level control and music source selection) and the Cloud BT-1 Series (Bluetooth audio input).



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