Connecting an LM-2 to a Line Input on a Z4MK4/Z8MK4

Preamble:

The LM-2* is a remote module for use with Cloud host units fitted with an RJ45 Facility Port. It combines the functions of a remote input connection plate, local audio mixer and a remote control for the host unit's background music.

Microphone and stereo line inputs are provided, with individual level controls. The stereo input is summed to mono, and then mixed with the mic input. The LM-2 is designed to be connected to a Facility Port on the host unit using screened Cat 5 cable and shielded RJ45 connectors. An audio source connected at the LM-2 module is then routed into the Zone to whose Facility Port it has been connected (normally the one where the LM-2 is installed).

It is sometimes useful to be able to make the remote audio source available to every Zone supported by the host unit, rather than just the one local to the LM-2. To achieve this, the balanced audio signal from the LM-2 needs to be connected to one of the host unit's balanced line inputs instead of a Facility Port; it can then be selected as the music source for each Zone where it is required, from the host unit's front panel (or from further LM-2 or RSL-6 Series remote control plates, if they are installed).

This Technical Note describes how to connect an LM-2 module to a balanced line input instead of a Facility Port. Note that the LM-2 Installation Guide (supplied with each module) should also be referred to while making this connection.

* The LM-2 is currently available in six style/finish variants: LM-2B, LM-2W, LM-2AB, LM-2AW, LM-2DB and LM-2DW. This Technical Note is applicable to all variants; the wording "LM-2" is used throughout for brevity.

Applicable products:

Cloud Z4MK4 and Z8MK4 Zone Mixers are fitted with both an RJ45 Facility Port and balanced line inputs and are thus suitable for the connection described in this Technical Note.
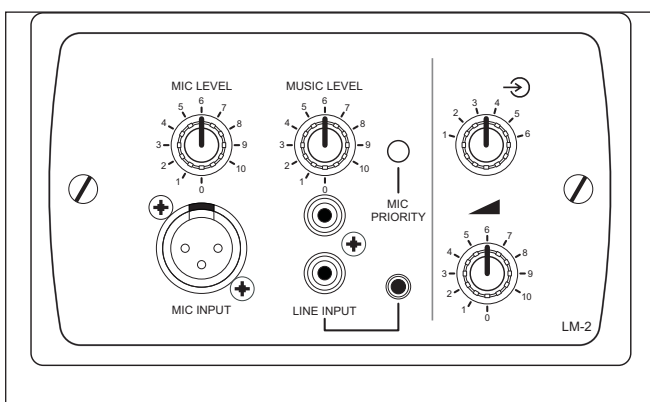
LM-2 front panel

Parts required:

- 2 x screened RJ45 plugs
- Screened Cat 5 cable of the appropriate length (host to module location)
- Short length 25 cm (12") of twin-and-screen audio cable
- 9-way nylon terminal block ("choc-strip") suitable for 1.5 mm^2 (6 A) cable
- Crimp ferrules (white)
- H15 silicone sleeves, 2 mm bore silicone sleeving
- Plastic enclosure to house terminal block with two cable grommets (recommended but not essential)

(Note that as the cable carries analogue audio, only _screened_ Cat 5 cable and _shielded_ RJ45 connectors should be used.)

Tools required:

RJ45 crimp tool, small wire cutters, wire stripper, small screwdriver, ferrule crimp tool. A drill will also be required if an enclosure is being used.

Required Skill Level: Low.

Ability to strip wire neatly, crimp RJ45 connectors, and use of crimp ferrules.

Procedure - wiring:

The procedure essentially consists of "breaking-out" three cores of Cat 5 cable and wiring them to one of the Z4/8MK4's four balanced line inputs. A terminal block housed in a plastic enclosure is used to make a neat and mechanically robust set of connections.

