Operating Manual

Balanced Bridging Kit
Single-Ended Bridging Kit

Balanced Y-Adapter
Single-Ended Y-Adapter

Madrigal Audio Laboratories, Inc.

Bridged Operation

Bridging Explained

Bridging refers to the act of reconfiguring the circuitry in both the left and right channels of an amplifier to act as though it were a single, much larger amplifier. (Of course, you will need a second bridged amplifier for stereo; more for multichannel sound, as in home theater applications.)

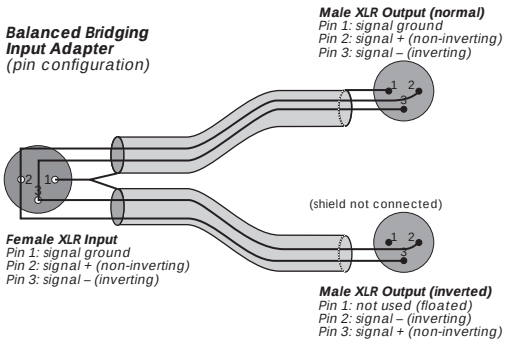
Bridging is accomplished by sending a normal signal to one channel and an *inverted* signal to the other. In this configuration, one channel will always be "pushing" when the other is "pulling." By connecting the loudspeaker leads across the left and right red output terminals, the amplifier can now deliver twice the normal voltage to the loudspeaker. Working together this way, the two amplifier channels can deliver almost *four times* the power to a speaker that a single channel could deliver on its own.

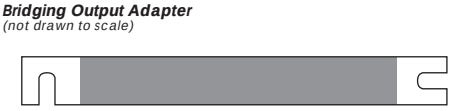
Bridged operation is particularly beneficial with low sensitivity, high-impedance loudspeakers (8Ω or higher) that have a greater need for voltage than for current. It is not recommended for loudspeakers that have an impedance significantly below 4Ω, as the speaker's impedance is "split" by the two halves of the amplifier. Thus the bridged amplifier "sees" a 2Ω load when connected to a 4Ω loudspeaker. Prolonged delivery of high power levels into such a low impedance creates a great deal of heat that needs to be dissipated. (Of course, Madrigal amplifiers are protected against overheating, but having an amplifier shut itself down even temporarily can put a damper on the evening's entertainment.)

Balanced Bridging

If your preamplifier has balanced outputs, use a Madrigal Balanced Bridging Kit for each channel to be bridged. This kit is comprised of two pieces: and input cable that splits the incoming signal (inverting one side only), and a ground bus bar that ties the output ground terminals together and allows ground currents to flow through an extremely low impedance.
These cables are wired internally as indicated below:

Balanced Bridging Kit





The "normal" leg of the Madrigal Balanced Bridging Kit will be marked with a red stripe on the XLR to indicate positive polarity, while the XLR on the inverted leg will be solid black to indicate inverted polarity.

The Bridging Output Adapter is simply a bus bar of solid copper (with gold over silver plating) used to strap two of the output ground terminals together. This establishes a common ground reference for the amplifier and completes the circuit that includes the loudspeakers. *(There are two such bus bars included in each kit: one appropriate for Mark Levinson 300-series amplifiers, and one appropriate for Proceed amplifiers. Use whichever is appropriate, or heavy guage speaker wire if for some reason the bus bars cannot be used.)*

Important!

Do not attempt to operate your amplifier in a bridged mode without first strapping the black output terminals together. Failure to establish a common ground reference between the two channels can damage your amplifier by forcing significant currents to flow where they do not belong!

To bridge your Madrigal amplifier using a balanced input signal, follow these steps:

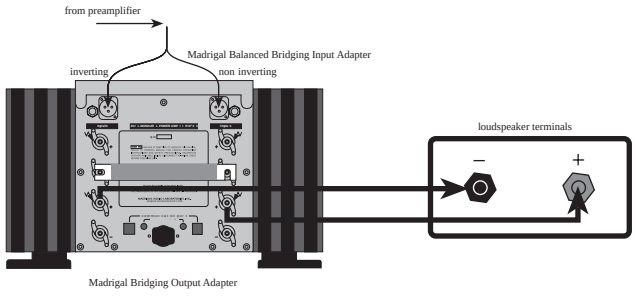
1 DISCONNECT YOUR AMPLIFIER FROM EVERYTHING

Start with your amplifier totally disconnected from inputs, outputs, and AC power. It is always best to power down an amplifier before changing connections; here you are also changing its basic configuration.

