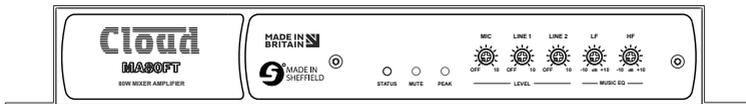# MA80FT
Mini Amplifier

Installation and User Guide

WARNING:

To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	WARNING: SHOCK HAZARD – DO NOT OPEN AVIS: RISQUE DE CHOC ELECTRIQUE – NE PAS OUVRIR
	The lightning flash with the arrowhead symbol within an equilateral triangle, is intended to alert you to the presence of uninsulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT SAFETY INSTRUCTIONS

1. Read these Instructions.

2. Keep these Instructions.

3. Heed all Warnings.

4. Follow all Instructions.

5. Do not use this apparatus near water.

6. Clean only with a dry cloth.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding - type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Use only with the cart, stand, tripod, bracket or table specified by the manufacturer or sold with the apparatus, when a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

⚠ Do not expose the apparatus to dripping or splashing, and ensure that no objects filled with water, such as vases, are placed on the apparatus.

L'appareil ne doit pas être exposé aux écoulements ou aux éclaboussures et aucun objet ne contenant de liquide, tel qu'un vase, ne doit être placé sur l'objet.

⚠ The mains plug is used as the disconnect device and it should remain readily accessible during intended use. In order to isolate the apparatus from the mains, the mains plug should be completely removed from the mains outlet socket.

La prise du secteur ne doit pas être obstruée ou doit être facilement accessible pendant son utilisation. Pour être complètement déconnecté de l'alimentation d'entrée, la prise doit être débranchée du secteur.

⚠ Terminals marked with the ⚡ symbol may use Class 2 Wiring, but voltages at these terminals may be of sufficient magnitude to constitute a risk of electric shock. The external wiring connected to these terminals requires installation by an instructed person or the use of pre-made leads or cords.

EU Declaration of Conformity

DATE OF ISSUE: 27th September 2018

MANUFACTURER: Cloud Electronics Limited

ADDRESS: 140 Staniforth Rd,
Sheffield,
S9 3HF. UK

PRODUCT NAMES: MA80EK, MA80NA, MA80AUS
MA80FTEK, MA80FTNA, MA80FTAUS
MA80EEK, MA80ENA, MA80EAUS

PRODUCT TYPE: Mini Mixer Amplifier

Cloud Electronics Ltd declare under our sole responsibility that the listed products comply with the requirements set out in the Council Directive **2014/35/EU** for electrical equipment used within certain voltage limits or Low Voltage Directive (LVD); and with the requirements of directive **2014/30/EU** for Electromagnetic Compatibility (EMC); and the CE Marking Directive **93/68/EEC** & **RoHS2 Directive 2011/65/EU**

For the evaluation of the compliance with these directives the following standards were applied:

Directive **2014/35/EU** (electrical equipment designed to be used within certain voltage limits);
Test Specification(s): **BS EN62368-1:2014**

Directive **2014/30/EU** (electromagnetic compatibility);
Test Specification(s): **BS EN55035:2017 (Immunity)**
       BS EN55032:2015 (Emissions)
       BS EN61000-3-2:2014 (Harmonics)

Cloud Electronics Ltd declare that the products produced under its brand name are designed and manufactured as professional audio products and therefore outside of the intended scope of the European Commission Regulations (EC) **1275/2008** of 17th Dec 2008 implementing Directive **2005/32/EC** of the European Parliament and of the Council with regards eco-design requirements for STANDBY and OFF mode electric power consumption of electrical and office equipment.

**Place and Date Issued:** Cloud Electronics Limited, 27th September 2018.

Simon Curtis,
Managing Director

REACH Directive; it's expected that our suppliers and business partners be aware of their obligations under REACH. Given those conditions, our current products are exempt from REACH pre-registration and later registration activities. We provide a separate EU Reduction of Hazardous Substances document for our RoHS compliant products.

The WEEE directive (2002/96/EC) places an obligation on all manufacturers and importers, trading in the EU, to take back electronic products at the end of their life. Cloud Electronics Ltd accepts the responsibility to finance the cost of disposing of such products. All our products are marked with the WEEE symbol; this indicates that these products must NOT be disposed of with other waste.

This document may not be changed or copied without authorisation
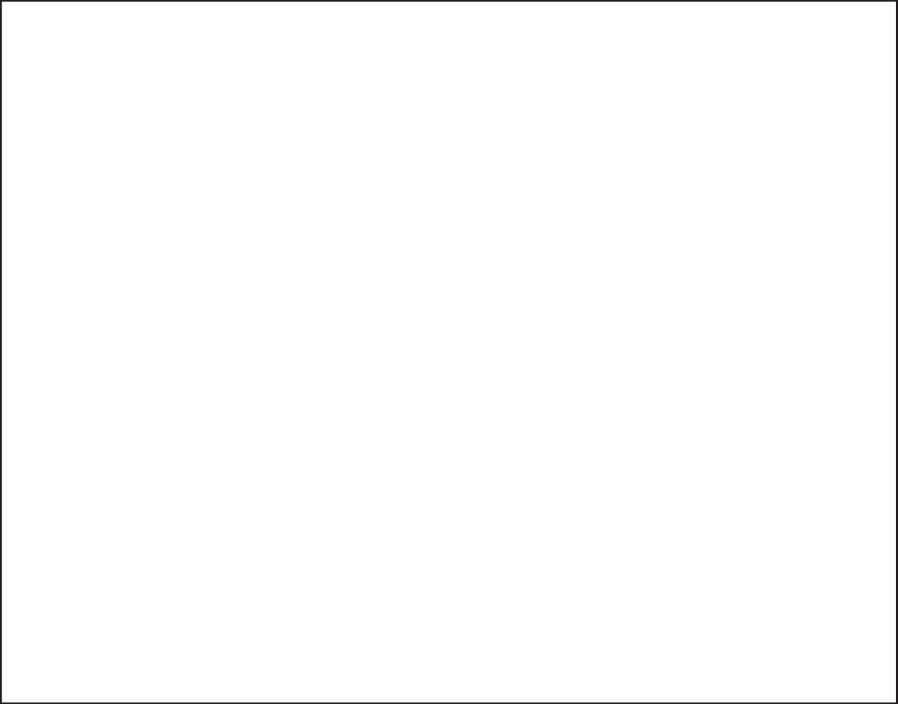
The Cloud MA80FT Mini Amplifier has been designed to meet the relevant provisions of the US Environmental Protection Agency's ENERGY STAR® Program.

The ENERGY STAR Program exists to identify products that contribute to the saving of energy and the reduction of harmful emissions, thereby both saving you money and protecting the environment.

ENERGY STAR certification is your assurance that this product is energy efficient. You can verify its inclusion in the ENERGY STAR Program at

https://www.energystar.gov/productfinder/product/certified-audio-video/results

CONTENTS

SAFETY INFORMATION

Safety Notes regarding Installation

- Do not expose the unit to water or moisture.

- Do not expose the unit to naked flames.

- Do not block or restrict any air vent.

- Do not operate the unit in ambient temperatures above 35°C.

- Do not touch any part or terminal carrying the hazardous live symbol ⚡ while power is supplied to the unit.

- Do not perform any internal adjustments unless you are qualified to do so and fully understand the hazards associated with mains-operated equipment.

- The unit has no user-serviceable parts. Refer servicing to qualified service personnel.

- If the moulded plug is cut off the AC power lead for any reason, the discarded plug is a potential hazard and should be disposed of in a responsible manner.

Conformities

This product conforms to the following European EMC Standards:

BS EN 55035:2017 (Immunity)

BS EN 55032:2015 (Emissions)

BS EN 6100-3-2:2-14 (Harmonics)

CE

This product has been tested for use in commercial and light industrial environments. If the equipment is used in controlled EMC environments, the urban outdoors, heavy industrial environments or close to railways, transmitters, overhead power lines etc. the performance of the unit may be degraded.

The product conforms to the following European electrical safety standard:

BS EN 62368-1:2014

This product is designed to be compliant with the relevant provisions of

ENERGY STAR® Eligibility Criteria Ver 3.0 for Audio-Video products.

