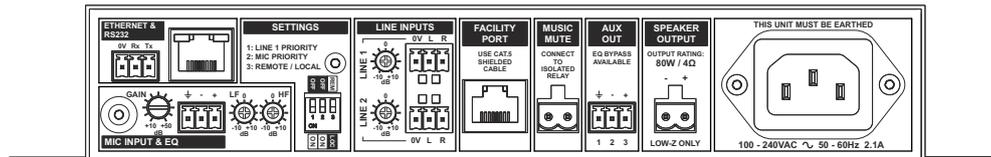


MA80E Front Panel



MA80E Rear Panel

General Description

The MA80E is a very compact mono amplifier of advanced design, designed for integration into installed audio and AV systems where de-centralised installation is advantageous. It may be considered 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 projectors, flat screen displays or loudspeakers, for example. It is highly suitable for use with in-store digital signage, gallery and museum exhibits and fixed or mobile tour guide systems.

The MA80E will operate "out of the box" in its basic configuration: a simple set of manual controls and configuration options makes it quick and easy to integrate into any audio system. Greatly enhanced control of the MA80E can be achieved through the internal web server, including further setup options and control of the amplifier's DSP section.

The MA80E can drive 80 W into a 4 ohm load. The power amplifier stage incorporates a Dynamic Clip Protection stage at its input and is fully protected against DC offset, 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 has two unbalanced stereo line inputs and a balanced microphone input. The L and R inputs of each line input are summed together to mono. By default both are active, and form the 'music channel', though each input may be selected individually via the web control page. 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 is then mixed with the music channel, but 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. 24 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 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 the source point may be changed via the web browser pages (see below) so that the front panel music channel EQ controls are bypassed for the auxiliary output, though still affecting the main output.

A greatly enhanced set of device features is available once the password-protected web pages are accessed through the Ethernet port. Depending on which functions the installer wishes to devolve to software control, some or all of the MA80E's physical controls may be disabled and thus the amplifier's setup can be placed under the user's control to a degree that suits the installation and the user.

The main control page is logically divided into seven tabs. The Line Inputs tab allows remote level control of input level and source selection (Line 1/Line 2/mixed/neither). The Mic Input tab has level and EQ controls for the mic input. The Room EQ tab allows control of EQ in either "simple" (two-band) or advanced (seven-band) modes, permitting extremely accurate equalisation to suit room acoustics. The Music EQ tab is a read-only page showing the settings of the front panel EQ controls, but allows them to be disabled if desired. The Speaker EQ tab allows the installer to optimise the amplifier channels to suit specific loudspeakers. Certain speaker EQ curves may be recalled as presets (if installed via firmware update): alternatively they may be entered manually into a dedicated five-band equaliser section using manufacturers' supplied data. A variable frequency fourth-order high-pass filter is included to remove LF content: this is desirable if the amplifier is used to drive 100/70/25 V-line systems via an external transformer. The Auxiliary Out tab allows level control and pre/post EQ selection for the balanced Aux Out signal, and the Master tab provides a Mute button which affects the amplifier output.

Further web pages allow general device configuration, such as channel labelling, Ethernet settings, definition of power-up conditions and serial port baud rate. A multi-user system of passwords is catered for: each user can be given specific access privileges at installation to prevent unauthorised system adjustment.

General Description (continued)

A particularly useful feature of the MA80E is the RJ45 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 Port 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 LINE 1/LINE 2 selection.

In addition to the control facilities provided by the web browser pages, the MA80E can also be controlled via RS-232 serial commands, which can be applied either to the unit's standard serial port, or via Ethernet.

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 MA80E 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 MA80E suitable for permanent installation in ceilings or similar plenum spaces.

The MA80E 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.

