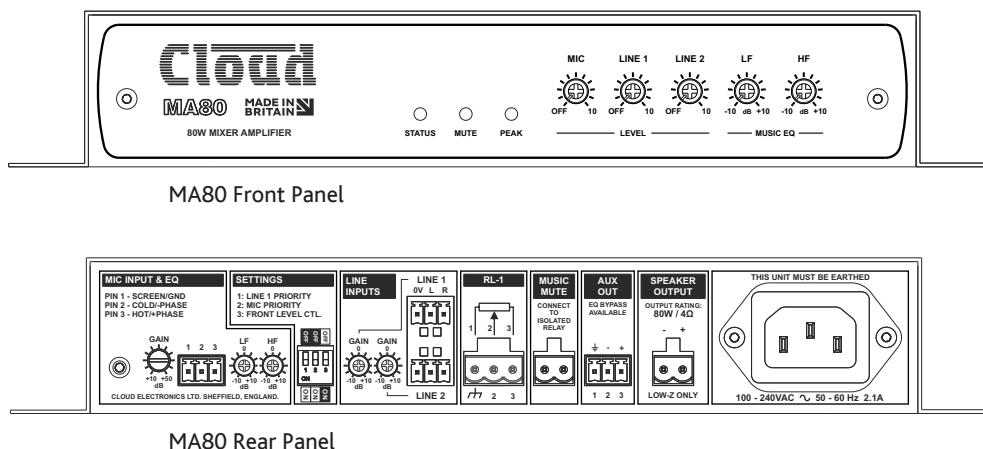


MA80 Mini Amplifier



General Description

The MA80 is a very compact mono amplifier designed for integration into installed audio and AV systems where de-centralisation of system components is advantageous. It is intended as an "install-and-forget" component, and is small enough to be fitted into a wall or ceiling void, or in any convenient location adjacent to a projector, flat screen display or loudspeakers, for example. A simple set of controls and configuration options makes it easy to integrate into any audio system. It is highly suitable for use with in-store digital signage, gallery and museum exhibits and fixed or mobile tour guide systems.

The MA80 can drive 80 W into a 4 ohm load. The power amplifier stage is fully protected against DC offset and over-current, and is also thermally protected. A switch-on delay function mutes the output during power-up and power-down to protect loudspeakers.

The amplifier mixes two unbalanced stereo line inputs with a balanced microphone input; the stereo inputs are summed to mono internally to form the 'music channel'. LINE 1 can be set to have priority over LINE 2 via a rear panel DIP switch to allow the connection of message stores, etc. The mic input can be configured (by another DIP switch) to automatically take priority over the line inputs when a mic signal is present, allowing its use for announcements. 12 V phantom power is available at the mic input, selectable by internal jumper.

Front panel controls are provided for MIC, LINE 1 and LINE 2 levels; additionally there are LF and HF EQ controls for the music channel which allow the amplifier's response to be optimised to suit the loudspeakers in use and room acoustics. A PEAK LED illuminates if the amplifier's dynamic clip protection becomes active, and thus clearly indicates the onset of distortion.

On the rear panel, each line input has a preset control for gain, while the mic input has preset gain and LF and HF EQ controls. A dedicated remote level control port is provided to permit the music level to be controlled by a standard Cloud RL Series remote control plate.

A 65 Hz high-pass filter, selectable by internal jumper, precedes the output stage and is included to allow the MA80 to drive 100/70/25 V-line loudspeaker systems (via an external transformer). Provision is also made for an EQ card to be fitted to optimise the amplifier's frequency response to suit various makes and models of installed sound loudspeakers.

A balanced, auxiliary line output is provided to allow additional power amplifiers to be connected, to drive active loudspeakers, or for any other purpose. The signal available at this output is the same mix of mic and line inputs fed to the power amplifier stage, but by moving an internal jumper, the source point may be changed so that the front panel EQ controls are bypassed (though they will still affect the main output).

In common with most Cloud products, a Music Mute Input is provided, which may permit compliance with local Fire Authority regulations; the microphone input remains active when the Music Mute is applied. A front panel MUTE LED illuminates if the Music Mute function becomes active.