Cloud

RoHS and WEEE declaration

Cloud Electronics Limited manages its business and collaborates with its suppliers to comply with the European Union restriction of the use of certain hazardous substances in electrical and electronic equipment, RoHS Directive (2002/95/EC), that came into force on 1st July 2006, and similar restrictions in other jurisdictions.

The "crossed out wheelie bin" symbol on the product and represented here is there to remind users of the obligation of selective collection of waste. This label is applied to various products to indicate that the product is not to be thrown away as unsorted municipal waste. At the end of life, dispose of this product by returning it to the point of sale or to your local municipal collection point for recycling of electric and electronic devices.

Customer participation is important to minimize the potential effects on the environment and human health that can result from hazardous substances that may be contained in this product.

Please dispose of this product and its packaging in accordance with local and national disposal regulations, including those governing the recovery and recycling of waste electrical and electronic equipment. Contact your local waste administration, waste collection company or dealer.

Safety Considerations and Information

The MA80FT amplifier must be earthed. Ensure that the mains power supply provides an effective earth connection using a three-wire termination.

Caution – High Voltage

Do not touch any part or terminal carrying the hazardous live symbol while power is applied to the unit. Terminals to which the hazardous live symbol refers require installation by a qualified person.

Caution - Mains Fuse

The internal PSU contains no user-replaceable fuses. Mains over-current protection is provided by the fuse in the AC mains plug, which should be rated at 5 A.

Servicing

The unit contains no user serviceable parts. Refer servicing to qualified service personnel. Do not perform servicing unless you are qualified to do so. Disconnect the power cable from the unit before removing the top panel and do not make any internal adjustments with the unit switched on. Only reassemble the unit using either the original bolts/screws, or ones identical to the original parts.

OVERVIEW

Introduction

The MA80FT is a very compact mono amplifier designed for integration into audio and AV systems where de-centralised installation is advantageous. It is intended as as an "install-and-forget" component, and is small enough to be fitted into wall or ceiling voids or in any convenient location adjacent to projectors, flat screen displays or loudspeakers. 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 MA80FT can deliver 80 W (mono) into a 4 ohm load, but also includes an output transformer, enabling it to drive 100 V, 70 V or 25 V-line loudspeaker systems. It has two unbalanced stereo inputs for line level signals (typically music sources) and a balanced mic input for paging/announcement use. An alternative mic input allows the amplifier to be fed with paging/announcements from a 100/70/25 V-line loudspeaker system. Front panel controls are provided for line input levels, microphone level and music EQ. There are also various preset-type controls and configuration DIP switches on the rear panel, and jumpers mounted internally on the main PCB. A Cloud LM-2 Series remote input module or RL Series remote level control can be wired to the amplifier's Facility Port, which can also be used as an additional line input.

Applicable Models

This Installation and User Guide describes the installation and operation of the following model:

- Cloud MA80FT 80 W mono amplifier for 4 ohm loudspeakers and 100/70/25 V-line loudspeaker systems

NOTE: Amplifier models MA80 and MA80E are NOT covered by this Guide, and when installing either of these models, reference should only be made to the Guides specific to them.

MA80FT main features

- Two unbalanced stereo line inputs with individual gain trims
- Electronically-balanced mic input with separate gain control
- 12 V phantom power selectable by internal jumper
- Front panel control of music level and mic levels
- HF & LF EQ adjustments for music sources
- Rear panel HF & LF EQ for mic input
- MIC input configurable for direct connection to 100/70/25 V-line system: allows MA80FT to receive announcements from main building PA/VA system
- 100/70/25 V-line input can be routed to LINE 2 for integration with existing background music system
- MIC input can be used with paging mics
- Paging configurable as automatic voice-over-music (VOX mode) or contact closure via access port
- Selectable LINE 1-over-LINE 2 priority
- Facility port for connection of LM-2 remote mic/line input module via screened Cat 5 cable; also allows remote control of music level
- 80 W power amplifier with both low-impedance output (4 ohms) and high impedance output via internal transformer, for driving 100/70/25 V-line systems
- Music Mute control input (N/O or N/C) for interfacing to an emergency system
- 65 Hz high-pass filter automatically enabled for 100/70/25 V-line operation
- Optional EQ cards available to suit various popular installation loudspeakers
- Automatic power-down function (user-selectable)
- 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

Available Options:

- LM-2 remote mic/line input module with music volume control
- BT-1 Bluetooth wireless audio input module
- RL Series remote control plates for music volume
- RSL Series remote control plates for Line 1/Line 2 selection and music volume
- 20 mm Flexible Conduit Adaptor Kit (Warepart CA947034) for permanent installations: replaces IEC receptacle

What's in the Box

Please check the shipping carton for damage before opening. If there is damage, please contact your Cloud agent and the shippers.
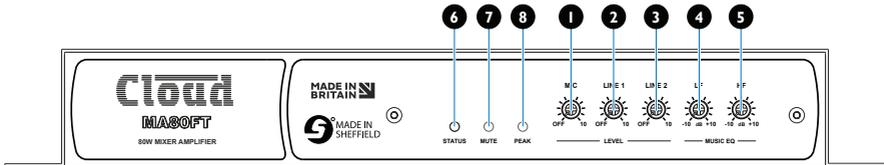
The packing carton should contain the following items:

- MA80FT amplifier
- IEC mains lead (AC cord) with moulded plug appropriate to the territory
- Set of mating plug-in screw-terminal connectors
- Set of four self-adhesive polyurethane feet
- This manual

BLOCK DIAGRAM
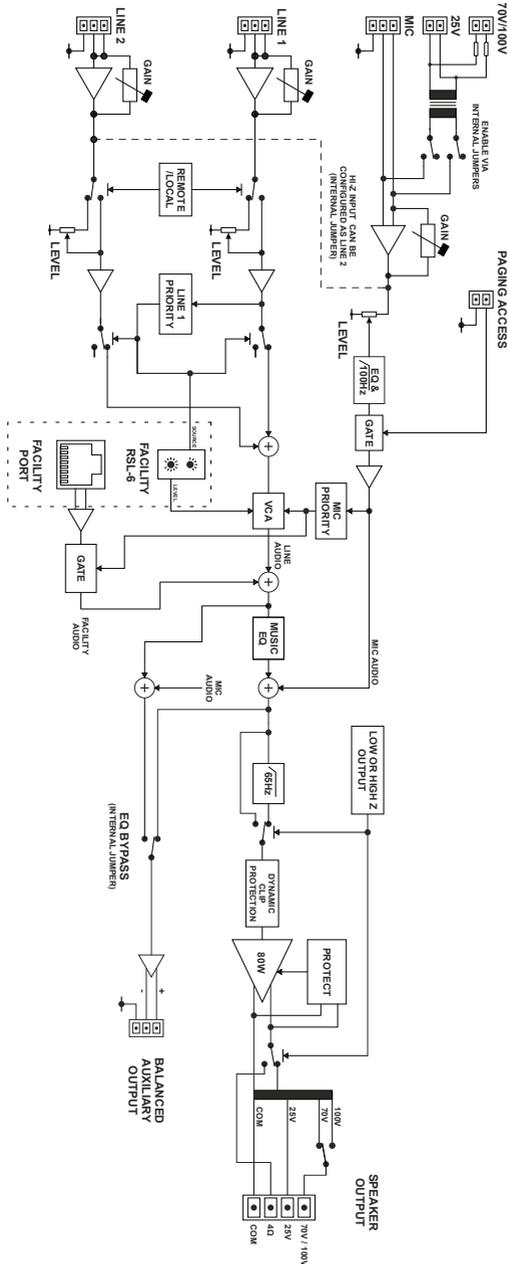
FRONT PANEL DESCRIPTION

LEVEL controls:

1. **MIC** – sets volume of signal at the **PAGE/MIC** input.

2. **LINE 1**– adjusts volume of signal at **LINE 1** input.

3. **LINE 2** – adjusts volume of signal at **LINE 2** input.

