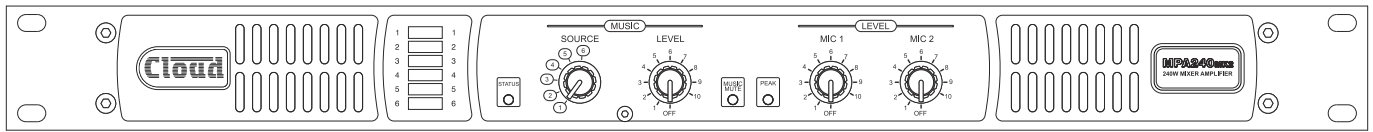
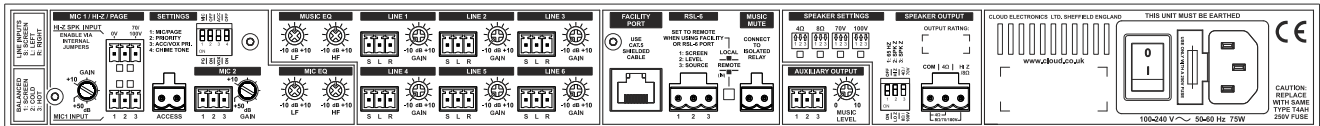


# CLOUD MPA MK2 Series Mixer-Amplifiers



Front panel view (MPA240 MK2 illustrated)



Rear panel view (MPA240 MK2 illustrated)

## General Description

The Cloud MPA Series is 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. It combines the functions of a two-channel microphone mixer with full paging facilities, a six-input music source selector and a mono power amplifier in a single 1U unit.

There are two models in the MPA range, which differ only in the rated power of the amplifier stage:

- MPA120 MK2: 120 watts
  - MPA240 MK2: 240 watts
- (ratings are into 4 ohms)

The MPA mixer-amplifiers have six unbalanced stereo line inputs for music sources, and two balanced microphone inputs. Each microphone input has its own rear panel sensitivity control and front panel gain control, allowing multiple mics to be mixed together. Each line input has a rear panel sensitivity control; the required music source is selected by a front panel rotary switch and the volume is also adjusted on the front panel. The selected music source is mixed with the summed mic signals before being fed to the power amplifier stage.

The MPA Series is compatible with the Cloud PM1 single-zone paging microphone, and may also be used for one of the zones supported by the Cloud PM4/8/12/16/4-SA/8-SA multizone paging microphones. Alternatively, Mic 1 input may be configured to suit most OEM paging systems; paging is activated by a short-to-ground access connection, and Mic 1 will have priority over Mic 2 to prevent announcement clashes (this priority may be overridden by moving an internal jumper). 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. A pre-announcement chime may also be enabled at installation. To allow integration into existing 70/100 V-line PA/VA systems, the mic channel also has a high impedance input which allows the local subsystem being driven by the MPA MK2 to carry paging and/or emergency announcements made using the building's main system. If the building's existing system is used for background music, the high impedance connection can alternatively be routed to the LINE 5 input by moving an internal jumper: this permits the

background music to be fed into the area covered by the MPA MK2, with the advantage of local or remote level control for that area alone.

The power output stage is transformerless, and is capable of driving 70/100 V-line loudspeaker distribution systems directly. Rear panel DIP switches allow the output voltage and impedance 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.

In addition to the main output, a balanced, line level Auxiliary Output is also available. This provides a music/mic mix: the music source can follow the front panel music source selection or be assigned to Line 1. The music level may be adjusted independently.

A particularly useful feature of the MPA MK2 Series is the Facility Port; this allows a remote input module 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 cable. 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 locally, simplifying the use of the area for presentations where portable audio sources are in use. The Facility Input is equipped with a fixed threshold noise gate to eliminate background noise in the absence of an input signal. LM-2 modules also provide remote control of music level and music source selection.

Additionally, music level may be controlled remotely using standard Cloud RL-1 Series remote control plates; both music level and source selection may be similarly controlled using RSL-6 Series plates.

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.