To assist the MA80 in meeting local installation regulations, an optional conduit adapter kit is available (Warepart CA947034), which may be retrofitted to the rear panel, replacing the IEC inlet connector* with a non-removable mains connection to the amplifier. This makes the MA80 suitable for permanent installation in ceilings or similar plenum spaces.

The MA80 is very energy-efficient** and draws very little power in a quiescent state. A user-selectable automatic power-down function puts the 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 or green if a fault condition arises, the colour depending on the nature of the fault.

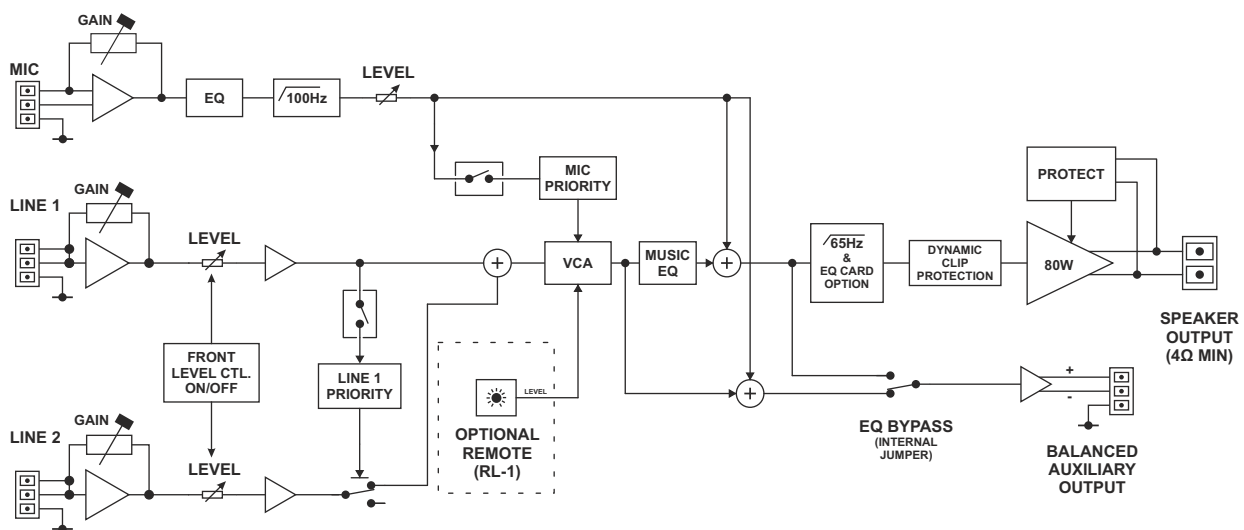
*Local regulations may apply: may require installation by a suitably qualified person.

