

# *Academy Audio Inc.*

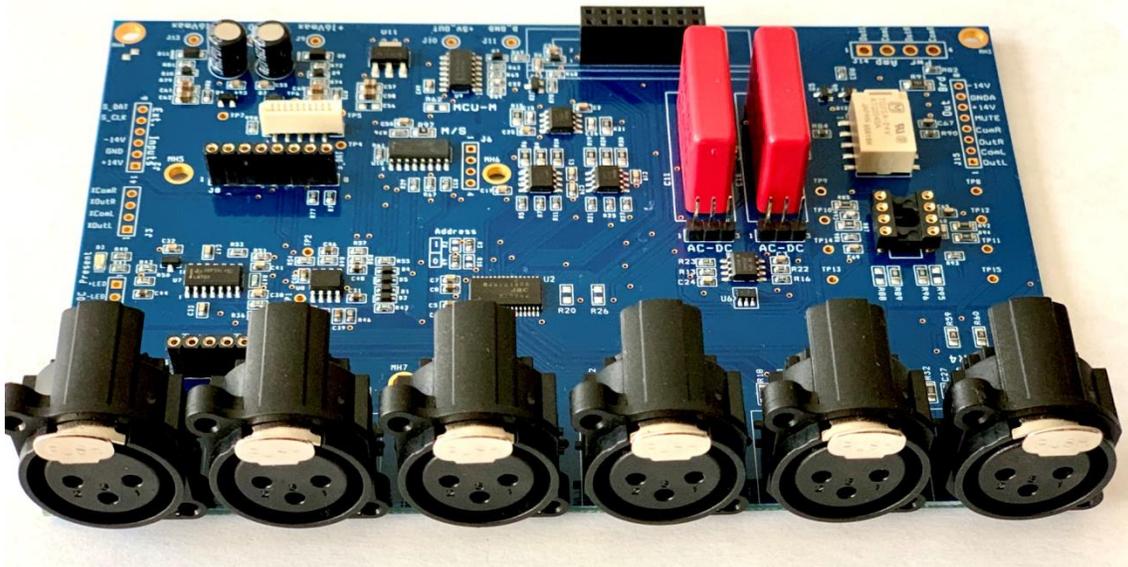
discovering the soul of music®

## **ISB Hi-End MUSES® Balanced Electronic Input Selector**

Ver. 01

## **User Manual**

Rev. 01



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## 1. Introduction

Thank you for purchasing the ISB Hi-End MUSES® Electronic Balanced Input Selector board from Academy Audio Inc.

This three input balanced electronic stereo XLR selector board is designed and built in the US, using the best quality parts, and is aimed to satisfy the highest audiophile quest for purity of sound reproduction.

The unit is built using a high quality relay for muting and a unique multichannel electronic analog switch chip designed to pair with the NJR MUSES®72320 volume control chip. This chip does not include any active circuitry, and therefore provides vanishingly low level of noise and distortions. It also features lower capacitance compared to signal relays.

When used with the MCL Control board, the VCM module and a power supply, the ISB board makes a complete balanced Hi End preamp that rivals most of the best commercially available preamplifiers.

A high quality output opamp is installed in a socket, and may be replaced by any dual JFET opamp with the standard pinout. The board can be used with an outboard amplifier/buffer section or without any active amplifier/buffer.