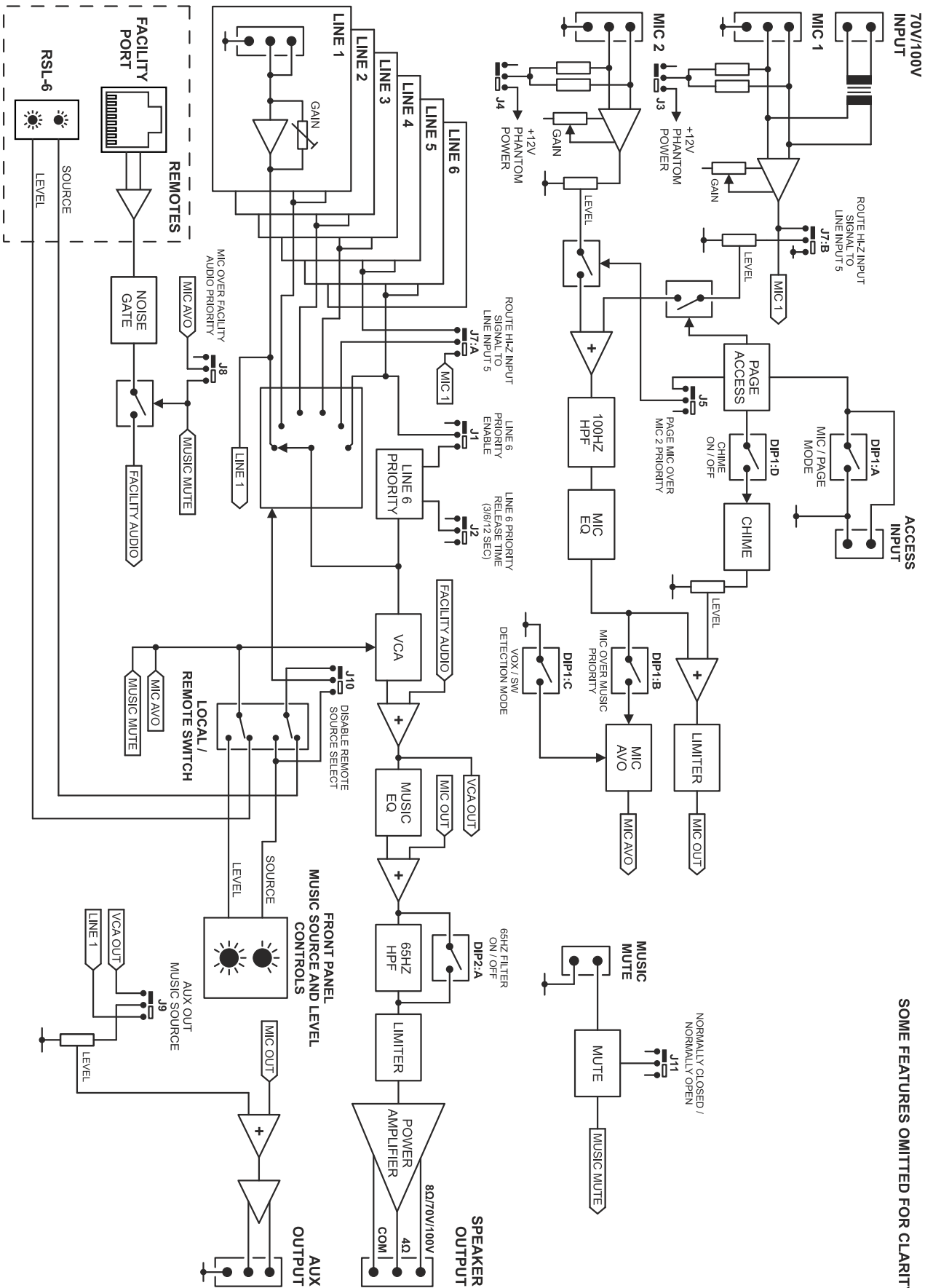
MPA MK2 Series mixer-amplifiers are very energy-efficient\* and draw very little power in a quiescent state. A user-selectable automatic power-down function puts the mixer-amplifier into an ultra-low-current standby mode after a preset period with no signal. A bicolour front panel LED indicates active status, and flashes red if a fault condition arises.