**ENERGY STAR certification applied for.

Key features

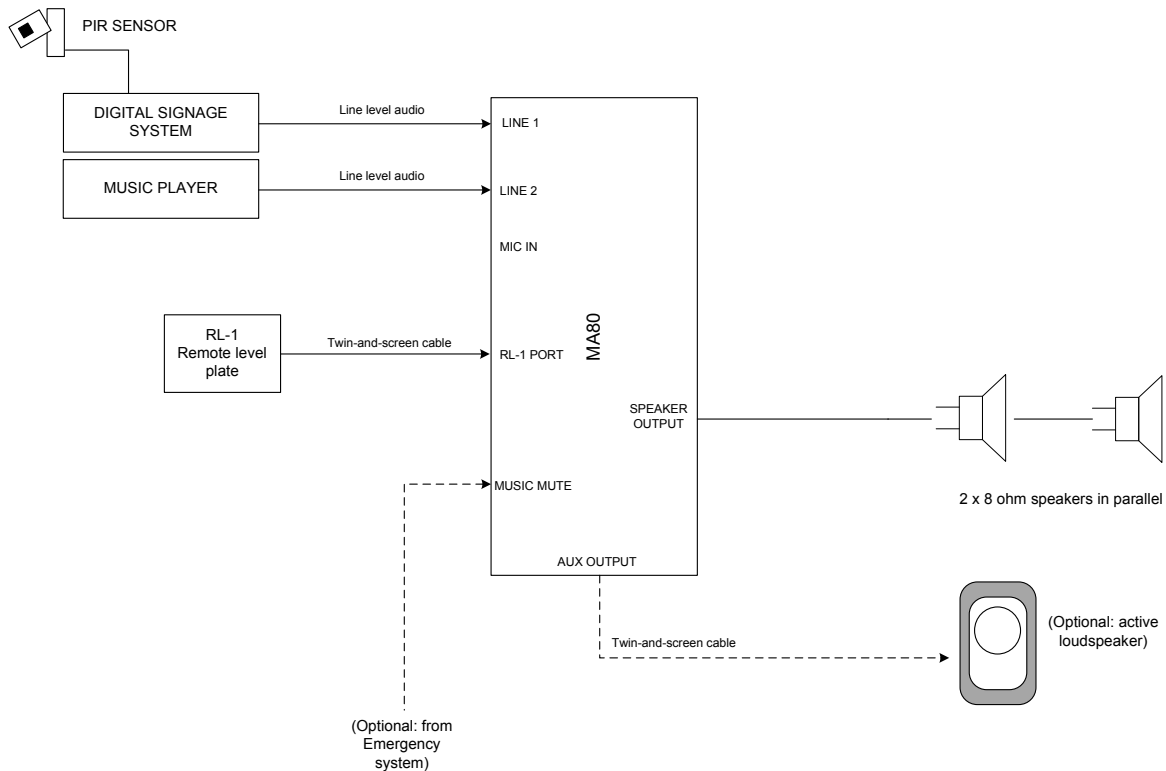
- Compact mono amplifier module for “install-and-forget” situations
- Two (unbalanced) stereo line inputs with individual sensitivity trims
- Electronically-balanced mic input with separate gain control
- Phantom power selectable by internal jumper
- Front panel control of music level and mic levels
- Front panel HF & LF EQ adjustments for music sources
- Rear panel HF & LF EQ adjustment for mic input
- Selectable MIC-over-LINE priority
- Selectable LINE 1-over-LINE 2 priority
- 80 W (4 ohms) power amplifier
- Optional EQ cards available to suit various popular installation loudspeakers
- Electronically-balanced auxiliary output
- Aux output source selectable pre- or post-EQ
- Remote level control port; compatible with Cloud RL Series plates
- Music Mute input; selectable N/O or N/C
- Automatic power-down function (user-selectable)
- Optional conduit adapter plate available: permits permanent mains connection
- Less than 1 W power consumption in sleep mode
- Convection cooled – silent in operation
- Power requirements: 100 to 240 V AC, 50 to 60 Hz

Block Diagram



System Example

Adding audio to digital signage with an MA80



Video displays used in digital signage systems do not normally incorporate loudspeakers, and if they do, audio quality is frequently poor due to size constraints. The system shown here uses an MA80 to improve the audio in a digital signage system. The compact size of the MA80 makes it practical to attach it by some simple means to the rear of the displays themselves.

The audio feed from the signage system is connected to Line Input 1, a source of background music is connected to Line Input 2 and Line 1 Priority is enabled. In this scenario, the background music plays continuously until a visitor approaches the digital signage system and triggers the PIR sensor. This initiates the replay of video and the accompanying audio, which automatically replaces the background music. When the video clip finishes, the background music resumes. An RL-1 remote level control plate could be installed in a location convenient to staff to permit easy adjustment of volume.

This is an example of an “install-and-forget” system; at the end of each day the MA80 would automatically enter its ultra-low power state once the audio feeds are stopped.

Two passive loudspeakers are shown, connected in parallel. Alternatively (or additionally), an active loudspeaker could be driven from the Auxiliary Output.