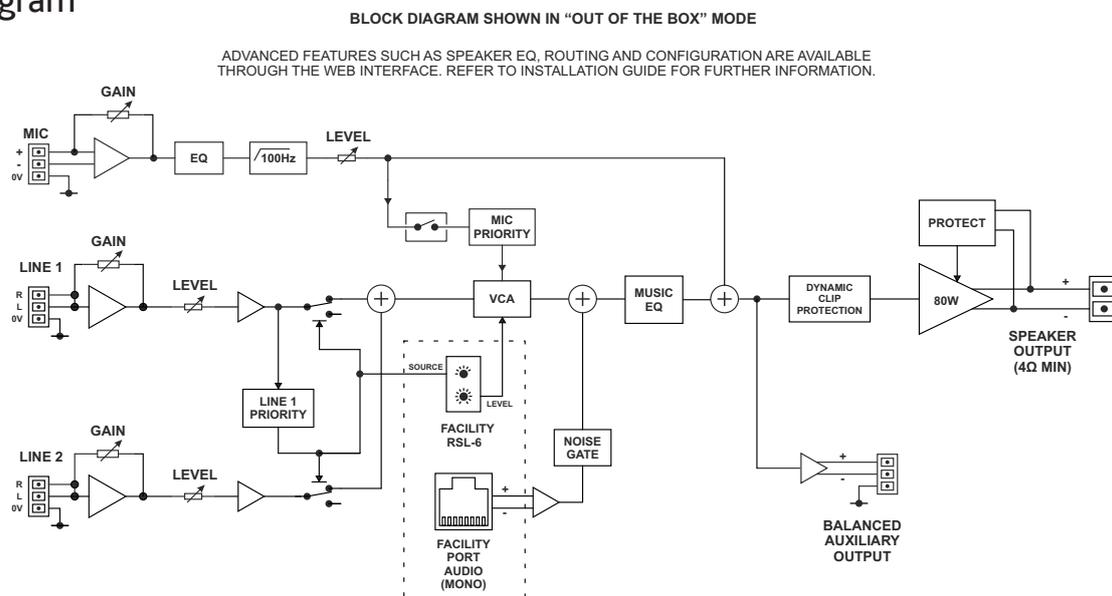
*Local regulations may apply: may require installation by a suitably qualified person.

**ENERGY STAR certification applied for.

Key features

- Compact mono amplifier module for "install-and-forget" situations
- Ready for "out-the-box" installation
- Internal web server for simple and secure setup and control from any location
- 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 and mic levels
- Front panel HF & LF EQ adjustments for music channel
- Rear panel HF & LF EQ adjustment for mic input
- Selectable MIC-over-LINE priority
- Selectable LINE 1-over-LINE 2 priority
- Extensive set of DSP functions for advanced configuration from web browser:
 - Input source selection
 - Input and output level control (inc. Aux Out)
 - 7-band room EQ section
 - Variable-frequency high-pass filter for use with 100/70 V-line systems
- 5-band Speaker EQ to suit various popular installation loudspeakers
- Master output mute
- Comprehensive password/access privilege control
- Front panel controls may be disabled when browser control is in use
- Facility port for connection of LM-2 or BT-1 remote mic/line input modules via screened Cat 5 cable; also allows remote control of music level and source
- 80 W (4 ohms) power amplifier
- Electronically-balanced auxiliary output with source selectable pre- or post music EQ
- Music Mute control input (N/O or N/C) for interface to emergency system
- RS-232 control of all amplifier functions via serial port or Ethernet
- Automatic power-down function (user-selectable)
- Optional conduit adapter plate available: permits permanent mains connection
- Less than 3 W power consumption in sleep mode
- Convection cooled – silent in operation
- Power requirements: 100 to 240 V AC, 50 to 60 Hz

Block Diagram



Examples of web control pages

Zone 1

Line Inputs

Input Source

Enabled Yes

Source ← Line 2 →

Line 1 Level

Enabled Yes

Level − −36 +

Priority No

Input Routing

Room EQ

Enabled Yes

Advanced mode On

Band 1 2 3 4 5 6 7

Low Shelf On

− 60 + − 0 +

Freq (Hz) Gain (dB)

Room EQ

Music EQ

Enabled Yes

0 0

LF (dB) HF (dB)