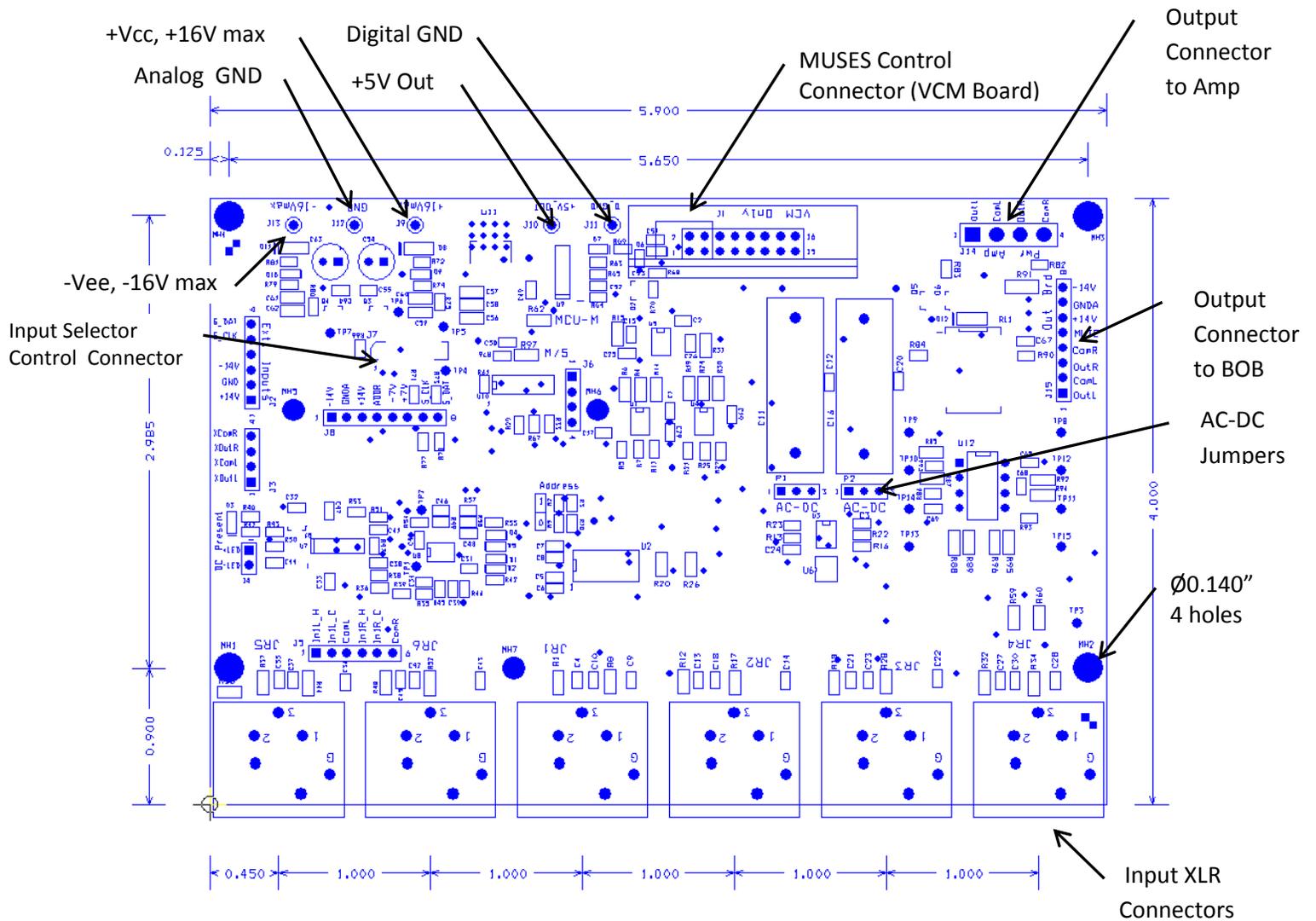
A high quality MUTE relay is provided to eliminate any unwanted noises from power-up/power-down processes.

## 2. Specifications

Dimensions:	4.00"L x 5.90"W x 1.80"H
Power requirements:	+10V ...+16V, 70mA; -10V ...-16V, 50mA (including VCM and MCL boards)
Max. Input Voltage:	5Vrms
Volume Control Range:	0dB to -111.5dB (0.5dB step), MUTE (-120dB)
Total Output Noise:	-109dBV (with VCM and PBA2604)
Total THD+N @1kHz:	-100dBV (with VCM and PBA2604)

### 3. Mechanical Installation

Refer to Figure 1 for mechanical dimensions and mounting holes location. Provide at least 0.150" between the board and the installation surface.



Total assembly height is 1.10" (1.860" with VCM). All dimensions in inches.

Figure 1 ISB Board Installation.

## 4. Power Connection

The ISB board requires a clean bi-polar power source of  $V_{cc}=+10V_{dc}$  to  $+16V_{dc}$  and  $V_{ee}=-10V_{dc}$  to  $-16V_{dc}$ . Connect the power source as follows:

J9	$V_{cc}=+10V_{dc}$ to $+16V_{dc}$ , 70mA (no $+5V_{dc}$ load)
J12	Analog Ground
J13	$V_{ee}=-10V_{dc}$ to $-16V_{dc}$ , 50mA

**IMPORTANT:** Use only dual power supplies. Applying only negative voltage to the board may cause a **permanent damage** to the MUSES chip.