Technical Specifications

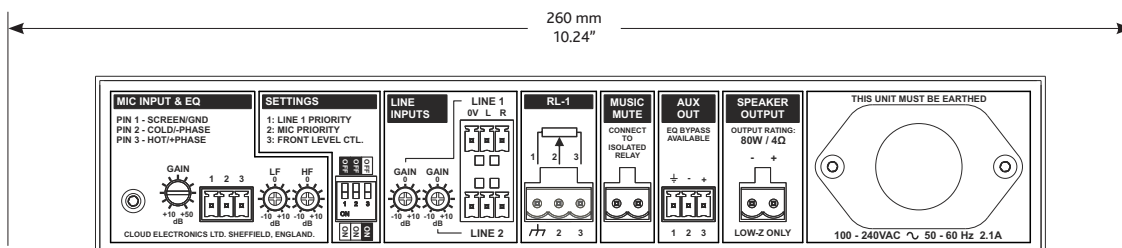
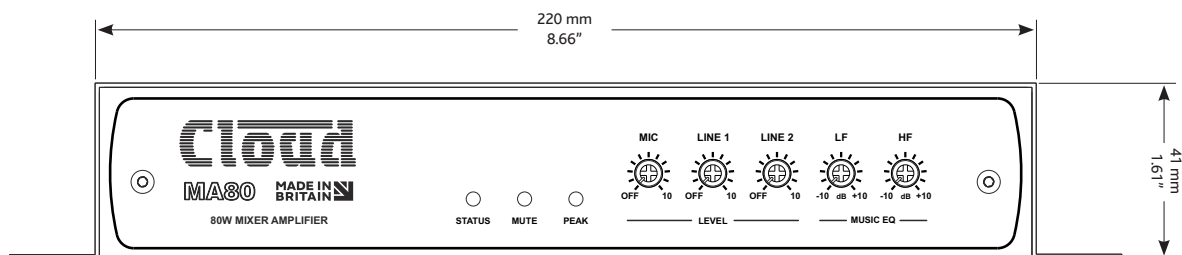
Line Inputs		
Frequency Response	±1 dB, 20 Hz to 20 kHz	
THD+N	<0.05% (1 kHz, full power, 22 kHz bandwidth)	
Sensitivity	-12 dBu (195 mV) to +8 dBu (2.0 V)	
Input Gain Control	20 dB range	
Input Impedance	47 kohms	
Headroom	16 dB	
Noise	<-95 dB	
Music Equalisation	LF: ±10 dB @ 50 Hz, HF: ±10 dB @ 10 kHz	
Microphone Input		
Frequency Response	-3 dB @ 100 Hz (filter) to 20 kHz +/-1 dB	
THD+N	<0.05% (1 kHz, full power, 22 kHz bandwidth)	
Gain	10 dB to 50 dB	
Input Impedance	2.7 kohms (balanced)	
Headroom	16 dB	
Noise	EIN: -127 dB (22 kHz bandwidth, Rs = 150 ohms)	
Phantom Power	+12 V (internal jumper)	
Mic Equalisation	LF: ±12 dB @ 100 Hz, HF: ±12 dB @ 5 kHz	
Main Output		
Output Power (1 kHz continuous sine wave)	80 W into 4 ohms, 1 kHz continuous sine wave	
High Pass Filter	-3 dB @ 65 Hz (selectable by internal jumper)	
Auxiliary Output		
Max output level	0 dBu (0.775 Vrms)	
General		
Power Supply (internal)	Universal type, 100 V to 240 V, 50 to 60 Hz	
Power consumption	Standby ¹	0.88 W, 7.35 VA
	Idle ²	5.41 W, 13.39 VA
	1/8th Power (4 ohms) ³	17.4 W, 31.75 VA
	1/3rd Power (4 ohms) ⁴	30.4 W, 50.58 VA
Heat Loss	Standby ¹	3.2 KJ/hr (3.0 BTU/hr)
	Idle ²	19.5 KJ/hr (18.5 BTU/hr)
	1/8th Power (4 ohms) ³	26.3 KJ/hr (24.9 BTU/hr)
	1/3rd Power (4 ohms) ⁴	27.0 KJ/hr (25.6 BTU/hr)
Amplifier protection	Fixed level signal limiter. Protection against DC, PSU overcurrent, amplifier overcurrent, over-temperature. Resettable internal breaker (no fuses)	
Cooling	Natural convection	
Dimensions (w x h x d)	Net	260 mm x 41 mm x 180 mm, 10.24" x 1.61" x 7.09"
	Shipping	400 mm x 145 mm x 255 mm, 15.75" x 5.71" x 10.0"
Weight	Net	1.35 kg
	Shipping	2.05 kg