\*ENERGY STAR certification applied for

## Key features

- Provides amplification and simple control of music, mic sources and paging in a single unit
- Available in two versions, with output power ratings of 120 or 240 W
- Integral two-channel microphone mixer with per-input sensitivity adjustment
- Front panel controls for music source, music level and level of each mic input
- Six (unbalanced) stereo line inputs with individual sensitivity adjustment
- Two balanced mic inputs – 12 V phantom power available on either or both
- Fixed 100 Hz hi-pass mic channel filter
- 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 (rear panel) for mic signals and music source
- Paging control on Mic 1 input via short-to-ground access connection
- Mic 1 configurable as high-voltage input for paging from existing 70/100 V-line system
- High-voltage input alternatively selectable to Line 5 input: permits existing background music to be routed via MPA MK2.
- Selectable VOX mic-over-music priority on all mic Inputs
- Automatic Mic 1-over-Mic 2 priority in Page mode; may be overridden by internal jumper
- Selectable LINE 6 priority with choice of release times
- Selectable pre-announcement chime
- Music Mute control input (N/O or N/C) for interface to an emergency system
- Facility port 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 Port supports 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)
- Power amplifier protection circuitry
- Power amplifier input limiter
- Transformerless output stage can be configured to drive either 70/100 V-line systems directly, or low impedance loudspeakers (4/8 ohms)
- Switchable 65 Hz low-pass filter: reduces transformer saturation in 70/100 V-line systems
- Aux output from pre-amp (balanced, line level)
- Automatic power-down function (user-selectable)
- ENERGY STAR Certification applied for
- Convection cooled (MPA120 MK2); forced-air cooling with variable speed control (MPA240 MK2)
- 1U 19" rack mounting unit