MUSIC EQ controls:

4. **LF** – LF EQ adjustment of music channel: +/-10 dB @ 100 Hz

5. **HF** – HF EQ adjustment of music channel: +/-10 dB @ 5 kHz

6. **STATUS** – bi-colour LED: illuminates as follows:

    - steady green - active
    - steady red – sleep (APD) mode
    - flashing green – fault condition (over-temperature, speaker wiring error or over-current); power-cycle to clear
    - flashing red – fault condition (DC protection triggered); power-cycle to clear

Please see "Troubleshooting – STATUS LED indications" on page 39 for a full description of the above modes.

7. **MUTE** – red LED: illuminates when the MUSIC MUTE function is active

8. **PEAK** – red LED: illuminates if the amplifier's dynamic clip protection becomes active

REAR PANEL DESCRIPTION
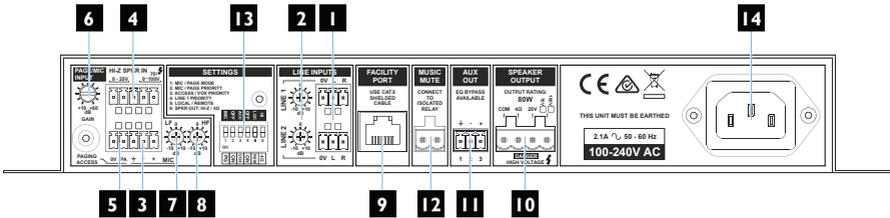
1. **LINE 1** and **LINE 2** – stereo line inputs for music sources (unbalanced).

2. Gain adjustment– preset level trim control (+/-10 dB) for each line input.

3. **MIC** – balanced mic input.

4. **HI-Z SPKR IN** – alternative high-voltage input, for connection to 100/70/25-V line speaker systems.

5. **PAGING ACCESS** – for external contacts when mic input is configured for paging.

6. **PAGE MIC/INPUT GAIN** – preset gain control for mic input; range +10 to +50 dB (10 to 20 dB with Hi-Z input selected).

7. **LF** – LF EQ adjustment of mic signal: +/-10 dB @ 100 Hz.

8. **HF** – HF EQ adjustment of mic signal: +/-10 dB @ 5 kHz.

9. **FACILITY PORT** – RJ45 socket for connection of remote input/control modules such as the LM-2 and BT-1; it is also possible to connect an RL-1 or RSL-6 remote control plate to this port.

10. **SPEAKER OUTPUT** – speaker output for low-impedance circuits or 100/70/25 V-line loudspeaker system.

11. **AUX OUT** – balanced line level output from pre-amplifier stage; post-EQ by default, may be selected to pre-EQ by internal jumper.

12. **MUSIC MUTE** – connect to external N/O or N/C contacts for remote muting of music sources.

13. **SETTINGS** – six-pole DIP switch for setting various amplifier configurations:

SWITCH	FUNCTION
1	MIC mode – configures MIC input for paging use
2	Enables mic-over-music priority
3	Selects paging priority mode – VOX or ACC (ACC = contact closure)
4	Enables LINE 1-over-LINE 2 priority
5	Enables remote control functions of Facility Port and disables front panel **LINE** level controls
6	Selects speaker output for low or high impedance use

See "Summary of rear panel DIP switch functions" on page 38 in the Appendix section for full details.

14. Power input – standard IEC receptacle for AC mains, voltage range 100 to 240 V, 50/60 Hz. May be replaced by the 20 mm Flexible Conduit Adaptor Kit (Warepart CA947034) for installations where it is desirable for the amplifier to be permanently connected to the mains supply.

INSTALLATION

Mechanical

The compact size and light weight of the MA80FT combined with its high energy efficiency allows it to be installed in almost any location. It can be easily placed in ceiling or wall voids, or fitted to the rear of display screens or loudspeaker cabinets.

The amplifier has mounting flanges with keyhole slots to permit it to be secured on a horizontal or vertical flat surface.
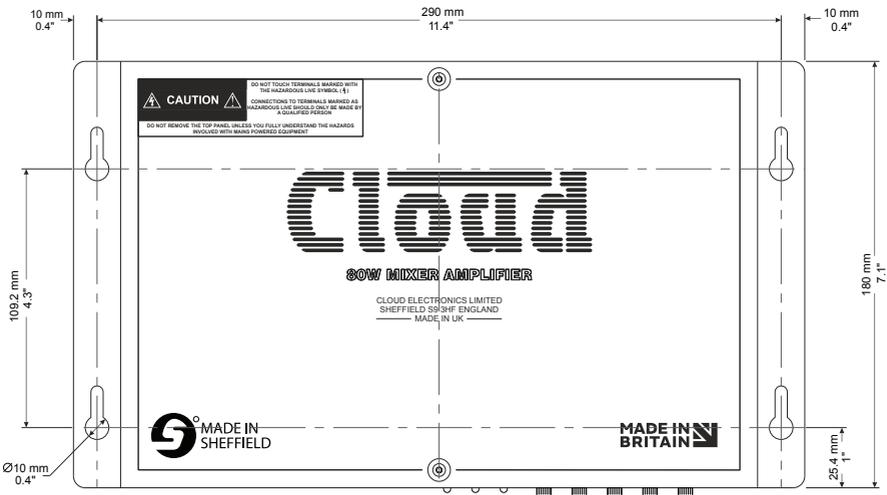
If using the MA80FT in a free-standing situation, the self-adhesive feet (supplied with each amplifier) should be fitted. The amplifier should always be stood on a flat surface. Care should be exercised in selecting a location for a free-standing unit, which should allow ventilation but be clear of any liquid or similar hazard.

Ventilation

The amplifier uses natural convection cooling, and care should be taken to locate it where airflow is unrestricted (e.g., not under ceiling insulation material). Consideration should also be given to ease of access, should the operational configuration or audio levels need adjustment after installation.

In free-standing installations, always fit the polyurethane feet supplied, and do not stand any other items on top of the unit.

Connections and adjustments

Line inputs

The amplifier has two stereo line inputs **1**, each of which is mixed internally to mono; these inputs are suitable for most music sources such as computer line outputs, satellite receivers and CD/DVD players.

The inputs are unbalanced and use 3-pin 3.5 mm-pitch screw terminal connectors. The connectors should be wired as follows:
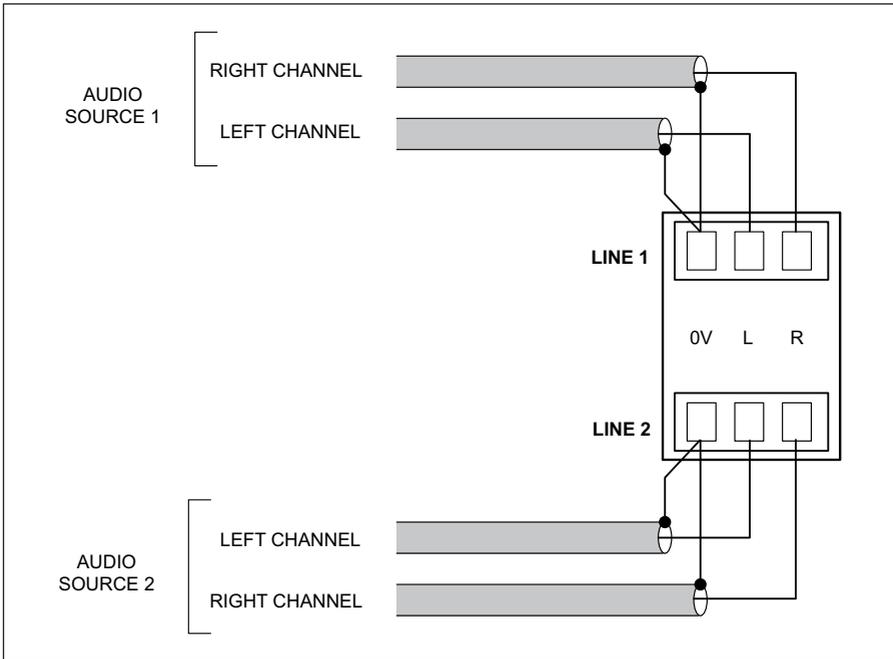
Unless a Cloud remote control plate or module such as the RSL-6 or LM-2 is in use, the two line inputs are summed together internally, though Line input 1 can be configured to have priority over Line input 2, see "Hi-Z input" on page 24.