Notes re Power Consumption and Heat Loss measurements:

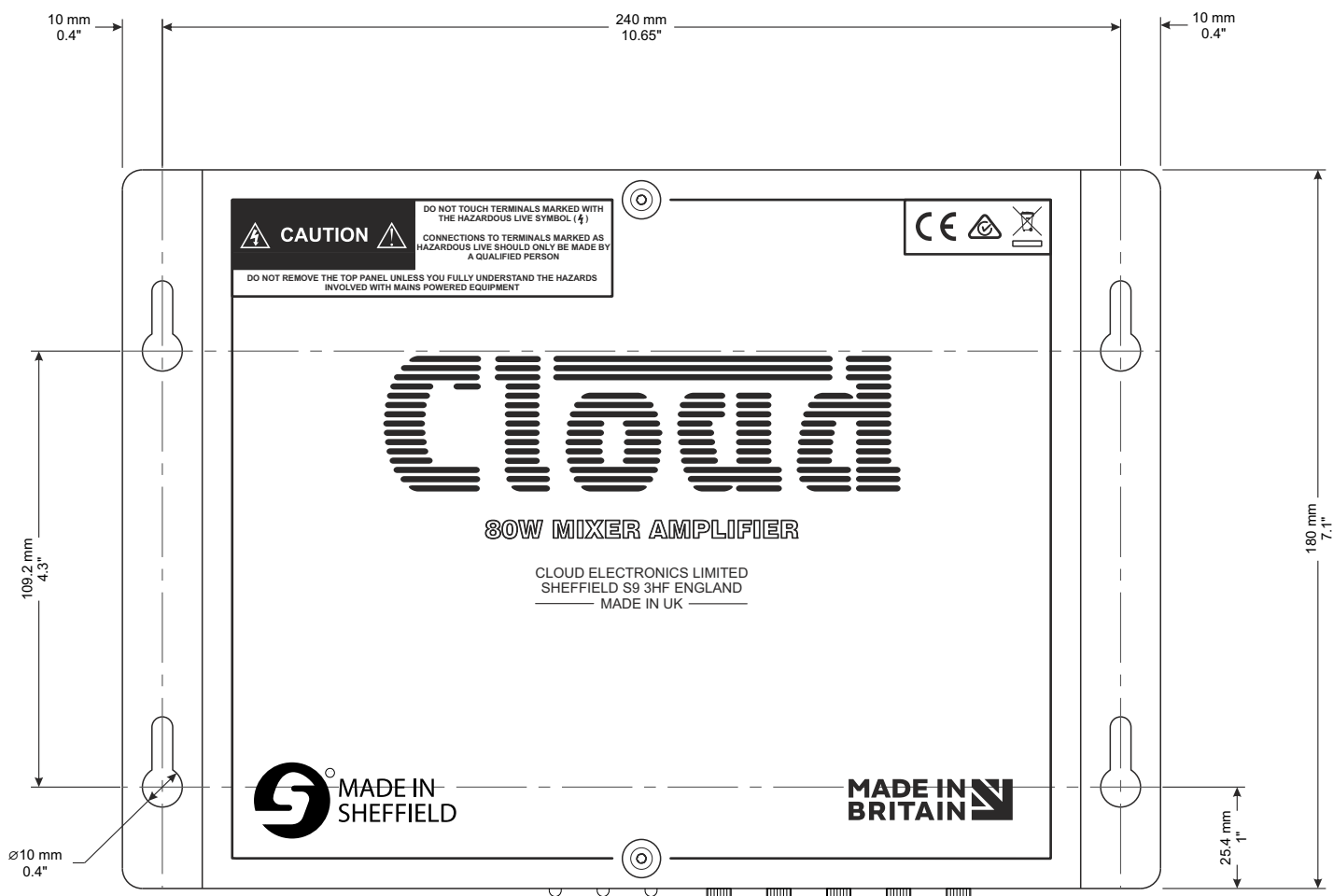
All measurements at 230 VAC 50 Hz power input

