MLA-1 / MLA-10
Installation/Operations Manual

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INTRODUCTION

This is the preliminary manual covering the installation and operation of the MLA-1 and MLA-10 MIDI Line Amplifiers.

The MLA-1 and MLA-10 are designed to act as long distance "amplifiers" for MIDI signals. The normal MIDI protocol calls for a maximum cable distance of about 50 feet, clearly not sufficient for many installations. The reason for this restriction has to do with the basic type of electrical protocol (current loop), which lends itself to inexpensive implementation.

Successful installations of 100 feet or so have been made, but require good (low capacitance) cable. Much more than 100 feet of MIDI transmission requires some sort of amplification.

The MLA-1 and MLA-10 take a MIDI input and convert it to a "push/pull" signal, much like RS-422. This low impedance type of signal lends itself to long distance, high reliability installations required by professional applications.

Since the MIDI signal is converted into a different format, an installation requires a transmitter on one side of the long run, and a receiver on the other. Both the MLA-1 and MLA-10 have 4 transmitters and 4 receivers each.

It is important to note that an installation requires either an MLA-1 or MLA-10 on each side of the long run. Even a single MIDI signal requires this pairing.

Normally, the long run consists of a multi-conductor cable. A twisted pair is needed for each MIDI signal. The MLA-10 can provide power to the MLA-1; in that case an additional number of wires is needed. For instance, a 4 input / 4 output system would need 8 twisted pair (16 conductors) for the signals, and possibly another 4 conductor for power, for a total of 20 conductors.

The choice between the MLA-1 and MLA-10 depends on mounting and powering requirements: the MLA-10 is a rack mountable unit with built-in MIDI connectors, while the MLA-1 is normally meant to be mounted in a wall box where the actual MIDI connectors are provided on a wall plate. The MLA-1 can receive its power thru the multi-conductor long cable from a MLA-10 if desired.

As such, the MLA-1 and MLA-10 units are identical in concept, but slightly different in implementation. We will treat each separately in this manual to (hopefully) avoid confusion.

MLA-10

- The MLA-10 is designed as a rack-mountable unit. It occupies a single height of rack and is less than 4 inches deep.

- The MLA-10 is powered by a UL-approved wall transformer and has a front panel power switch and power indicator.

- This unit has eight front panel LEDs that indicate MIDI activity on each of the 4 MIDI inputs and 4 MIDI outputs.

- On the rear panel are 4 MIDI input DIN connectors and 4 MIDI output DIN connectors.

- On the rear panel is a 24-position wire terminal strip for connection of the multi-pair long cable. This is a plug-in type, so that the unit may be removed without disconnection of individual wires.

MLA-1

- The MLA-1 is designed as a surface mountable unit. This may be inside of a wall box. It measures 6.7" by 6.2" by .8".

- The MLA-1 is normally powered remotely from a MLA-10, but may be ordered from the factory for wall-transformer power.

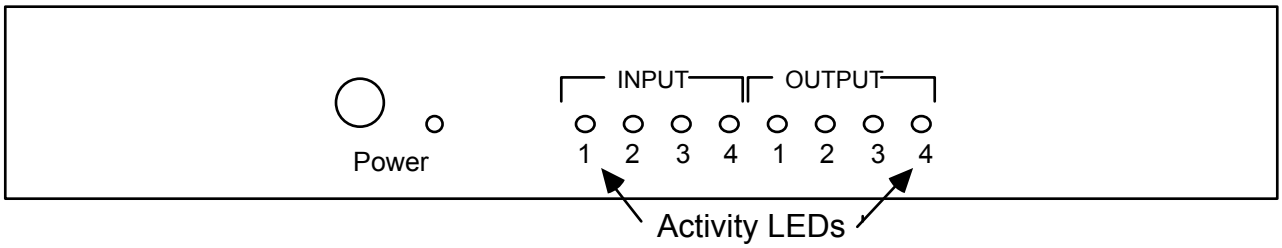
- Since this unit is normally mounted inside a wall box, no LEDs are included.

- MIDI connection is made via a 24 position terminal strip. Normally, the installer would mount the MIDI DIN connectors on a wall plate, and wire these to the terminal strip.

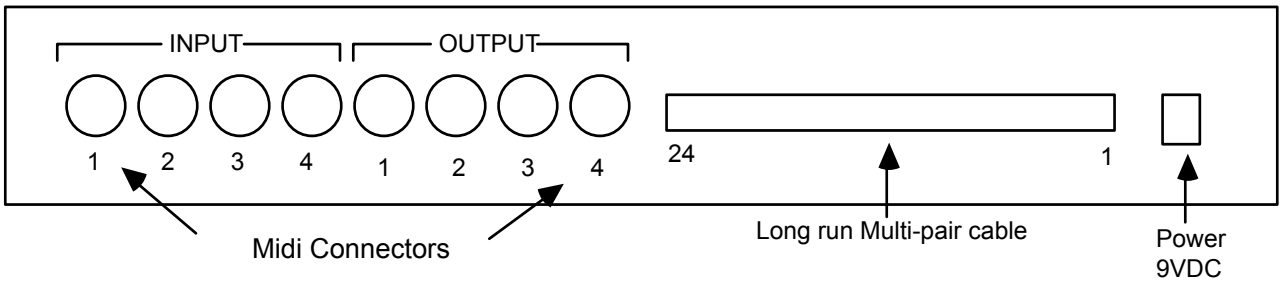
- The unit has another 24-position wire terminal strip for connection of the multi-conductor long cable.