Line input 2 may alternatively receive its signal from the high-impedance microphone input **4**. This is achieved by moving an internal jumper. See "Hi-Z input" on page 24 for more details.

Sensitivity & Gain Control

Each of the stereo line inputs has an input impedance of 10 kohms and a preset type gain control **2** on the rear panel adjacent to the input connector. The gain controls have a range of 20 dB allowing the input sensitivity to be varied from -12 dBu to +8 dBu (0 dBu = 0.775 Vrms). The gain controls should be set so that the input sources in use do not distort, and the front panel level controls **2** and **3** have a useful range.

Music Level and EQ control

The front panel **LINE 1** and **LINE 2** controls **2** and **3** should be adjusted during installation to set the volume of the audio sources. The line inputs are summed post the level controls (hereafter referred to as the "music channel"); equalisation can be applied using the front panel **LF** and **HF** controls **4** and **5**, which can apply a cut or boost of up to 10 dB at 50 Hz and 10 kHz respectively. Adjust the EQ controls to suit the audio programme material being used, the speaker characteristics and the room acoustics. If the programme material includes speech, the EQ should be adjusted for best intelligibility

If the line input levels are set too high, the amplifier's dynamic protection will activate to prevent clipping and the front panel **PEAK** LED **8** will illuminate to indicate this. Note that this LED also indicates an excessive mic signal level.

Line 1 Priority

When both line inputs are in use, one audio source can be given automatic priority over the other by connecting it to Line 1 input and setting rear panel **SETTINGS** DIP switch 4 (**LINE 1 PRIORITY**) to ON. This is a useful facility when a Digital Sound Store, jukebox, emergency announcement system or similar source forms part of the audio system.

When Line 1 Priority is enabled, the amplifier will route the input signal at Line 2 normally until a signal is detected at Line 1's input. When this happens, it switches its music source automatically to Line 1. Once the signal at Line 1 stops (e.g., when an announcement finishes), Line 2's source will smoothly restore to its former level over approx. 3 seconds.

Mic inputs

The MA80FT has a single microphone channel, enabling it to be used for paging or announcements. By default, the mic channel is independent and is simply mixed with the summed line inputs. The mic channel can be reconfigured so that it operates as a standard Cloud-type paging input, with selectable mic-over-line priority and triggering by either contact closure or automatic signal detection. It is then compatible with paging microphones using zone selection by contact-closure such as the Cloud PM range, including the PM1 single-zone microphone. See "Paging control and mic priority" on page 26 for more details.

The mic channel has two separate physical inputs: a standard balanced input and a high-level transformer-isolated input for connection to 100/70/25 V-line systems. Both inputs, and the connections for paging access, are on the 2 x 5-pin 3.5 mm-pitch screw terminal connector **PAGE/MIC INPUT**.

IMPORTANT: Cloud recommend that no attempt is made to use both the balanced and high-voltage inputs.

The microphone signal path includes a fixed high-pass filter. This attenuates the response below 100 Hz, which helps to reduce the effects of microphone handling noise.

Balanced input

The MA80FT's microphone pre-amplifier is an electronically balanced, transformer-less design configured for optimum low noise performance. The input impedance is greater than 2 kohms and is suitable for microphones in the 200 ohm to 600 ohm range. The connector uses three pins of the lower 5-pin 3.5 mm-pitch screw terminal type on the rear panel **3**. Use the wiring shown below.
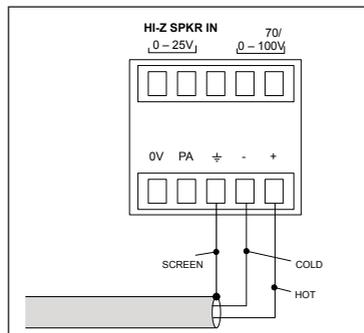
12 V phantom power is available at the mic input, and is activated by setting internal jumper J6 to the ON position. See page 37 for further information regarding the internal jumpers. Care should be taken to ensure that phantom power is activated only when the microphone connected to the input requires it – i.e., a capacitor or electret type; other types of microphones (such as dynamic) may be damaged if a DC voltage is applied to them.
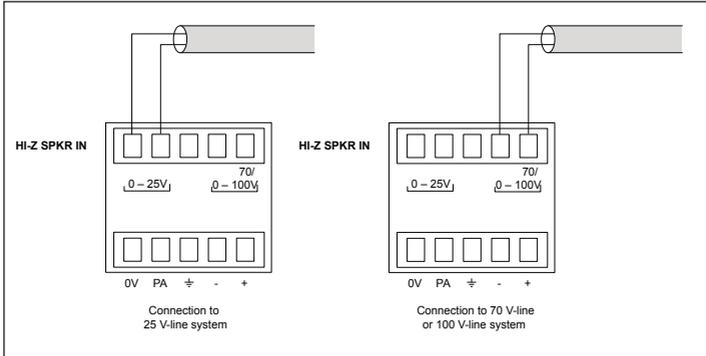
Hi-Z input

The MA80FT is provided with an second, alternative input, which by default is routed to the mic channel when selected. This is a high impedance, transformer-isolated input which can be connected directly to a 25 V-line, 70 V-line or 100 V-line loudspeaker system. When configured in this way, the mic input can be used to route paging announcements from a building-wide PA or PA/VA system into the area covered by the MA80FT.

The high-voltage input is enabled by moving internal PCB jumpers J8, J9 and J10. All three jumpers must be moved together. See "PCB layout diagram" on page 36 for details of jumper locations.

The high-voltage input may alternatively be routed internally to the music channel, where it replaces Line Input 2. This means the MA80FT can be fed, for example, with background music from a 25/70/100 V-line system, allowing it to be fully integrated with an existing building system. It also allows the music level may be controlled remotely in the same way as when Line Inputs 1 and 2 are used for music sources. The internal routing of the Hi-Z input - to the mic channel or Line 2 - is determined by internal jumpers J2 and J3. The factory default is for the high-voltage input to be routed to the mic channel: moving the jumpers will route it to the music channel. Both jumpers must be moved together. See page 36 for details of jumper locations.

Note that when the high-voltage input is enabled, the balanced mic input **3** will be disconnected; if J2 and J3 are moved to the LINE 2 position, Line Input 2 **1** will also be disconnected.

To use the high-voltage input, connect a 25 V-line system feed to the **0-25V** line input, or a 70 V-line or 100 V-line system feed to the **0-70/100V** input , as shown below. The Hi-Z input uses four pins of the upper 5-pin section of the connector.

HI-Z SPKR IN

70/
0 – 25V   0 – 100V

0V   PA   ⏚   -   +

Connection to
25 V-line system

HI-Z SPKR IN

70/
0 – 25V   0 – 100V

0V   PA   ⏚   -   +

Connection to 70 V-line
or 100 V-line system

Note that the 70/100 V input is suitable for use with either 70 V-line or 100 V-line systems.

Do not make any connections to the unused high-voltage input (i.e., either **0-25V** or **0-70/100V**).

Mic gain adjustment

The mic input has a preset gain control (**PAGE/MIC INPUT GAIN** 6) adjacent to the input connector. This is operative whichever of the two mic inputs is in use, though with different gain ranges:

- Normal mic input - gain range 40 dB, from 10 dB to 50 dB

- Hi-Z input – gain range 10 dB, from 10 dB to 20 dB

Note that the **GAIN** control is still operative when the Hi-Z input is routed internally to Line 2 by moving jumpers J2 and J3.

Microphone level control

A front panel level control 1 is provided for the mic channel and this provides the user with a means of adjusting the volume of the microphone, or the announcements from a PA/VA system if the 25/70/100 V-line inputs are in use. The rear panel gain control 6 should be set at a level where distortion does not occur even when the front panel level control is fully clockwise. If the mic level is set too high, the front-panel **PEAK** LED 8 will illuminate. Note that this LED also indicates excessive music level.

Paging control and mic priority

The microphone channel can be reconfigured to operate as a paging input with **SETTINGS** DIP switches 1, 2 and 3.