Music EQ

Auxiliary Out

Aux Level − −14 +

Aux EQ ← Use Music EQ →

Auxiliary Output

Speaker EQ

Protect Enabled Yes

HP Filter − 65 +

Freq (Hz)

EQ Enabled Yes

Advanced mode Off

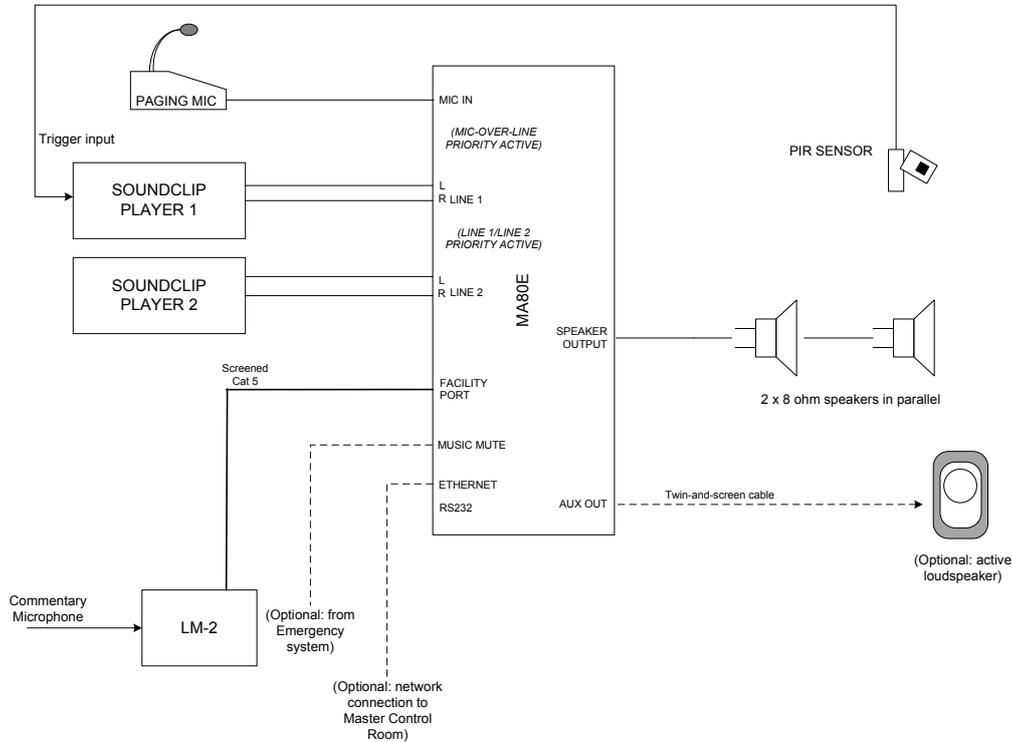
Manufacturer ← None →

Model ← Flat →

Speaker EQ

System Example

Theme park attraction with an MA40E



The system shown here shows how the features of an MA80E could be used to provide sound effects for an attraction in a theme park or museum. Soundclip Player 2 plays continuous background FX until an approaching visitor triggers a PIR sensor (or similar) to initiate replay of an alternative sound effect from Soundclip Player 1. Setting Line 1/Line 2 Priority to ON will ensure that the audio from Player 1 will override that from Player 2. An LM-2 remote input module is connected to the Facility Port (using screened Cat 5 cable) allowing a commentary microphone to be routed through the sound system when required.

A second microphone could be connected to the MIC input to permit general announcements to be made while commentary is not in progress. MIC-over-LINE priority should be set to ON to allow announcements to automatically override the Soundclip Players.

The amplifier is connected to the attraction's Ethernet network, making it possible for staff in the master control room to adjust levels, etc. In common with most other Cloud products, the amplifier's Music Mute input can be connected to a site-wide alarm system to ensure that the audio is muted in the event of an emergency.