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. 1/8th Power: constant sound level at 10 W output (audio mainly clean, only occasional clipping)
4. 1/3rd Power: constant sound level at 27 W output (audio beginning to become compressed, limited or heavily clipped)

Dimensions: MA80

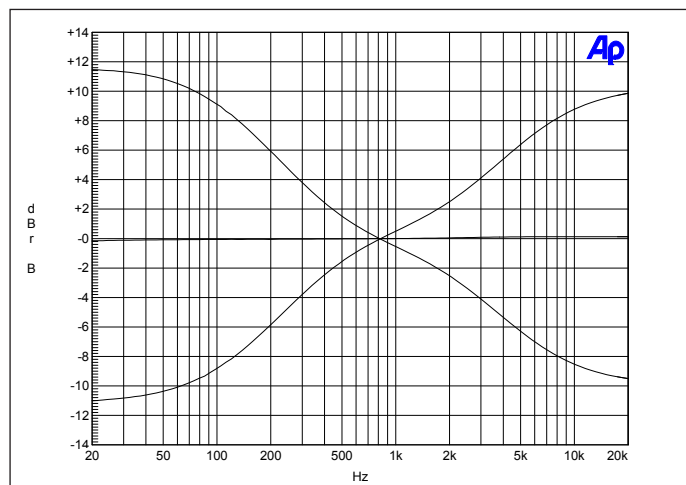


Shown fitted with
optional conduit adaptor



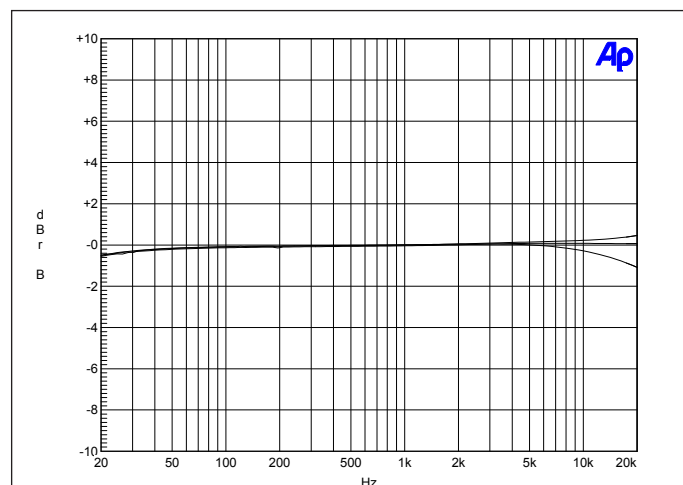
Performance Graphs

Music EQ



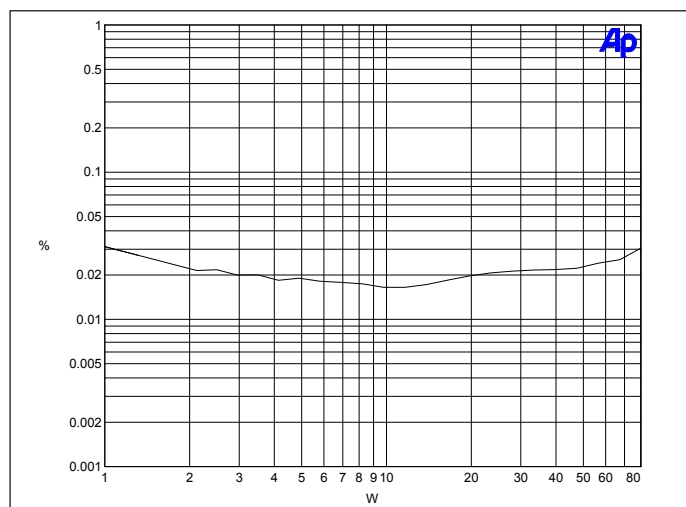
Frequency response of Music EQ (front panel) applied to line input.
Load = 8ohm