For normal (non-paging) operation, all three switches should be in the 'up' position. The priority functions operate as described below whichever of the two mic inputs is in use (balanced or Hi-Z).

- Switch 1 – MIC/PAGE MODE: in the MIC position (switch up), the mic input operates as a standard microphone input. In this mode, DIP switch 3 (ACCESS/ VOX PRIORITY) is disabled. In the PG position (switch down), the mic input operates as a typical Cloud paging input and DIP switch 3 is enabled. In PAGE mode, the Paging Access contacts will need to be shorted in order for the mic input to become active.

- Switch 2 – MIC/PAGE PRIORITY: set to ON (switch down) to enable Mic-over-Line priority. This can be selected in both MIC and PAGE modes, i.e., regardless of the setting of DIP switch 1. The priority function will mute both LINE and FACILITY inputs. In MIC mode the priority trigger is always VOX; in PAGE mode the priority can be either by access contacts or VOX mode, as selected by DIP switch 3.

- Switch 3 – ACCESS/VOX PRIORITY: this switch is only enabled when DIP switch 1 is set to PG. When DIP switch 3 is set to ACC (switch up), contact closure priority triggering is selected: a short circuit at the Paging Access connector **5** will trigger priority (see below for wiring details), muting any line input signals and enabling the mic input. With the switch down, VOX mode is selected: a signal at the mic input will automatically trigger priority. In order for VOX mode to operate when DIP switch 1 is ON ('PAGE'), the two pins of the Paging Access connector must be shorted together.

The Paging Access control input is on two pins (**PA** and **0V**) of the lower section of the PAGE/MIC input connector **5**. The Paging Access input provides compatibility with "contact-closure" paging microphones. In PAGE mode, the microphone input is muted as long as the pins of the access connector are open-circuit. When the pins are connected together, the mic input becomes active.
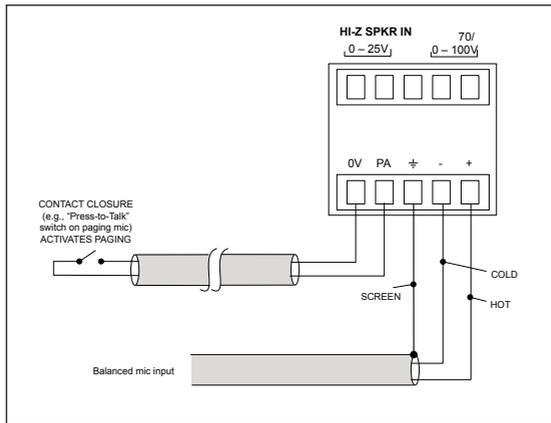
In either VOX or ACC mode, the music signal is faded back up after the announcement is complete over a period of approx. 3 seconds.

Output

The power amplifier stage is fully protected against DC offset, PSU and amplifier over-current, and is also thermally protected. Activation of the protection circuitry shuts the power amplifier stage down until the fault condition clears. All protection conditions will automatically self-clear if the amplifier is power-cycled. A switch-on delay function mutes the output during power-up and power-down to protect loudspeakers.

The MA80FT has both a low impedance output (4 ohms) and a high voltage output for 25/70/100 V-line speaker systems. Both outputs are available on the 4-pin 5 mm-pitch screw-terminal **SPEAKER OUTPUT** connector **10**.

Only one of the two output options can be used at a time. The output type is selected with **SETTINGS** DIP switch 6: select 4Ω (switch down) for low impedance operation or HI (switch up) for 25/70/100 V-line operation. The switch is set to HI at the factory: set it to the down position if the amplifier is to be use with low impedance loudspeakers.

Lo-Z output

The MA80FT can deliver its rated power of 80 W into a 4 ohm load. When using multiple low-impedance loudspeakers (generally 8 ohms) with a single amplifier, series and parallel wiring should be employed to produce a total load impedance of not less than 4 ohms.

The low impedance output is available on pins 1 and 2 of the **SPEAKER OUTPUT** connector:
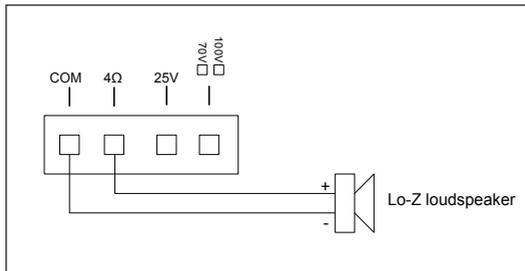
Connecting to 25/70/100 V-line systems

The MA80FT is fitted with an internal transformer enabling it to directly drive 100 V, 70 V or 25 V-line loudspeaker systems. The power amplifier stage is rated at 80 W.

Connect to a 100 V-line or 70 V-line speaker system by wiring pins 1 and 4 of the **SPEAKER OUTPUT** connector. The selection between 70 V and 100 V operation is made by moving the connector on an internal flying lead from one 4-pin header to another. The two connectors are adjacent to the toroidal output transformer and are marked CON3 for 100 V operation and CON4 for 70 V operation. See "PCB layout diagram" on page 36 for locations of the headers.

Units shipped to Europe will be factory-set to 100 V, and units shipped to the US and Canada will be factory-set to 70 V: a tick box above pin 4 of the SPEAKER OUTPUT connector will be marked accordingly to confirm the internal connection.

Connect to a 25 V-line speaker system by wiring pins 1 and 3 of the **SPEAKER OUTPUT** connector. The 25 V-line output will operate correctly regardless of the internal selection of CON3 or CON4.
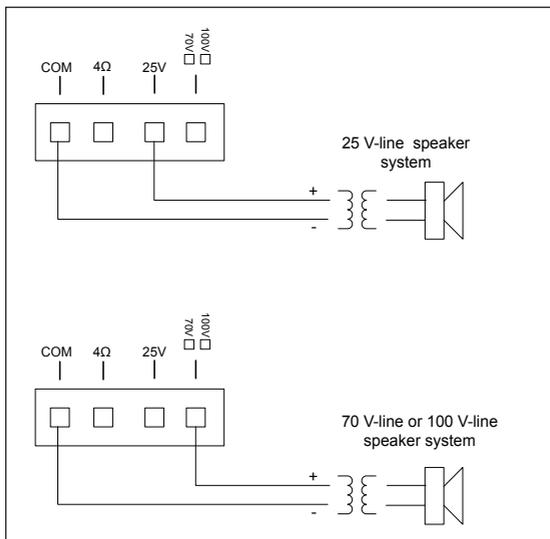

When driving 25/70/100V-line loudspeaker systems there is a risk of transformer core saturation at high levels and low frequencies, which can produce distortion. To prevent this, the MA80FT's output stage is provided with a 65 Hz high-pass filter, which is automatically placed in circuit when **SETTINGS** DIP switch 6 (**SPKR OUT: HI-Z/4Ω**) is set to HI.

Auxiliary Output

The amplifier is provided with an Auxiliary Output, **AUX OUT** **11**. This may be used to drive an additional amplifier, for recording, or any other purpose where system "expansion" is required. The connector is a 3-pin, 3.5 mm-pitch screw terminal type.

The signal at the Auxiliary Output is balanced and at line level, and can thus be used to drive most external equipment directly. The wiring is as follows:
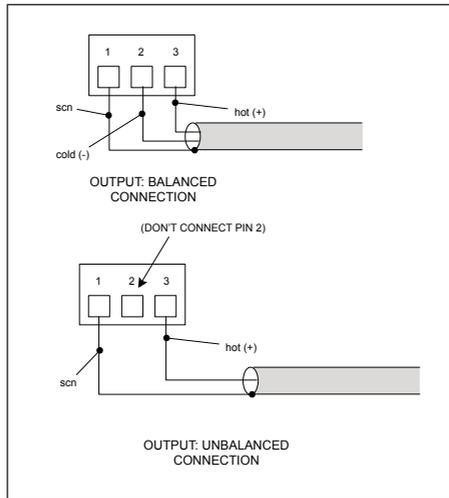
The "out-of-the-box" factory default source for the Auxiliary Output is taken from the input to the power amplifier stage, and will thus consist of the same mix of line and mic inputs, and will be affected by both Line 1 and Mic Priorities. However, it will not be subject to the action of either the 65 Hz high-pass filter or the power stage's dynamic clip protection.