2 CONNECT THE BALANCED BRIDGING INPUT ADAPTER TO THE AMP'S INPUTS

Connect the two male XLRs to the inputs of your amplifier, noting which XLR is marked red and which is black. You may want to standardize on "Red is Right" to avoid confusion, although it makes no difference to the amplifier. The channel with the red, normal input will later be connected to the red, positive terminal of your loudspeaker.

Balanced Bridged Input Connection



3 CONNECT ONE END OF THE BALANCED BRIDGING OUTPUT ADAPTER TO TWO SIDE-BY-SIDE BLACK OUTPUT TERMINALS

Connect one end of the Balanced Bridging Output Adapter to an upper black output terminal on one side of the amplifier, and then connect the other end to a black output terminal on the other side of the amplifier. (The two connections should be side-by-side rather than one above the other.) Make sure these connection are snug and secure. (*The upper black connectors are used on Mark Levinson 300-series amplifiers since strapping the lower black terminals would inhibit access to the communication ports and AC cord. Electrically, it would make no difference.*)

4 CONNECT YOUR LOUDSPEAKER WIRE ACROSS TWO SIDE-BY-SIDE, RED OUTPUT TERMINALS

In this case, you may use either the upper or the lower red output terminals. Connect the positive/+/red binding post of your loudspeaker to the red output terminal ***associated with the red (normal) side of the Input Adapter***. Connect the negative/–/black binding post of your loudspeaker to the red output terminal on the other side of the amplifier, the one ***associated with the black (inverted) side of the Input Adapter***.

Following this connection convention preserves the polarity of the signal sent to the loudspeaker. In practice, the most important thing is to be consistent throughout the system, as inconsistency will result in out-of-phase loudspeakers. In turn, this results in unstable imaging and poor bass reproduction. (The effect is not dangerous, but neither is it subtle.)

5 CONNECT ONE OUTPUT CHANNEL OF YOUR PREAMPLIFIER TO THE INPUT OF YOUR BRIDGED AMPLIFIER

The female XLR at the junction of the Balanced Bridging Input Adapter is now the *single* input to this *bridged* amplifier.

6 POWER UP YOUR AMPLIFIER

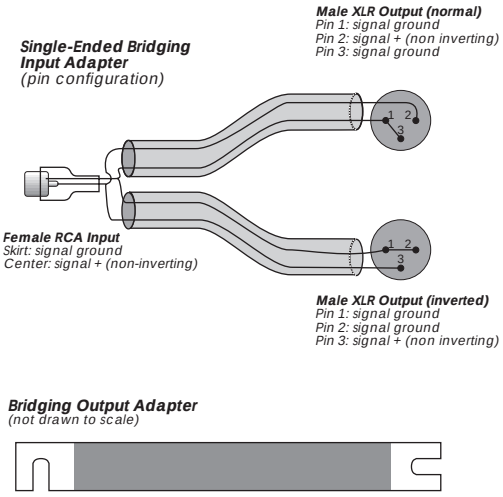
Remember that a Mark Levinson power amplifier incorporates inrush protection circuitry that allows its power supply to charge up gently, enhancing its longevity. Plug the amplifier back into the AC mains; press the **standby** button once to bring the amp from **off** to **standby**; wait at least ten seconds; and press the **standby** button again to bring it from **standby** to **operate**.

7 REPEAT THIS PROCESS WITH YOUR OTHER AMPLIFIER(S)

Single-Ended Bridging

If your preamplifier has only single-ended (RCA) outputs, a few details of bridged operation will differ from the discussion above, all pertaining to the connection of the preamp to the bridged amplifiers—resulting in your use of a Madrigal Single-Ended Bridging Kit for each channel to be bridged.