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	<0.025% @ 1 kHz, full power (22 kHz bandwidth)
Sensitivity	-12 dBu to +8 dBu (195 mV to 2.0V)
Input Gain Control	20 dB range
Input Impedance	47 kohms
Headroom	10 dB
Noise	<-90 dB rms (22 kHz bandwidth)

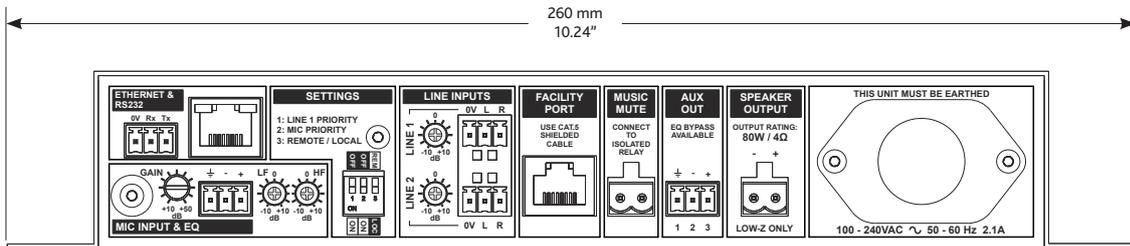
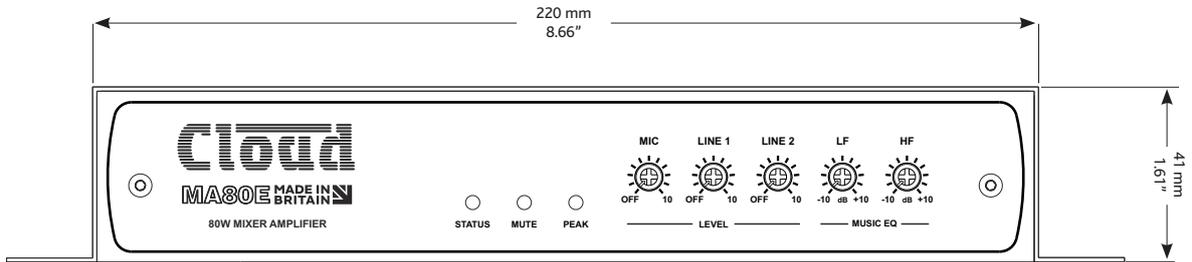
Technical Specifications (continued)

Microphone Input		
Frequency Response	-3 dB @ 100 Hz (fixed filter) to 20 kHz \pm 1 dB	
THD + N	<0.025% @ 1 kHz, full power (22 kHz bandwidth)	
Sensitivity	-50 dBu to -10 dBu (2.45 mV to 245 mV)	
Input Gain Control	10 dB to 50 dB	
Input Impedance	2.7 kohms (balanced)	
Headroom	16 dB	
Noise (EIN)	-127 dB, 22 Hz – 22 kHz (Rs = 150 ohms)	
Common mode rejection	>50 dB	
Phantom Power	+24 V (internal jumper)	
Facility Input		
Sensitivity	0.775 V (0 dBu)	
Input Impedance	10 kohms (balanced)	
Headroom	10 dB	
Noise Gate	-55 dBu	
Equalisation		
Music EQ (front panel)	HF: \pm 10 dB @ 10 kHz; LF: \pm 10 dB @ 50 Hz	
Mic EQ (rear panel)	HF: \pm 10 dB @ 5 kHz; LF: \pm 10 dB @ 100 Hz	
Room EQ (via web pages)	7-band parametric EQ with optional low and high shelf	
Protection EQ (via web pages)	Fourth-order high-pass filter, 40 Hz – 20 kHz	
Speaker EQ (via web pages)	5-band parametric EQ	
Main Output		
Output Power	80 W into 4 ohms (1 kHz continuous sine wave)	
Amplifier protection	Fixed level signal limiter. Protection against DC, PSU overcurrent, amplifier overcurrent, over-temperature, under/over supply voltage. Resettable internal breaker (no fuses)	
Auxiliary Output		
Max output level	0 dBu (0.775 V)	
General		
Power Input	Universal type, 100 V to 240 V, 50 to 60 Hz	
Power consumption	Standby ¹	2.917 W, 9.66 VA
	Idle ²	5.04 W, 12.66 VA
	1/8th Power (4 ohms) ³	17.21 W, 31.52 VA
	1/3rd Power (4 ohms) ⁴	33.94 W, 56.47 VA
Heat Loss	Standby ¹	10.5 KJ/hr (10.0 BTU/hr)
	Idle ²	18.1 KJ/hr (17.2 BTU/hr)
	1/8th Power (4 ohms) ³	27.0 KJ/hr (25.6 BTU/hr)
	1/3rd Power (4 ohms) ⁴	27.6 KJ/hr (26.2 BTU/hr)
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 10.00"
Weight	Net	1.35 kg
	Shipping	2.05 kg