This means that by default the source is derived "post" the front panel **MUSIC EQ** controls. In some installations, it may be desirable to ensure that the EQ controls only affect the output to the loudspeakers connected to the amplifier's main output and not the Auxiliary Output as well. This can be achieved by moving internal PCB jumper J9 from ROOM (post-EQ) to FLAT (pre-EQ). See page 36 for details of PCB jumper locations.

Facility Port

The MA80FT amplifier is provided with a **FACILITY PORT** in the form of a rear panel RJ45 connector **9**. The primary use of the Facility Port is for the connection of an LM-2 or BT-1 remote active module, but it may also be used to connect RL and RSL Series remote control plates, or as a general-purpose auxiliary balanced input (see "Using the Facility Port as an auxiliary input" on page 34 for more information on this application).

The active modules operate from DC power supplied by the MA80FT. The current consumed by each module is minimal and in the vast majority of installations there will be no power supply issues.

IMPORTANT: In order for the remote control functions on an LM-2 module or an RL/RSL Series plate to operate, **SETTINGS** DIP switch 5 (**LOCAL/REMOTE**) must be set to REM (switch down). This will disable the front panel **LINE 1** and **LINE 2** controls, and control of line level and/or LINE 1/LINE 2 selection will be available from the remote module or plate. DIP switch 5 should be left set to LOC (switch up) when a BT-1 is connected to the Facility Port.

The pinout of the Facility Port connector is given in the table below:

PIN	USE	Cat 5 CORE*
1	Audio 'cold' phase (-)	White + Orange
2	Audio 'hot' phase (+)	Orange
3	Priority VCA control	White + Green
4	+ 12 V	Blue
5	0 V	White + Blue
6	-12 V	Green
7	Music level control (0 to 10 V)	White + Brown
8	Music source select control (0 to 10 V)	Brown
SCN	GND ref for system music controls	Connector shell
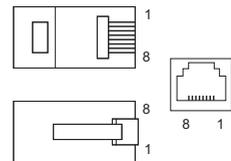
* Standard wiring for pre-made cables

Connecting an LM-2 or BT-1
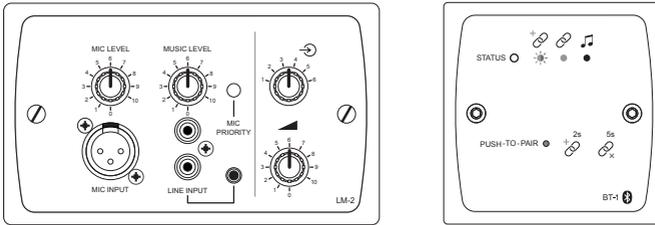
The LM-2 is an active input module which allows a microphone and a stereo line input in a remote location to be connected to the MA80FT. The module also includes the functions of a Cloud RSL-6 Remote Control Plate, which allows remote control of the MA80FT's music level and selection of Line 1 or Line 2 as the music source.

The BT-1 is a Bluetooth remote audio input module which enables compatible portable devices such as laptops, tablets and smartphones to stream audio wirelessly to the module, and thus into the audio system of the area where the module is installed.

NOTE: The MA80FT is only compatible with the BT-1F variant of the BT-1: do not attempt to connect variant BT-1E.

The LM-2 or BT-1 should be connected to the MA80FT's **FACILITY PORT** using screened Cat 5 cable. (Note that as the cable carries analogue audio, only *screened* Cat 5 should be used.) The LM-2 includes controls for local music level and source selection, the wiring for these functions being catered for on the Facility Port. The maximum total Cat 5 cable length should not exceed 100 m.

LM-2: The LM-2's upper PCB is fitted with an RJ45 connector labelled **OUTPUT**. Connect this to the **FACILITY PORT** using screened Cat 5 cable with screened RJ45s at each end. Follow the colour coding shown in the table on page 31. The metal screening of the connectors should be bonded to the screen of the cable. Full details can be found in the LM-2 Installation Guide.

Before the LM-2's music source and level controls will operate, set **SETTINGS** DIP switch 5 to REM (switch down). In this setting, the front panel **LINE 1** and **LINE 2** controls become inoperative. Positions 3 to 6 on the LM-2's Music Source switch have no function on the MA80FT; selecting these positions will effectively mute both line inputs.

BT-1: Connect the RJ45 socket on the rear of the BT-1 to the MA80FT's **FACILITY PORT** with *screened* Cat 5 cable and shielded RJ45 plugs. Full details can be found in the BT-1 Installation Guide.

Connecting an RL or RSL Series remote control plate

The MA80FT amplifier is also compatible with standard Cloud remote control plates of the RSL Series (music source select and level), and RL Series (level only). The MA80FT differs from most other Cloud products in that it does not have a dedicated 3-pin "Remote Control" port: RL and RSL Series plates must instead be connected to the Facility Port **9**. This is most easily accomplished by using screened Cat 5 cable between the MA80FT and the remote control plate, but only connecting the one (or two) cores concerned with the remote control functions (see page 31), plus the screen, to the plate.

REMOTE LEVEL CONTROL WIRING

REMOTE SOURCE & LEVEL CONTROL WIRING
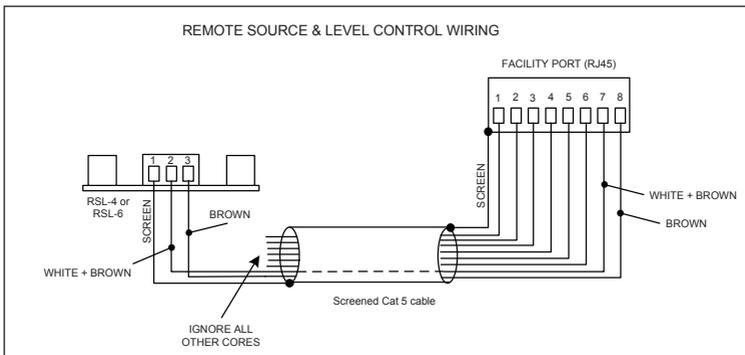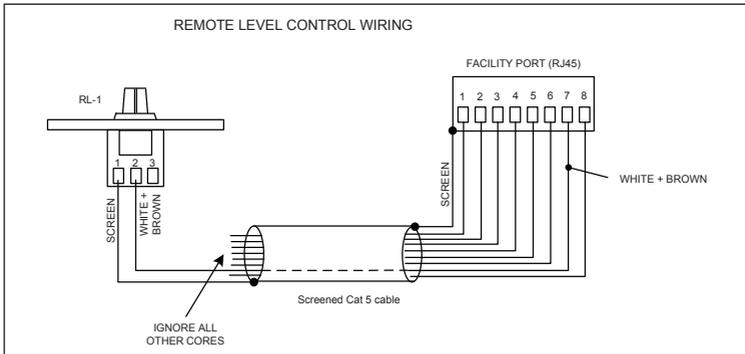
Using the Facility Port as an auxiliary input

The Facility Port provides a balanced audio input. If a port is not connected to a remote input module or remote control plate, it may be used as an additional, balanced line input. The signal applied at the Facility Port is mixed with the other inputs (LINE 1, LINE 2 and MIC), but has no independent level control on the amplifier; the signal level must be adjusted at the source. If Mic-over-Line priority is enabled (see "Paging control and mic priority" on page 26), a line input at the Facility Port will be muted in the same way as LINE 1 and LINE 2.