MLA-10

The front panel of the MLA-10 has the Power switch and LED and the MIDI activity LEDs. These activity LEDs will flicker whenever the associated channel carries MIDI data.



The rear panel of the MLA-10 has the power connector for the wall transformer, the eight MIDI connectors, and the terminal strip for the multi-pair long run cable.



The definition of the pins of the terminal strip are as follows:

Pin	Name	Pin	Name	Pin	Name
1	MIDI In #1 (-)	9	MIDI Out #1 (-)	17	Ground
2	MIDI In #1 (+)	10	MIDI Out #1 (+)	18	Ground
3	MIDI In #2 (-)	11	MIDI Out #2 (-)	19	Ground
4	MIDI In #2 (+)	12	MIDI Out #2 (+)	20	Ground
5	MIDI In #3 (-)	13	MIDI Out #3 (-)	21	+9 VDC
6	MIDI In #3 (+)	14	MIDI Out #3 (+)	22	+9 VDC
7	MIDI In #4 (-)	15	MIDI Out #4 (-)	23	+9 VDC
8	MIDI In #4 (+)	16	MIDI Out #4 (+)	24	+9 VDC

This means that a MIDI signal put into the MLA-10's MIDI Input #1 will be converted and transmitted out on pins 1 and 2 as a ± pair. Pins 17 thru 24 are intended as output power to a MLA-1. ***Under no circumstances should pins 21 thru 24 be attached between two MLA-10 units.***

Connections- MLA-10 to MLA-1

When attaching a MLA-10 to a MLA-1, wiring is very simple: Pin 1 on the MLA-10 goes to Pin 1 on the MLA-1 and so forth until pin 24.

/f only 10 pair cable is used, skip past pins 19 and 20 on both ends. This will provide two conductors of ground and two conductors of +9 VDC power.

Connections- MLA-10 to MLA-10

When attaching two MLA-10's together, it is necessary to swap the In's versus the Out's of the wiring. The connections will be as follows:

Unit A pin	Unit B pin	Unit A pin	Unit B pin	Unit A pin	Unit B pin
1	9	9	1	17	17
2	10	10	2	18	18
3	11	11	3	19	19 (optional)
4	12	12	4	20	20 (optional)
5	13	13	5		
6	14	14	6		
7	15	15	7		
8	16	16	8		

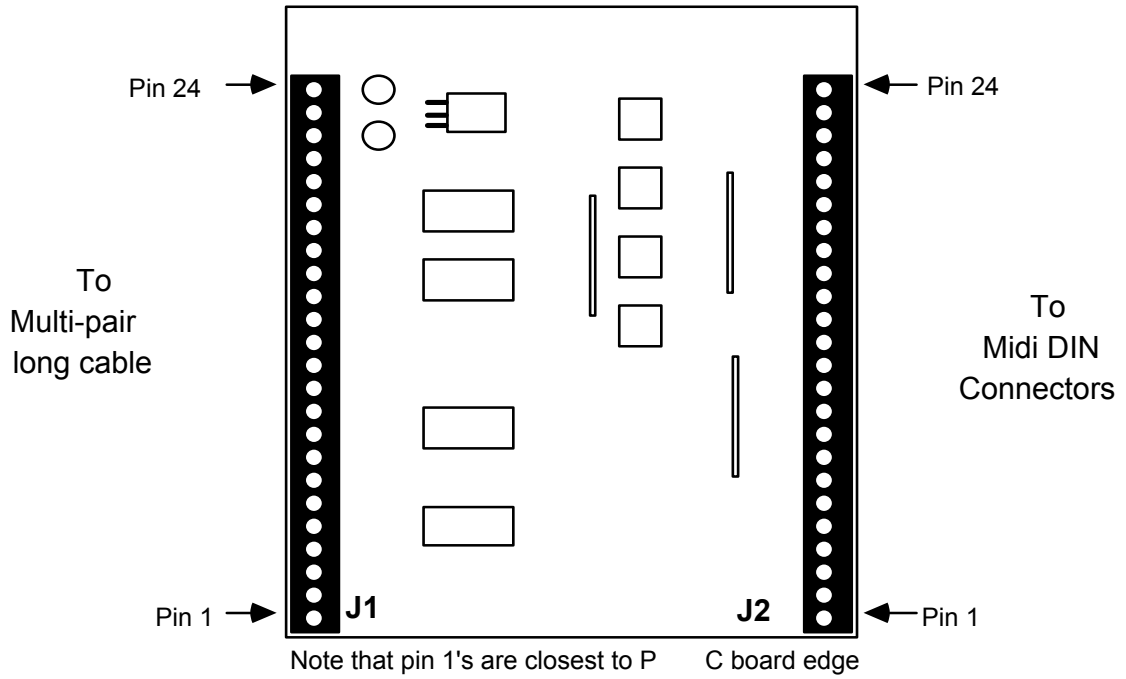
Clearly, the inputs and outputs have been swapped on one side. Note that pins 21 thru 24 are not attached at either end.