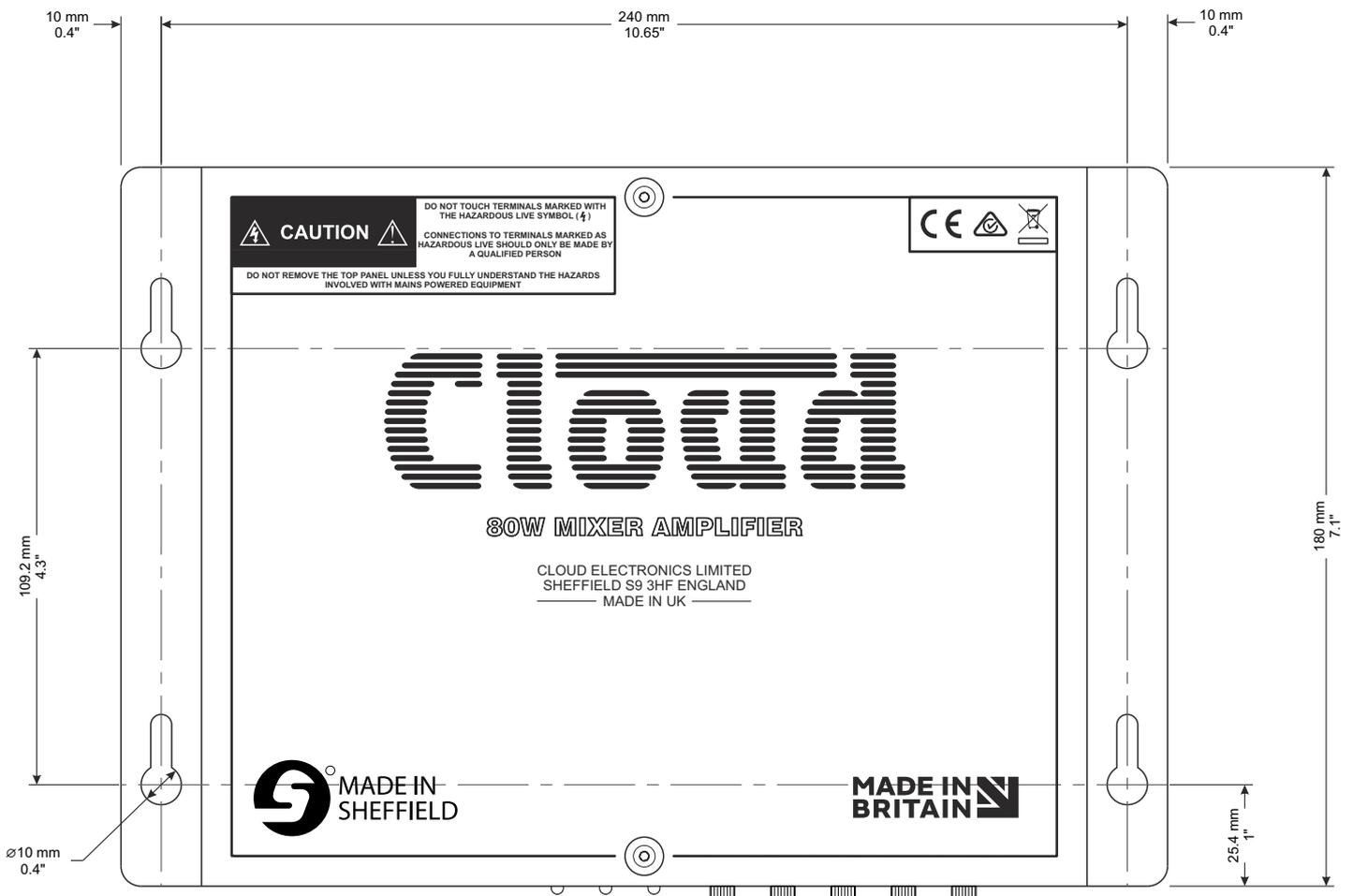
Notes re Power Consumption and Heat Loss measurements:
All measurements at 230 VAC 50 Hz power input