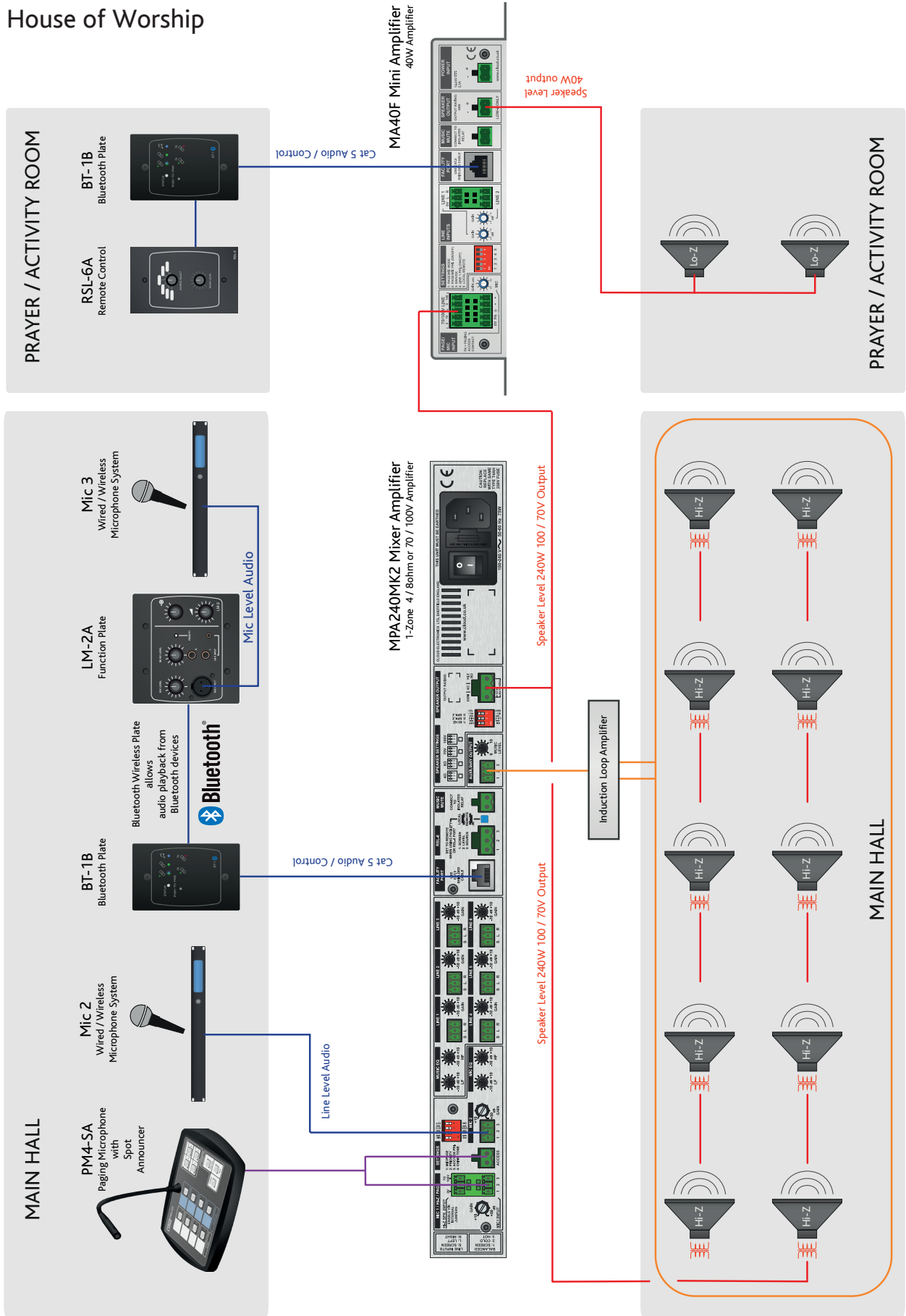
# Block Diagram



SOME FEATURES OMITTED FOR CLARITY.

# Application Example

## House of Worship



## 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	47 kohms			
Headroom	16 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	2.54 mV (-50dBu) to 245 mV (-10 dBu)			
Input Impedance	3.3 kohms (balanced)			
Phantom Power	12 V, switchable per-input by jumpers			
Headroom	16 dB			
Noise (EIN)	-126 dBu			
Equalisation	HF: $\pm 10$ dB @ 5 kHz LF: $\pm 10$ dB @ 100 Hz			
High voltage input				
Frequency Response	via Mic I i/p	-3 dB @100 Hz (fixed filter) to 20 kHz, $\pm 1$ dB		
	via Line 5 i/p	20 Hz to 20 kHz, $\pm 1$ dB		
Input Gain Control	10 dB to 20 dB			
Noise	<-90 dB (22 kHz bandwidth)			
Facility Input				
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)	MPA120 MK2	120 watts		
	MPA240 MK2	240 watts		
Minimum load	Low-Z output	4 ohms		
		High-Z output	70 V-line	MPA120 MK2
	100 V-line		MPA240 MK2	66 ohms
		MPA120 MK2	21 ohms	
MPA240 MK2	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			
Auxiliary Output				
Nominal output level	0 dBu (0.775 Vrms), balanced			
Noise	<-90 dB, 22 kHz bandwidth			