Connect an external balanced source to the Facility Port as shown below:
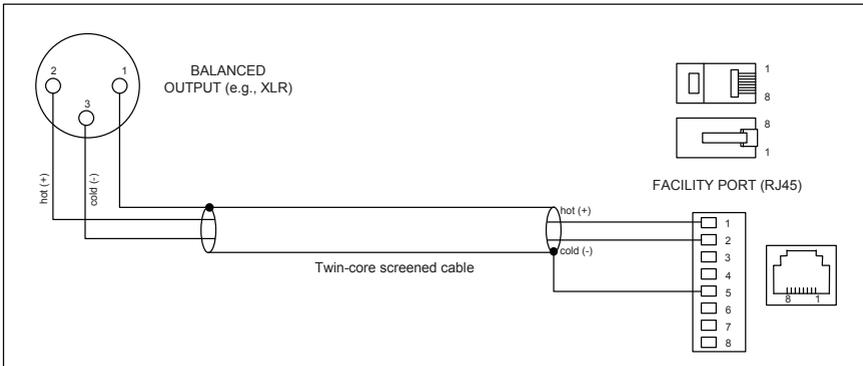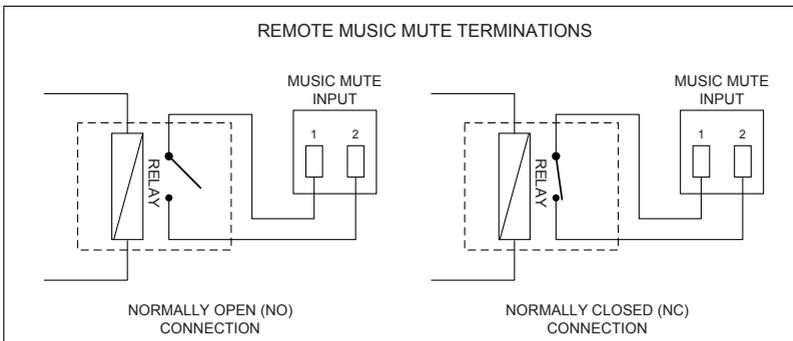

An unbalanced source may also be connected; the use of a balancing transformer is recommended.

Music Mute Input

External muting of music may be commanded through the **MUSIC MUTE** connector **12**. National or Local Authority regulations governing installed audio systems may require that normal programme material (i.e., music) should be muted in an emergency, to ensure that any evacuation messages are clearly audible. When active, it mutes all line inputs (including that at the Facility Port), leaving the microphone input active.

The Music Mute input is on a 2-pin 5 mm-pitch screw-terminal connector. It should be connected to the appropriate alarm output on whichever building management system registers the alarm (typically the Fire System). The alarm output must be volt-free; if no such output is available, an intermediate relay or other isolation device must be installed between the alarm output and the Music Mute input.

The Music Mute input can be set to operate on either normally open (N/O) or normally closed (N/C) contacts via internal jumper J1 (see "PCB layout diagram" on page 36). The factory default setting is N/O, thus requiring a short-circuit to be applied across the two pins of the connector for muting to occur.

REMOTE MUSIC MUTE TERMINATIONS

MUSIC MUTE INPUT

1 2

RELAY

NORMALLY OPEN (NO) CONNECTION

MUSIC MUTE INPUT

1 2

RELAY

NORMALLY CLOSED (NC) CONNECTION

Auto Power Down

The MA80FT is an extremely energy-efficient amplifier, but can be made even more so by enabling the Auto Power-Down feature. When active, the signal level is constantly monitored and if no input signals are measured for 15 minutes the amplifier enters a "Sleep" mode, minimising power consumption. If a signal is detected while the channel is in this mode, the amplifier "wakes up" in less than 300 ms.

The MA80FT is shipped with the Auto Power Down function disabled. It may be enabled by moving internal PCB jumper J5. See "PCB layout diagram" on page 36 for details of jumper locations.

APPENDIX

PCB layout diagram

To access the internal PCB, disconnect the amplifier from its AC power source* and remove the six screws securing the top cover; remove the cover.
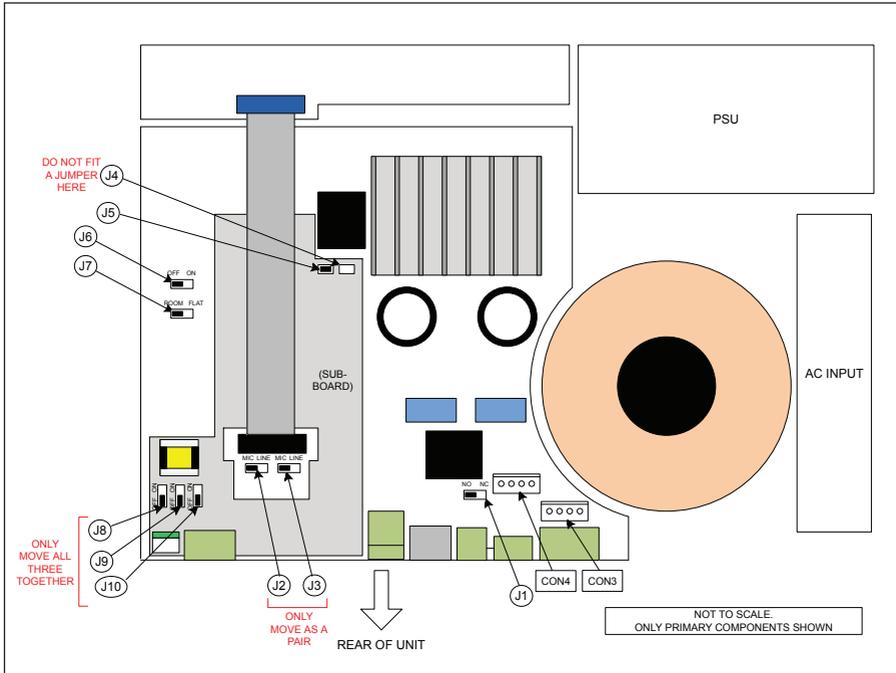
*Note that if the optional conduit adaptor plate has been fitted, replacing the IEC receptacle, this may necessitate isolating the mains circuit to which the amplifier is connected.

Table of internal jumpers and default settings

JUMPER	PURPOSE	OPTIONS	DEFAULT	REMARKS
Motherboard jumpers (lower PCB):				
J1	Music Mute	N/O or N/C	N/O	
J2	Hi-Z input internal routing	MIC: Mic channel LINE: Music channel (LINE 2)	Mic channel	J2 and J3 must be moved together
J3				
J6	12 V Mic phantom power	ON/OFF	OFF	
J7	Auxiliary output source	Room: source is post-front panel EQ Flat: Source is pre-front panel EQ	Room (front panel EQ affects Aux out)	
Sub-board jumpers (upper PCB):				
J4	For factory use only			Do not fit a jumper here
J5	Auto Power Down	Present: APD disabled Absent: APD enabled	Present (APD disabled)	
J8	Hi-Z input enable	OFF: Hi-Z input disabled ON: Hi-Z input enabled, routing determined by J2/J3	OFF	J8, J9 and J10 must all be moved together
J9				
J10				

Summary of rear panel DIP switch functions

DIP SWITCH		POSITION	FUNCTION
1	MIC/PAGE MODE	**OFF = MIC MODE (MIC)**	Both PAGE/MIC inputs function as standard microphone inputs, including GAIN and LEVEL controls. DIP switch 3 is disabled.
		ON = PAGE MODE (PG)	Both PAGE/MIC inputs function as typical Cloud paging inputs. DIP switch 3 is enabled.
2	MIC/PAGE PRIORITY	**OFF = PRIORITY OFF (OFF)**	The mic signal is mixed with the line inputs according to the front panel LEVEL controls.
		ON = PRIORITY ON (ON)	The mic signal will take priority over the line inputs (including the Facility Port), which will be muted while the mic is in use. Priority triggering will be determined by the settings of DIP switches 1 and 3: with switch 1 in PAGE mode, priority triggering is set by DIP switch 3.
3	ACCESS/ VOX PRIORITY	**OFF = ACCESS (ACC)**	The PA and 0V pins of the PAGE/MIC connector must be shorted together to enable the mic input and mute the line inputs.
		OFF = VOX (VOX)	A signal at the PAGE/MIC input will trigger mic-over-line priority and mute the line inputs. The PA and 0V pins of the PAGE/MIC connector must be permanently shorted together for VOX operation in PAGE mode (disabled in MIC mode).
4	LINE 1 PRIORITY	**OFF = PRIORITY OFF (OFF)**	In LOCAL mode (ref SW5), the signals at LINE 1 and LINE 2 are mixed together. In REMOTE mode, LINE 1 or LINE 2 is selected by the MUSIC SOURCE switch on an RSL plate or LM-2 module connected to the Facility Port.
		ON = PRIORITY ON (ON)	A signal at LINE 1 input has priority over that at LINE 2: LINE 2 is automatically muted.
5	LOCAL/ REMOTE	**OFF = LOCAL (LOC)**	The levels of LINE 1 and LINE 2 input signals are controlled by the two front panel LEVEL controls. The two inputs are mixed together.
		ON = REMOTE (REM)	The two front panel LEVEL controls (LINE 1 and LINE 2) are disabled. The summed line input level is controlled by the level control on the remote plate or module connected at the Facility Port. If an RSL Series plate or LM-2 module is in use, the Music Source control can select either LINE 1 and LINE 2.
6	SPKR OUT: HI-Z/4Ω	**OFF = HI**	The amplifier output stage is configured for high voltage operation and the 65 Hz hi-pass filter enabled; the 4Ω pin of the SPEAKER OUTPUT connector is disconnected.
		ON = 4Ω	The amplifier output stage is configured for low impedance operation; the 25V and 70V/100V pins of the SPEAKER OUTPUT connector are disconnected.