Digital power of  $+5V_{dc}$  required for operation of the MCL (LCD) controller is generated by the ISB board. It is supplied to the MCL (LCD) controller board through the flat cable connector J7.

The ISB board may also supply up to 50mA of  $+5V_{dc}$  to an external load. Use J17 and J18 for that connection.

J10	<b>Output</b> $V_{dd}=+5V_{dc} \pm 2\%$ , 50mA
J11	Digital Ground

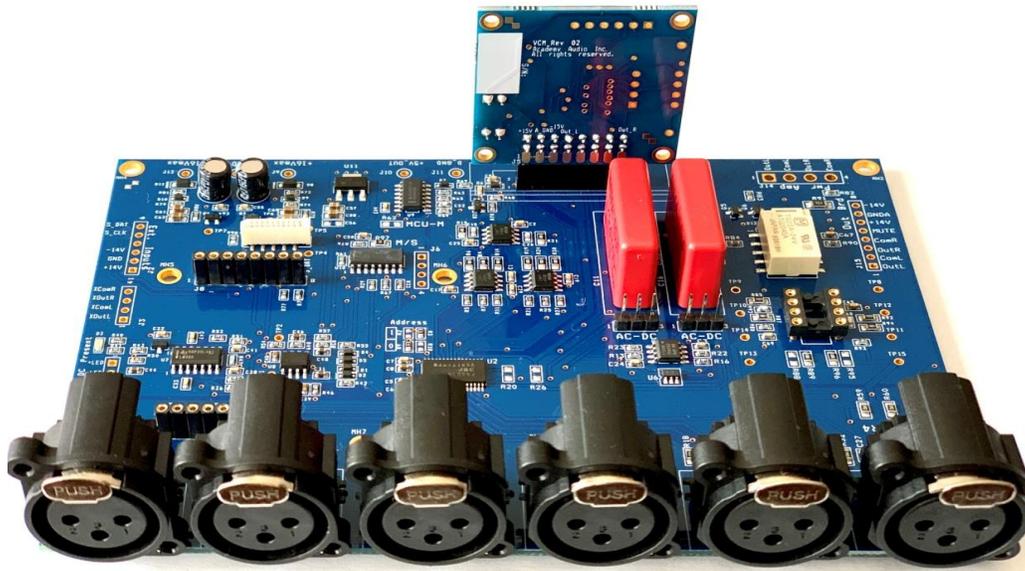
Please note that the left bottom mounting hole MH1 of the board is connected to the analog GND. If this connection is undesirable, remove the resistor R56.

## 5. Complete System Use

The ISB board is designed to be used as a part of the system with VCM and MCL modules from Academy Audio.

To use the ISB board in the system:

- 5.1. Plug the VCM module into the J1 16-pin dual row connector as shown on the Figure 5.1. Make sure all 16 pins are fully engaged.