## Technical Specifications (continued)

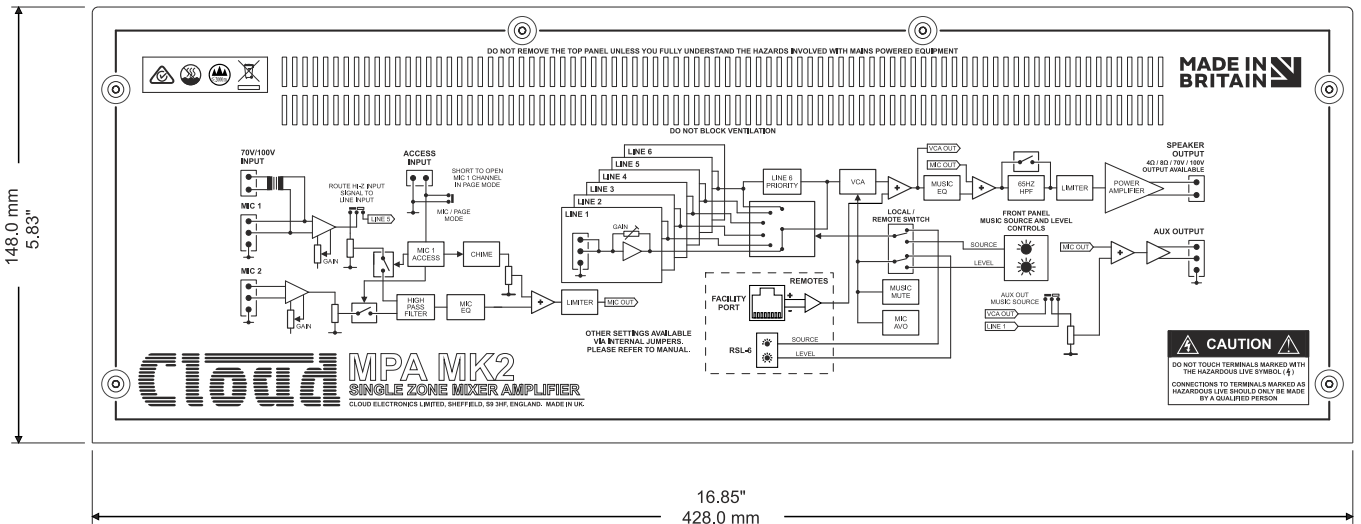
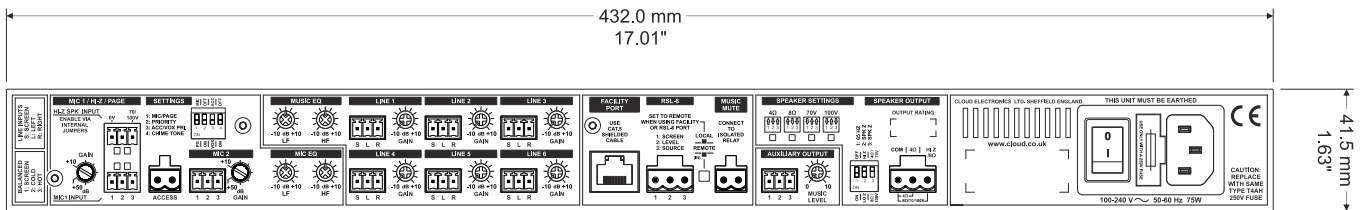
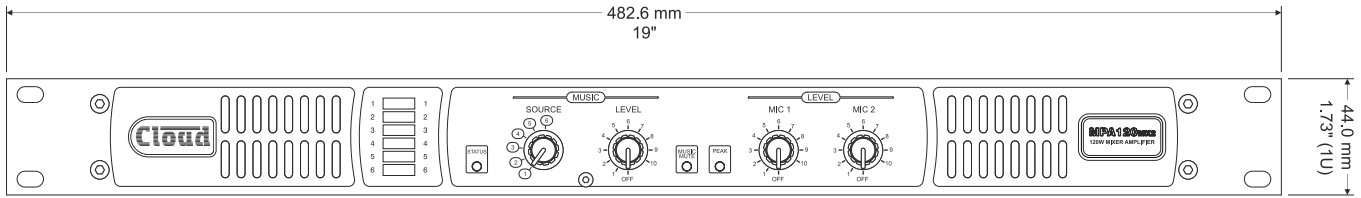
General			
Power Input	Universal type, 85 to 265 VAC, 45 to 65 Hz		
Fuse details	5 x 20 mm, time delay, 4 A		
Normal operating temperature	0 °C to 35 °C (Note: performance and specifications cannot be guaranteed outside of this range)		
Cooling	MPA120 MK2	Natural convection	
	MPA240 MK2	Forced air cooling, variable speed	
Power consumption	Standby <sup>1</sup>	MPA120 MK2	0.89 W (11.8 VA)
		MPA240 MK2	
	Idle <sup>2</sup>	MPA120 MK2	9.6 W (18.9 VA)
		MPA240 MK2	
	1/8th Power <sup>3</sup>	MPA120 MK2	29.9 W (40.6 VA)
		MPA240 MK2	48 W (56.7 VA)
	1/3rd Power <sup>4</sup>	MPA120 MK2	59 W (67.1 W)
		MPA240 MK2	104.6 W (112.5 VA)
Heat Loss	Standby <sup>1</sup>	MPA120 MK2	3.2 KJ/hr (3.1 BTU/hr)
		MPA240 MK2	
	Idle <sup>2</sup>	MPA120 MK2	34.5 KJ/hr (32.8 BTU/hr)
		MPA240 MK2	
	1/8th Power <sup>3</sup>	MPA120 MK2	53.2 KJ/hr (50.5 BTU/hr)
		MPA240 MK2	64.3 KJ/hr (60.9 BTU/hr)
	1/3rd Power <sup>4</sup>	MPA120 MK2	68.5 KJ/hr (64.0 BTU/hr)
		MPA240 MK2	87.7 KJ/hr (83.2 BTU/hr)
Dimensions (w x h x d)	Net	482.6 mm x 44 mm (1U) x 150 mm (less connectors & knobs) 19" x 1.75" (1U) x 5.9" (less connectors & knobs)	
	Shipping (Gross)	560 mm x 60 mm x 290 mm, 22" x 2.4" x 11.4"	
Weight	Net	2.15 kg / 4.8 lbs	
	Shipping	3.2 kg / 7.2 lbs	