Note: default settings are in **BOLD** text.

Troubleshooting – STATUS LED indications

The MA80FT is well protected against errors in speaker wiring and other inappropriate operating conditions. The speaker output is monitored for excessively low impedance (i.e., a short circuit) and for the presence of DC. The internal temperature of the amplifier's power stage is also monitored.

In the event of any of the pre-defined safety conditions being exceeded, the amplifier will enter Protection mode, and will cease passing audio. In this case, the cause of the problem should be investigated and resolved (see below) and the amplifier power-cycled to exit Protection mode.

The front panel **STATUS** LED **6** provides information about the amplifier's current state and will flash if Protection mode has been triggered.

INDICATION	STATUS	CAUSE
Steady green	Normal	No fault – normal operation
Steady red	APD Mode	Standby mode (if enabled)
Flashing green	Protection Mode	Over-temperature sensed or over-current protection triggered
Flashing red		DC detected at output terminals

Fault resolution

Over- temperature (STATUS LED flashes green):

Check that the amplifier has sufficient airflow around the casing (e.g., it is not covered by ceiling insulation material or similar), and that the ambient temperature at the amplifier location is not above +40°C. Power-cycle the amplifier to cancel Protection mode.

Over-current protection (STATUS LED flashes green):

Over-current protection will be triggered if the load at the output terminals is low enough for the amplifier's 80 W rating to be exceeded. This includes the possibility of a short-circuit. The amplifier needs to have an input signal and the level control(s) turned up for this protection to operate. Investigate the output wiring and check for a faulty loudspeaker. Power-cycle the amplifier to cancel Protection mode.

DC protection (STATUS LED flashes red):

DC protection will be triggered if one of the speaker terminals is shorted to ground. Check the loudspeaker wiring. It can also be triggered when the input signal contains high amplitude, low frequency components, such as may be caused by clicks and

pops from other connected equipment. Check the rear panel **GAIN** **2** and **6** and front panel **LEVEL** **1** to **3** controls are not set too high. Power-cycle the amplifier to cancel Protection mode.

EMC considerations

The MA80FT amplifier fully conforms to the relevant electromagnetic compatibility (EMC) standards and is technically well behaved. You should experience no problems interfacing units to other items of equipment and under normal circumstances, no special precautions need to be taken. If the unit is to be used in close proximity to potential sources of HF disturbance such as high power communication transmitters, radar stations and the like, it is suggested that input signal leads be kept as short as possible. Always use balanced interconnections wherever possible. We recommend that the MA80FT amplifier is not located in close proximity to a high-power amplifier or similar item of equipment, which may radiate a strong magnetic field from its power transformer.

Earthing

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 0 V rail of an MA80FT amplifier is directly coupled to the chassis ground. No interconnection problems should be encountered, but if there is any hum or other extraneous noise when source equipment is connected, the situation can generally be remedied by observing the following guidelines:Always connect sources using balanced connections wherever possible. Note that, for EMC reasons, the cable screen should be connected at both ends.

1.   Always connect sources using balanced connections wherever possible. Note that, for EMC reasons, the cable screen should be connected at both ends.

2.   Use audio isolating transformers (readily available from trade suppliers) at the inputs if necessary. These will ensure that the amplifier is electrically isolated from the source equipment.

3.   The signal source units should be located as close as possible to the amplifier. The metal housing of the various units should not be electrically connected. Try to ensure that all interconnected units, including power amplifiers are connected to a common power source to ensure a common ground is provided.

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 to +8 dBu (195 mV to 2.0 V)
Input Gain Control	20 dB range
Input Impedance	47 kohms
Headroom	16 dB
Noise	<-90 dB rms (22 kHz bandwidth)
Music Equalisation	LF: +/-10 dB @ 50 Hz, HF: +/-10 dB @ 10 kHz

MICROPHONE INPUT	
Frequency Response	-3 dB @ 100 Hz (fixed filter) to 20 kHz +/-1 dB
THD + N	<0.05% @ 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	3.3 kohms (balanced)
Headroom	16 dB
Noise (EIN)	-127 dB, 22 Hz to 22 kHz (Rs = 150 ohms)
Common mode rejection	70 dB typical
Phantom Power	12 V (internal jumper)
Mic Equalisation	LF: +/-10 dB @ 100 Hz, HF: +/-10 dB @ 5 kHz

HI-Z INPUT		
Frequency Response	Via Mic i/p	-3 dB @ 100 Hz (fixed filter) to 20 kHz +/-1 dB
	via Line 2 i/p	+/-1 dB, 20 Hz to 20 kHz
Input Gain Control		10 dB to 20 dB
Noise		<88 dB rms (22 kHz bandwidth)

FACILITY INPUT	
Frequency Response	+/-1 dB 20 Hz to 20 kHz
Sensitivity	0.775 V (0 dBu)
Input Impedance	10 kohms (balanced)
Headroom	18 dB
Noise Gate	-60 dBu

MAIN OUTPUT		
Output Power (1 kHz continuous sine wave)		80 W
Lo-Z Output	Minimum load	4 ohms
	Frequency Response	+/-1 dB 20 Hz to 20 kHz
Hi-Z Output	Minimum load	100 V: 125 ohms; 70 V: 62 ohms; 25 V: 7.8 ohms
	Frequency Response	-3 dB @ 65 Hz (filter), -1.5 dB @ 20 kHz
THD + N		<0.05% @ 1 kHz, full power (22 kHz bandwidth)
Amplifier protection		Fixed level signal limiter Protection against DC, PSU overcurrent, amplifier overcurrent, over-temperature. Resettable internal breaker (no fuses)
AUXILIARY OUTPUT		
Max output level		0 dBu (0.775 V)
GENERAL		
Power Input		Universal type, 85 V to 264 V, 47 to 63 Hz
Power consumption	Standby[1]	0.94 W, 7.5 VA
	Idle[2]	6.1 W, 14.8 VA
	1/8th Power (4 ohms)[3]	Lo-Z Output: 16.2 W, 30.6 VA
		Hi-Z Output: 17.9 W, 33.4 VA
	1/3rd Power (4 ohms)[4]	Lo-Z Output: 32.9 W, 54.6 VA
		Hi-Z Output: 36.4 W, 60.0 VA
Heat Loss	Standby[1]	3.4 KJ/hr (3.2 BTU/hr)
	Idle[2]	22.0 KJ/hr (20.8 BTU/hr)
	1/8th Power (4 ohms)[3]	Lo-Z Output: 28.6 KJ/hr (27.1 BTU/hr)
		Hi-Z Output: 32.3 KJ/hr (30.7 BTU/hr)
	1/3rd Power (4 ohms)[4]	Lo-Z Output: 41.6 KJ/hr (39.5 BTU/hr)
		Hi-Z Output: 53.1 KJ/hr (50.4 BTU/hr)

Dimensions (w x h x d)	Net	310 mm x 41 mm x 180 mm, 12.20" 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	2.55 kg, 5.71 lb
	Shipping	3.25 kg, 7.28 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. 1/8th. 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)

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