Single-Ended Bridging Kit



The "normal" leg of the Madrigal Single-Ended Bridging Input Adapter will be marked with a red stripe to indicate positive polarity, and the inverted leg will be marked with a black stripe to indicate inverted polarity (corresponding to the red and black terminals of your loudspeaker).

The Bridging Output Adapter is simply a bus bar of solid copper (with gold over silver plating) used to strap two of the output ground terminals together. This establishes a common ground reference for the amplifier and completes the circuit that includes the loudspeakers. *(There are two such bus bars included in each kit: one appropriate for Mark Levinson 300-series amplifiers, and one appropriate for Proceed amplifiers. Use whichever is appropriate, or heavy guage speaker wire if for some reason the bus bars cannot be used.)*

Important!

Do not attempt to operate your amplifier in a bridged mode without first strapping the black output terminals together. Failure to establish a common ground reference between the two channels can damage your amplifier by forcing significant currents to flow where they do not belong!

To bridge your Mark Levinson amplifier using a single-ended (RCA) input signal, follow these steps:

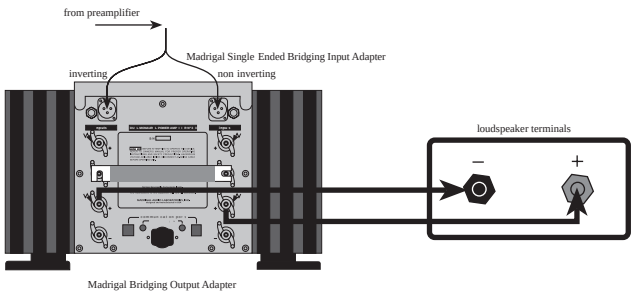
1 DISCONNECT YOUR AMPLIFIER FROM EVERYTHING

Start with your amplifier totally disconnected from inputs, outputs, and AC power. It is always best to power down an amplifier before changing connections; here you are also changing its basic configuration.

2 CONNECT THE SINGLE-ENDED BRIDGING INPUT ADAPTER TO THE AMP'S INPUTS

Connect the two male XLRs to the inputs of your amplifier, noting which XLR is marked red and which is black. You may want to standardize on "Red is Right" to avoid confusion, although it makes no difference to the amplifier. The channel with the red, normal input will later be connected to the red, positive terminal of your loudspeaker.

Single-Ended Bridged Input Connection



3 CONNECT ONE END OF THE SINGLE-ENDED BRIDGING OUTPUT ADAPTER TO TWO SIDE-BY-SIDE BLACK OUTPUT TERMINALS

Connect one end of the Balanced Bridging Output Adapter to an upper black output terminal on one side of the amplifier, and then connect the other end to a black output terminal on the other side of the amplifier. (The two connections should be side-by-side rather than one above the other.) Make sure these connection are snug and secure. (*The upper black connectors are used on Mark Levinson 300-series amplifiers since strapping the lower black terminals would inhibit access to the communication ports and AC cord. Electrically, it would make no difference.*)

4 CONNECT YOUR LOUDSPEAKER WIRE ACROSS TWO SIDE-BY-SIDE, RED OUTPUT TERMINALS

In this case, you may use either the upper or the lower red output terminals. Connect the positive/+/red binding post of your loudspeaker to the red output terminal *associated with the red (normal) side of the Input Adapter*. Connect the negative/–/black binding post of your loudspeaker to the red output terminal on the other side of the amplifier, the one *associated with the black (inverted) side of the Input Adapter*.

Following this connection convention preserves the polarity of the signal sent to the loudspeaker. In practice, the most important thing is to be consistent throughout the system, as inconsistency will result in out-of-phase loudspeakers. In turn, this results in unstable imaging and poor bass reproduction. (The effect is not dangerous, but neither is it subtle.)