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)

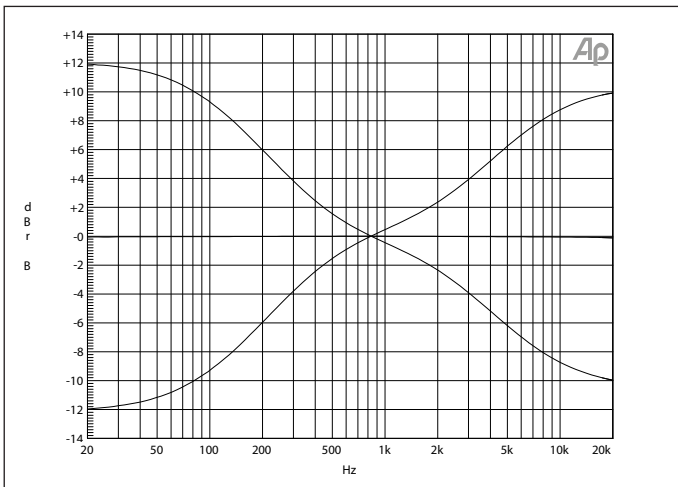
Dimensions: MPA MK2 Series



MPA120 MK2 illustrated: MPA240 MK2 dimensions are identical.

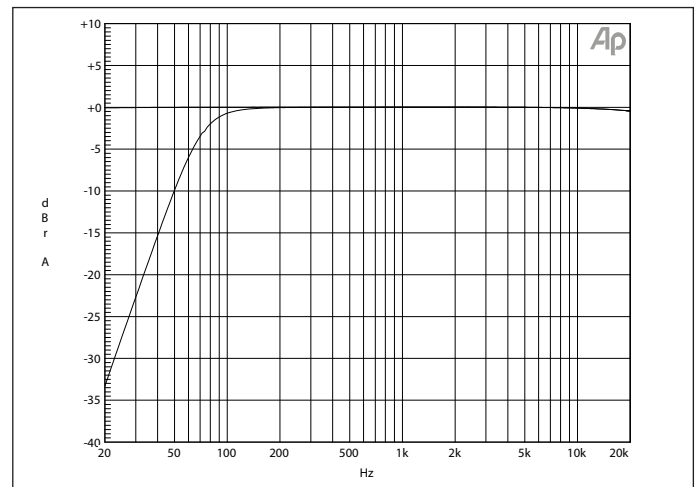
## Performance Graphs

### Music EQ



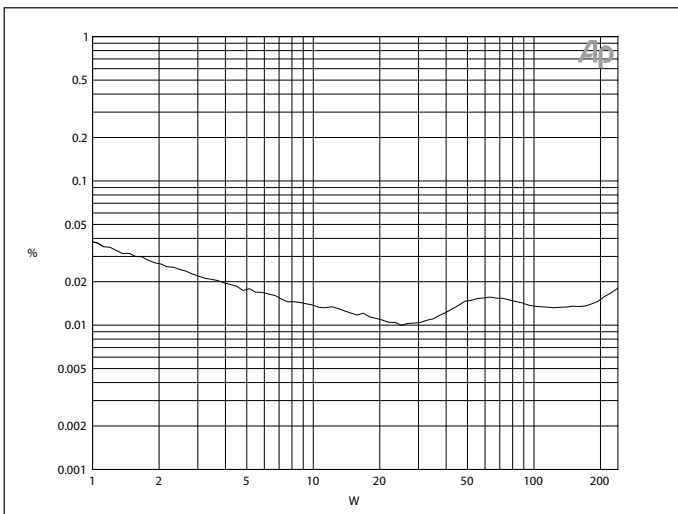
Frequency response of Music EQ applied to line input.  
Load = 4 ohms