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: MA80E

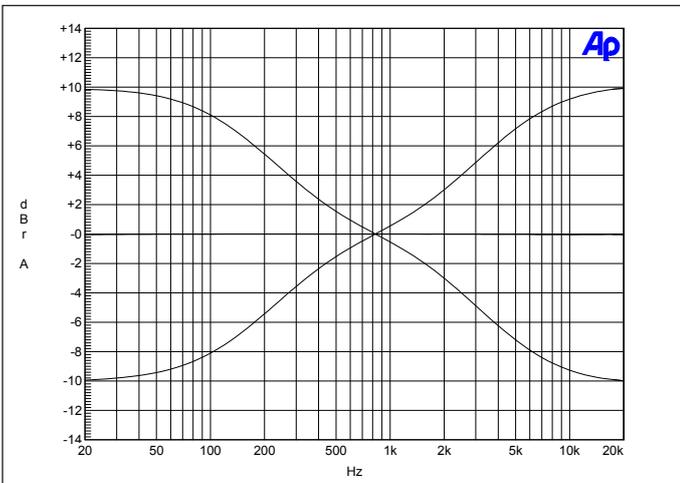


Shown fitted with optional conduit adaptor



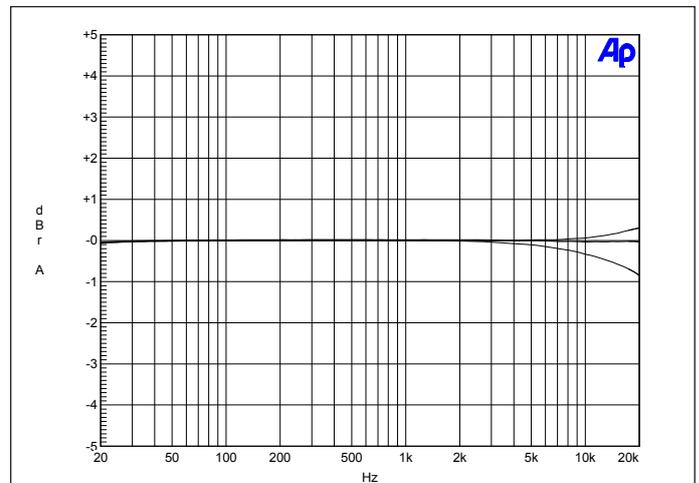
Performance Graphs

Music EQ



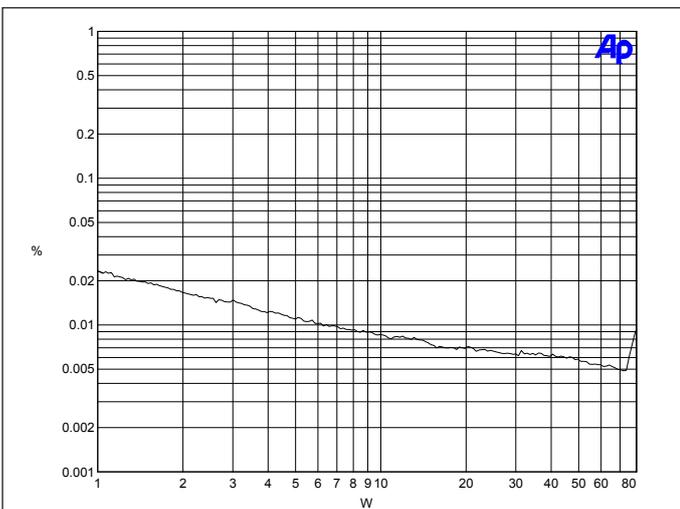
Frequency response of Music EQ (front panel) applied to line input.
Load = 8ohm

Line Frequency Response



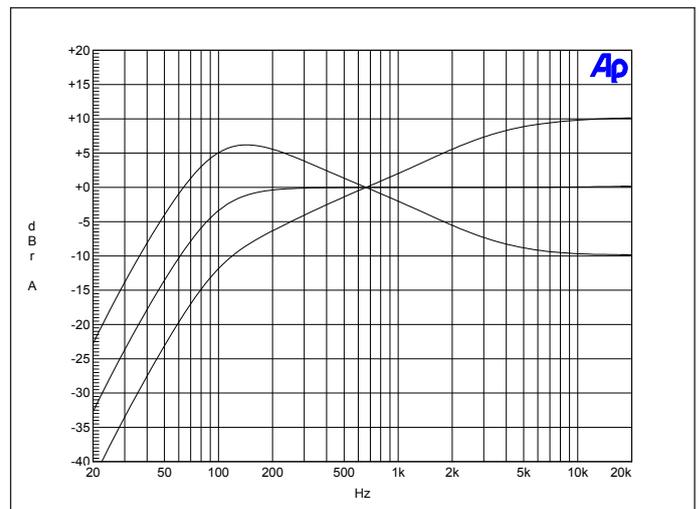
Frequency Response of Line input under 3 different load conditions.
4ohm, 8ohm & 16ohm (from bottom to top) (8ohm is flat)

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 at the microphone input will automatically mute the music signal, ii) detection of a signal at one line input will automatically override the other. These functions shall be selectable without accessing the internal web server, nor removing any part of the amplifier housing.

The 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 either input and adjust overall amplifier 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.

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.

The amplifier shall include an RJ45 Ethernet interface and internal web server. It shall be possible to control all operational amplifier functions from a standard web browser on a device connected to the same network as the amplifier. Access to the web pages shall be PIN-protected; it shall be possible to store at least six PINs and to designate access to different control functions for each PIN. It shall be possible to control the following amplifier functions from the web browser pages: i) selection of each individual input (mic and line); it shall also

be possible to enable the line inputs to be mixed, or for neither to be selected; ii) level adjustment of each input; iii) parametric equalisation adjustment with at least seven frequency bands; iv) enabling of the front panel equalisation controls and display of their settings; v) a variable-frequency high-pass filter with a slope of 24 dB/octave; vi) recall of previously-stored equalisation curves to optimise the amplifier for use with various popular installation loudspeakers; vii) a five-band parametric equaliser to achieve loudspeaker optimisation should the presets in vi) be unavailable; viii) level control of the auxiliary output and selection of its source as pre or post the front panel EQ controls; ix) muting of the amplifier output; x) it shall be possible to save all current settings and reload these settings when power is applied. Alternative power-up options shall be to load the original factory settings or those in force at power-down, even if they were not specifically saved.

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 include a bi-directional RS-232 serial port permitting remote control of all unit functions and settings. It will be possible to configure the serial port to operate at a range of baud rates, including 9600 baud. It shall also be possible to perform the same remote control functions by transmitting the same serial commands via the Ethernet connector.

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 3 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 MA80E. The optional active modules shall be the Cloud LM-2 Series (for wired devices) and the Cloud BT-1 (for wireless devices). The optional conduit adapter shall be Cloud Warepart CA947034.