5 CONNECT ONE OUTPUT CHANNEL OF YOUR PREAMPLIFIER TO THE INPUT OF YOUR BRIDGED AMPLIFIER

The female RCA at the junction of the Single-Ended Bridging Input Adapter is now the *single* input to this *bridged* amplifier.

6 POWER UP YOUR AMPLIFIER

Remember that a Mark Levinson power amplifier incorporates inrush protection circuitry that allows its power supply to charge up gently, enhancing its longevity. Plug the amplifier back into the AC mains; press the **standby** button once to bring the amp from **off** to **standby**; wait at least ten seconds; and press the **standby** button again to bring it from **standby** to **operate**.

7 REPEAT THIS PROCESS WITH YOUR OTHER AMPLIFIER(S)

Biamplification

Biamplification Explained

In contrast to bridged operation (wherein a two channel amplifier is "fooled" into behaving as a single, larger amplifier), biamplification makes use of a two-channel amplifier to drive *different portions* of a single loudspeaker. As with bridging, it offers a modular way of increasing the overall performance of your system (***if*** your loudspeakers support biamplification).

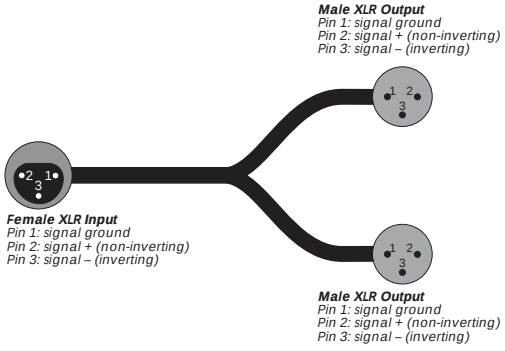
Since each channel of the amplifier is delivering current into its load only over a limited range of frequencies (typically bass *vs.* midrange/treble), several forms of distortion are reduced as compared to each channel handling the full range of musical information. For this reason, many loudspeaker companies design their products to include multiple speaker inputs (since using multiple amplifiers improves the performance of their products as well). Another common use of biamplification involves adding a subwoofer (along with an appropriate electronic crossover) to supplement and/or improve the deep bass performance of your system.

Always refer to the specific directions provided by your loudspeaker manufacturer prior to setting up a biamplified speaker system. Any instructions contained herein cannot be substituted for those that are specific to the loudspeaker in question. In general, however, biamping is done in one of two ways: *active* biamplification, or *passive* biamplification.

Active biamping refers to the presence of an "active" electronic crossover that divides the music into two (or sometimes more) bands of frequencies. These are then forwarded to separate power amplifiers, and sent on directly to the appropriate drivers in the speakers. The most common application of this approach is the use of a subwoofer crossover to separate the deep bass (below, say, 80 Hz) from the rest of the program material. It is then amplified separately and sent to a dedicated subwoofer designed to handle those extremely low frequencies.

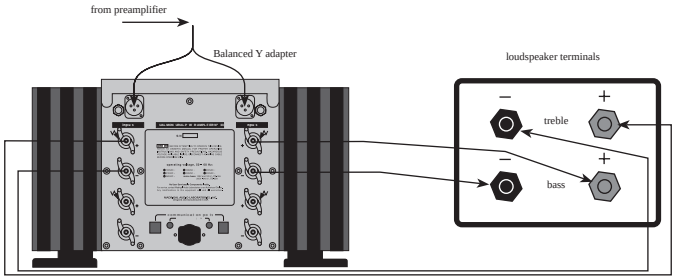
Apart from adding a subwoofer, the next most common form of biamping (called *passive* biamplification) involves merely using a conventional "Y-adapter" (either balanced or single-ended) to provide a full range signal to two channels.

Balanced Y-adapter



The outputs of these two channels are then connected to two sets of binding posts on each loudspeaker. (See below.) The loudspeaker's internal crossover continues to divide the frequencies appropriately among the various drivers.

Passive "vertical" biamping wiring diagram



"Horizontal" biamping refers to the practice of using one amplifier for left and right low frequencies, and another for the high frequencies. For example, one might use a Mark Levinson Nº333 for the bass and a Mark Levinson Nº331 for the mids and highs (since the low frequencies typically require the greatest portion of the available power).