### Line Frequency Response



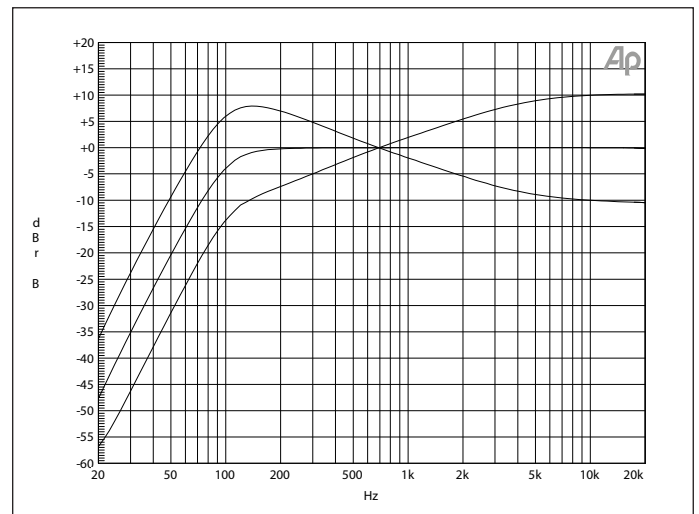
Frequency Response of Line input with 65 Hz filter enabled.  
Load = 4 ohms

### Line THD vs Power



THD+N (%) vs Output Power (W) into a 4 ohm load.  
1 kHz sine wave input.  
20 - 22 kHz analyser signal bandwidth.

### Mic Frequency Response



Mic input frequency response, including the rear panel Mic EQ response.  
Load = 4 ohms, middle trace is flat (MIC LF / HF set to 0 dB).  
100 Hz HPF evident.



## Architect's and Engineer's Specification

The mono mixer-amplifier shall be equipped with six unbalanced stereo music inputs and two balanced microphone inputs; all inputs shall be via removable screw-terminal connectors. The music input to be used shall be selectable by a six-position front panel rotary switch. The mic inputs shall be mixed together and summed with a mono (L+R) sum of the selected music input. Each mic input shall have its own front panel level control. It shall be possible to control the level of the music source independently of the mic levels. Each music input and each mic input shall also have a rear panel gain control. Two-band equalisation adjustment shall be provided independently for the selected music source and summed mic signals.

An alternative microphone input shall also be provided, which should be suitable for connection directly to a 100 V-line or 70 V-line loudspeaker system: the sensitivity of the input shall be reduced by 10 dB in this mode. It shall also be possible to re-assign this input to one of the music inputs.

A control input shall be provided to activate one mic input (Mic 1) by external contact closure; it shall be possible to configure the mixer-amplifier such that this function is overridden and Mic 1 is always active. It shall be possible to configure the mixer-amplifier to perform the following additional functions: i) when activated by its control input, Mic 1 will take priority over any other mic input in use; ii) detection of a signal on any mic input will automatically reduce the music level by 30 dB, iii) 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; 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 will include a chime generator circuit triggered by applying an external short circuit to a rear panel connector; it shall be possible to disable/enable this function without removing the unit's lid. The chime volume shall also be adjustable; this adjustment may be made internally.

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 100/70 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, measured into a 4 ohm load. The mixer-amplifier shall be capable of driving either low impedance loads of four or eight ohms, or 100 V-line or 70 V-line systems: the output stage design shall be transformerless. 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.

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 mic 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 at this output shall be adjustable, the means of adjustment shall be external.

The mixer-amplifier shall be provided with a multi-function control port using a connector of the RJ45 type. Optional active input modules shall be available which may be wired to this connector 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 any music input and adjust 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 port shall also permit the direct connection of a balanced audio source, and provide DC power for the remote modules.

The mixer-amplifier shall be compliant with the relevant provisions of EnergyStar® Eligibility Criteria Ver. 3.0 for Audio-Video Products. In the absence of an input signal, it shall automatically enter "standby" mode wherein the DC power consumption shall be less than 1 W. It shall be possible to override this mode by an internal jumper.

The mixer-amplifier shall be built in a 1U steel chassis for mounting in a standard 19" rack. Temperature-controlled forced-air fan cooling with front-to-rear airflow shall be employed on the 240 W version; the 120 W version shall be convection cooled. The amplifier will be fitted with a rear-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 MPA120 MK2 (120 W output) and the Cloud MPA240 MK2 (240 W output). 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).