Line Frequency Response



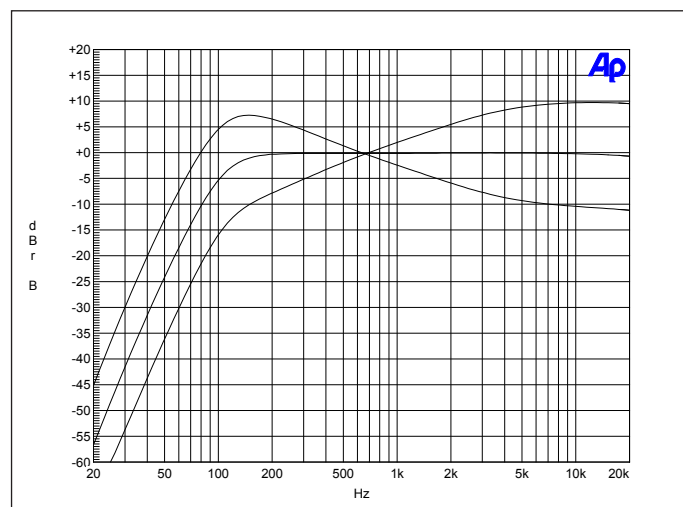
Frequency Response of Line input under 3 different load conditions.
4ohm, 8ohm & 16ohm (from bottom to top) (8ohm is flat)

Line THD vs Power



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

Mic Frequency Response



Mic input frequency response, including the rear panel Mic EQ response.
Load 8 ohm, middle is flat (MIC LF / HF set to 0)
100 Hz HPF evident

Architect's and Engineer's Specification

The single channel amplifier shall have a low-impedance output able to deliver 80 W into a 4 ohm load. The output shall be via a plug-in screw terminal connector.

The amplifier shall be equipped with two unbalanced stereo line inputs and an electronically balanced microphone input; the line inputs shall be summed internally to mono (the music channel), and mixed with the microphone input. The front panel shall be fitted with a microphone level control, separate level controls for each line input and HF and LF equalisation controls for the music channel. Each of the three inputs shall have rear panel sensitivity controls; the microphone input shall have in addition HF and LF equalisation controls: all rear panel rotary controls shall be of the preset type. Phantom power shall be available at the microphone input, selectable by an internal jumper. All input connections shall be via plug-in screw terminal connectors. There shall be visual indication on the front panel if any input signal activates the amplifier's clip protection.

It shall be possible to configure the mixer to perform the following functions: i) detection of a signal on the microphone input will automatically mute the music signal, ii) detection of a signal on one line input will automatically override the other. It shall be possible to select these configurations without removing any part of the amplifier housing.

The amplifier shall include a high-pass filter of a design permitting the amplifier to be used with 100 V, 70 V or 25 V-line loudspeaker systems without LF distortion. The filter shall reject frequencies below 65 Hz and it shall be possible to switch the filter in or out of circuit as required. It shall be possible to modify the amplifier's frequency response to optimise it for use with a range of common installation loudspeakers by the addition of optional, plug-in, internal cards.

A control input shall be provided to permit the music output level of the amplifier to be adjusted from a remote location; an optional accessory shall be available to facilitate this. The input connector shall be of the plug-in screw-terminal type.

An auxiliary output shall be available; this shall be balanced and at nominal line level. The connector shall be of the plug-in screw-terminal type. The output shall carry the same mix of music channel and mic signal as the main output. It shall be possible to select whether the music channel element of the mix is derived pre or post the front panel EQ.

An external control input shall be provided on a plug-in screw terminal connector to allow muting of the music channel by a fire alarm or other external emergency system via isolated, 'voltage-free' contacts, and this input shall be configurable to respond to either a short or open external circuit. There shall be visual indication of the mute input's state on the front panel.

The 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. There shall be colour-coded visual indication of the amplifier's status (i.e., active, standby or faulty) on the front panel.

The amplifier shall be built in a robust steel housing suitable for installation in unattended locations. Cooling shall be by natural convection. The amplifier shall operate from any AC mains supply voltage from 100 V to 240 V. The power input connector shall be a standard IEC type. It shall be possible for suitably-qualified personnel to replace the IEC connector with a standard 20 mm diameter cable inlet conduit to permit the amplifier to be installed in sealed environments where a permanent AC supply is mandated.

The amplifier shall be the Cloud MA80. The optional remote control plate shall be the Cloud RL-1 Series. The optional conduit adapter shall be Cloud Warepart CA947034.