"Vertical" biamping (illustrated above) refers to the practice of using a single stereo amplifier for each loudspeaker (say, a Nº332 driving each loudspeaker). Vertical biamping allows the amplifier to be placed extremely close to each speaker, keeping speaker leads as short as possible.

To facilitate biamping, all Mark Levinson power amplifiers have the same voltage gain (26.7 dB) and input sensitivity (for 2.83V out into 8Ω). All Proceed amplifiers have a gain of 29 dB (single-ended) and 23 dB (balanced), allowing you to mix single-ended and balanced connections in the same system without difficulties. Because of this fact, you should not have to concern yourself with adjusting the relative volumes of the bass and treble sections of your loudspeakers—if they sounded good with a single amplifier, they should sound better when biamplified.

U.S. and Canadian Warranty

Limited five year warranty

Madrigal provides an owner-transferable, five year limited warranty on all its products within the U.S. and Canada **ONLY**. Warranty and service policies outside the U.S. and Canada are set by the local, authorized distributor and are applicable in the country of purchase **ONLY**. Madrigal products are designed to operate at set voltages appropriate for the country of sale and may be damaged if operated at the wrong voltage.

Madrigal® components purchased in the United States or in Canada are warranted to be free from defects in material and workmanship under normal use for a period of five (5) years from the date of purchase. During the warranty period, and upon proof of purchase, any Madrigal component exhibiting defects in materials and/or workmanship will be repaired or replaced, *at our option*, without charge for either parts or labor, at our factory. The warranty will not apply to any Madrigal component that has been misused, abused or altered.

Any Madrigal component not performing properly may be returned (freight prepaid) to the factory for evaluation. ***Return authorization must first be obtained*** by either calling or writing the factory prior to shipping the component. (Please see *Obtaining Service*, next page). The factory will pay for return shipping charges (within the United States and Canada) to return the unit only in the event that the component is found to be defective as above mentioned. There are other stipulations that may apply to shipping charges.

There is no other express warranty on this component. Neither this warranty nor any other warranty, express or implied, including any implied warranties of merchantability or fitness, shall extend beyond the warranty period. No responsibility is assumed for any incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts and other states do not allow the exclusion or limitation of incidental or consequential damages, so that the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. ***This warranty is applicable in the United States and Canada only.***

Obtaining Service

We take great pride in our dealers. Experience, dedication, and integrity make these professionals ideally suited to assist with our customers' service needs.

If your Madrigal component must be serviced, please contact your dealer. Your dealer will then decide whether the problem can be remedied locally, or whether to contact Madrigal for further service information or parts, or to obtain a Return Authorization. The Madrigal Technical Services Department works closely with your dealer to solve your service needs expediently.

Important!

Return authorization must be obtained from Madrigal's Technical Services Department BEFORE a unit is shipped for service.

It is extremely important that information about a problem be explicit and complete. A specific, comprehensive description of the problem helps your dealer and the Madrigal Technical Services Department locate and repair the difficulty as quickly as possible.

A copy of the original bill of sale will serve to verify warranty status. Please include it with the unit when it is brought in for warranty service.

Warning!

All returned units must be properly packaged (preferably in their original packing material), and the proper return authorization numbers must be marked on the outer carton for identification. If the packaging to protect the unit is, in our opinion or that of our dealer, inadequate to protect the unit, we reserve the right to repackage it for return shipment at the owner's expense. Neither Madrigal nor your dealer can be responsible for shipping damage due to improper (that is, non-original) packaging.

Your dealer can order a new set of shipping materials for you if you need to ship your component and no longer have the original materials. There will be a charge for this service. We *strongly* recommend saving all packing materials in case you need to ship your unit some day.

MADRIGAL AUDIO LABORATORIES INC.
2081 South Main Street, P.O. Box 781
Middletown, Connecticut 06457 USA

Telephone: (860) 346-0896
Fax: (860) 346-1540
http://www.madrigal.com

630232

Printed in U.S.A.