Failure to attach two MLA-10's as shown above will cause output to fight output, and damage to both units will probably result.

We strongly recommend that a minimum of 22 AWG twisted pair cable be used. An example of this would be Belden #9747, which is non-shielded 12 pair.

MLA-1

With the cover removed, this PC board is found:



J1

This connector will attach to the long multi-twisted-pair cable. For each MIDI channel used, a cable pair is needed. In addition, at least two pair of wires are needed for power if the MLA-1 is being powered remotely from a MLA-10. If more conductors are available, they should also be used for power. This will minimize the voltage drop thru the cable.

When attaching a MLA-1 to a MLA-10, wiring is very simple: Pin 1 on the MLA-1 goes to Pin 1 on the MLA-10 and so forth until pin 24.

If only 10 pair cable is used, skip past pins 19 and 20 on both ends. This will provide two conductors of ground and two conductors of +9 VDC power.

We strongly recommend that a minimum of 22 AWG twisted pair cable be used. An example of this would be Belden #9747, which is non-shielded 12 pair.

J1 Connector

Pin	Name	Pin	Name
1	Chan 1 Out (-)	13	Chan 3 In (-)
2	Chan 1 Out (+)	14	Chan 3 In (+)
3	Chan 2 Out (-)	15	Chan 4 In (-)
4	Chan 2 Out (+)	16	Chan 4 In (+)
5	Chan 3 Out (-)	17	Ground
6	Chan 3 Out (+)	18	Ground
7	Chan 4 Out (-)	19	Ground
8	Chan 4 Out (+)	20	Ground
9	Chan 1 In (-)	21	+9 VDC
10	Chan 1 In (+)	22	+9 VDC
11	Chan 2 In (-)	23	+9 VDC
12	Chan 2 In (+)	24	+9 VDC

(Note that some units are silk-screened to have pins 9 thru 16 as channels 5 thru 8. The wiring is the same regardless.)

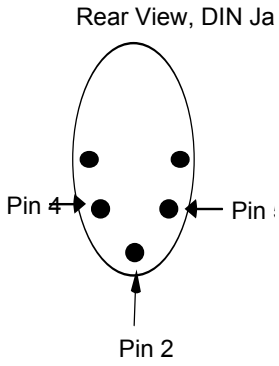
J2

This connector carries the actual MIDI signals, and must usually be brought to normal 5 pin DIN connectors. Normally, these would be mounted to a wall plate. Any type of wire may be used for these connections. The wiring is as follows:

J2 Pin	MIDI Connector	J2 Pin	MIDI Connector
1	MIDI Out 1, pin 4	13	MIDI In 1, pin 4
2	MIDI Out 1, pin 2	14	No Connection
3	MIDI Out 1, pin 5	15	MIDI In 1, pin 5
4	MIDI Out 2, pin 4	16	MIDI In 2, pin 4
5	MIDI Out 2, pin 2	17	No Connection
6	MIDI Out 2, pin 5	18	MIDI In 2, pin 5
7	MIDI Out 3, pin 4	19	MIDI In 3, pin 4
8	MIDI Out 3, pin 2	20	No Connection
9	MIDI Out 3, pin 5	21	MIDI In 3, pin 5
10	MIDI Out 4, pin 4	22	MIDI In 4, pin 4
11	MIDI Out 4, pin 2	23	No Connection
12	MIDI Out 4, pin 5	24	MIDI In 4, pin 5

(Note that some MLA-1 metal work was silk-screened with MIDI Ins designated as channels 5 thru 8. The wiring is the same regardless.)

Please note that a 5-pin DIN connector is not numbered with consecutive pin numbers. Viewed from the rear, the pin-out for the DIN is:



Special Interest notes:

1. One output may be connected to as many as 4 inputs. For instance, pins 1 &2 of a MLA-10 could be attached to pins 9 &10 of up to 4 other MLA-10's. **The opposite of this is not true!!** For instance, pins 1 & 2 of multiple units may not be attached to pins 9 &10 of another. This would result in outputs fighting each other.

2. While this multiple-slave approach may be used with MLA-1's also, it is not possible to remotely power multiple MLA-1's from one MLA-10's. If Multiple MLA-1's are to be used, contact the factory for instructions about modifying the MLA-1's for local power.

3. When working with an MLA-1, you will be constructing some number of panels with MIDI Jacks. You should keep in mind that, according to the MIDI specification, the MIDI Input jacks have no ground connection. Only pins 4 and 5 need be connected, pin 2 is left unconnected. The MIDI Output jacks, however, have pin 2 going to ground. If you are trying to find a source for 5-pin DIN jacks, we recommend Switchcraft part number 57GB5F. These can be mounted with screws or rivets.