Follow the wiring instructions in the LM-2 Installation Guide, and install screened Cat 5 cable between the host unit and the LM-2. Crimp a shielded RJ45 onto each end of the cable according to the normal wiring standard, which is included here for completeness:
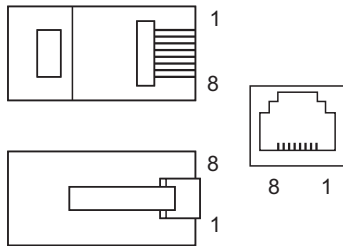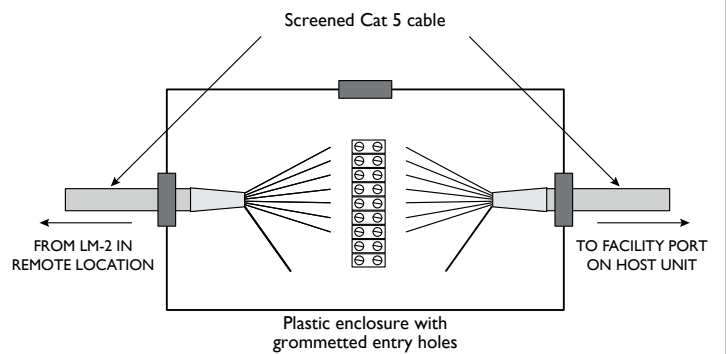

PIN	USE	CAT 5 CORE
1	Audio 'cold' phase (-)	White + Orange
2	Audio 'hot' phase (+)	Orange
3	Priority VCA control	White + Green
4	+V	Blue
5	0V	White + Blue
6	-V	Green
7	Music level control (0 to 10V)	White + Brown
8	Music source select control (0 to 10V)	Brown
SCN	GND for system music controls	Connector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

At the LM-2 end, plug the RJ45 into the LM-2's **OUTPUT** connector.

Turn the host unit off, plug the RJ45 into the Facility Port for the Zone in use, then cut the Cat 5 cable approximately 15 cm (6") back from the connector. Strip the jacket back on both ends by about 5 cm (2"), fit H15 sleeves, and fan the cores out, including the drain wire for the cable screen.

If the terminal block is to be housed in a plastic container (recommended for neatness), pass the cables through holes in the enclosure, fitting grommets in the holes first. (The holes may need to be drilled.)

Screened Cat 5 cable

FROM LM-2 IN REMOTE LOCATION

TO FACILITY PORT ON HOST UNIT

Plastic enclosure with grommetted entry holes

As Cat 5 cores are invariably solid wires, it is strongly recommended that crimp ferrules are fitted to all cores to make a mechanically robust connection. White ferrules should be satisfactory for all the connections.

Connect the cores into the terminal block as shown:

Z4/Z8 Balanced Line Input
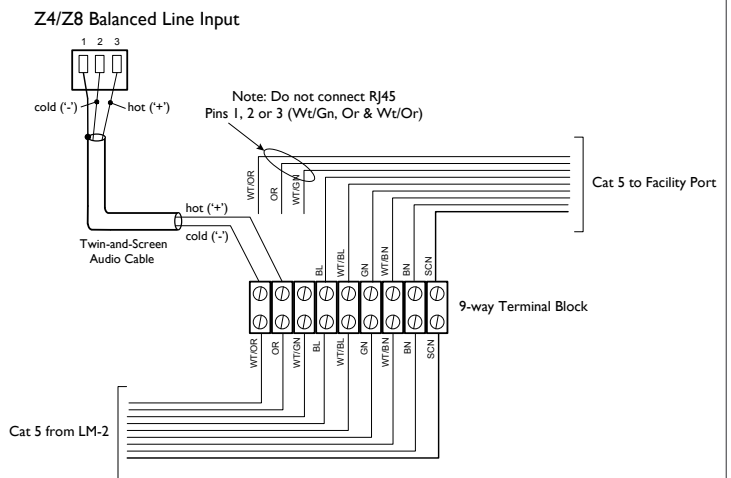
Note that the White+Green core (RJ45 pin 3) should not be connected in this particular application. This core carries the VCA priority control voltage from

the LM-2 and use of the PRIORITY button on the LM-2 will interfere with correct operation in this case. Disconnecting Pin 3 disables the PRIORITY switch.

Connect a suitable length of twin-and-screen audio cable to the terminals carrying the orange pair from the incoming Cat 5 cable. Do not connect the screen at the terminal block end. Wire the other end to the screw-terminal connector for any of Line Inputs 3, 4, 5 and 6 as shown:

PIN	CONNECTION
1	Screen
2	Signal '-' (cold)
3	Signal '+' (hot)

Note that Line Inputs 1 and 2 are unbalanced, and use phono connectors on the Z4MK4 and Z8MK4. Only make the connections as shown to Line Inputs 3 to 6.

When all connections are made, refit the lid on the enclosure (if used).

Procedure – host configuration:

In order for the LM-2's remote control section (background music source and level controls) to operate correctly, the host unit must be set for remote control operation. Please refer to the Z4/Z8MK4 Installation Guide for full details of how to do this.

Operation

Once the connections have been made as described, the audio source(s) connected at the LM-2 will be available in any Zone by selecting the Line Input to which the connection has been made as the Music Source for the Zone.

In the Zone where the new "global" audio source is connected to the LM-2, this selection will be made using the **MUSIC LEVEL** control on the LM-2 itself, and the volume in the Zone will be set by the adjacent **MUSIC LEVEL** control.*

In all other Zones, the source can be selected either by a remote control module or plate (e.g., LM-2 or RSL-6) installed in the Zone, or - if remote controls are not installed - by the **Music Source** controls on the front panel.

In the same way, audio level can be adjusted by either by a remote control module or plate, or the front panel Music Level controls, as appropriate.

Note however, that the **MIC LEVEL** and **MUSIC LEVEL** controls on the LM-2 module where the source is connected now act as "Master" controls and will alter the levels of the audio source in all Zones.

In the example diagram shown on the following page, the global source is connected to an LM-2 in Zone1; the Cat 5 cable from the LM-2 is "broken out" to Line In 3 on the Z4MK4 using the modification described in this Technical Note. Zones 2 and 3 also have LM-2s installed, but Zone 4 does not. To route the laptop audio to all zones, Line In 3 must be selected as the music source: in Zones 1, 2 and 3 this is done on the LM-2 modules in each zone, but for Zone 4, the selection must be made on the front panel of the Z4MK4. The **MUSIC CONTROL** switches for Zones 1, 2 and 3 must be set to REMOTE to enable their remote control sections, while that for Zone 4 is left at LOCAL, so that the Zone 4 front panel music controls remain operative.

From the above it will be seen that a practical method of setting levels might be to first turn the ◢ Zone Music control on the LM-2 to which the source is connected to maximum, and then increase the **MUSIC LEVEL** until the volume in the Zone is as high as is ever likely to be required. This will provide a sensible setting for input gain, and the levels in other Zones can then be adjusted individually.

*This assumes that the LM-2's remote controls are in use and have thus been enabled at the host. If they are not, the front panel **Music Source** and **Music Level** controls should be set in a similar way.

ZONE 2

ZONE 3

MIC INPUT

MIC LEVEL

LINE INPUT

MUSIC LEVEL

MIC PRIORITY

LM-2

Select Line in 3 for Zone 2

Adjust the laptop audio level in Zone 2 here

Cat 5

Adjust the laptop audio level in Zone 3 here

Select Line in 3 for Zone 3

Cat 5

MUSIC CONTROL switches are set to REMOTE for Zones 1, 2 & 3

MUSIC LEVEL control is "master" level for laptop audio throughout system

Source (laptop) connected to LM-2 in Zone 1

Cat 5

ZONE 1

MIC INPUT

MIC LEVEL

LINE INPUT

MUSIC LEVEL

MIC PRIORITY

LM-2

Cat 5 from LM-2 in Zone 1 is "broken out" to e.g., Line in 3

Select Line in 3 for Zone 1

Adjust the laptop audio level in Zone 1 here

Cloud
Z4 MK4
Four Zone Venue Mixer

Music Level

Music Source

Paging Mic Level

Microphone

Zone 1

Zone 2

Zone 3

Zone 4

Select Line In 3 for Zone 4

Adjust the laptop audio in Zone 4 here