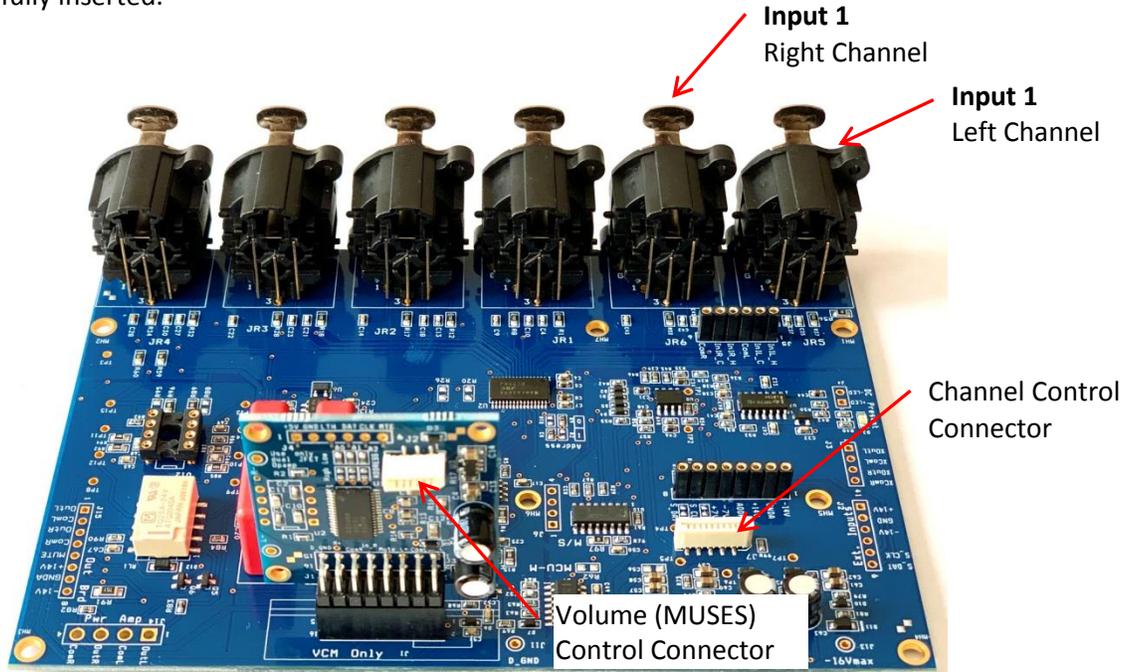
**Figure 5.1.** ISB board with VCM board installed.

- 5.2. Connect the power supply as described at Section 4.
- 5.3. Connect the output RCA connectors or the power amp input connectors to the connector J14.

J14	Description
Pin 1	OutL – Left Channel Audio Output
Pin 2	ComL – Left Channel Audio GND*
Pin 3	OutR – Right Channel Audio Output
Pin 4	ComR – Right Channel Audio GND*

\* To avoid ground loops do not connect the Audio grounds to the chassis.

- 5.4. Connect flat cables supplied with the MCL board to the ISB/VCM combination. Connect the narrow 6-conductor cable to the VCM MUSES control connector J2 (VCM). Connect the wider 10-conductor cable to the channel control connector J7 (ISB) as shown on the Figure 5.2. Make sure the contact area of each cable faces the corresponding connector contacts, and the cables are fully inserted.



**Figure 5.2.** ISB board /VCM board control connectors.

- 5.5. Connect at least one audio source to a pair of the XLR inputs (LEFT and RIGHT).
- 5.6. Apply the power and enjoy the great sound of MUSES!

## 6. Advanced Use of the ISB Board

The ISB Input Selector board presents a versatile “playground” for advanced users. The unique properties of the MUSES®72320 volume control chip open extensive possibilities for sound quality improvements.

### 6.1. Experimenting with Opamps.

The ISB board is shipped with a PBA2604 pre-biased Class A JFET opamp installed in U12 position. This opamp provides excellent measurements and sonics. Nevertheless, there is always room for improvement.

Feel free to experiment with any +/-15V powered standard pinout dual JFET opamp using the provided socket U12. It is also possible to use a SOIC-8 SMT dual opamp using an appropriate SOIC8-to-DIP8 adapter. A PBA adapter, providing a Class A bias for any standard SOIC-8 pinout opamp, is available from Academy Audio as well

There is an option to use an outboard buffer or a gain stage. To use this option, remove the opamp chip from the socket in U12 position, and connect the external board to the test points as follows.

Test Point	Description
TP10	Left Channel Input
TP11	Right Channel Input
TP9	Left Channel Output
TP12	Right Channel Output
TP14	ComL, Left Channel Audio GND
TP15	ComR, Right Channel Audio GND
TP8	+Vcc, +11Vdc...+16Vdc, 200mA max
TP13	-Vee, -11Vdc...-16Vdc, 200mA max
TP3	Power GND

For a completely passive volume control solution, remove the opamp from the socket U12 and connect TP10 to TP9, and TP11 to TP12. Remove resistors R82, R83, R89 and R96. Note, that a high quality high input impedance buffer should be used in the downstream audio circuitry.

### 6.2. True DC Operation.

It is well-known that capacitors in the audio signal path may affect sound quality. The ISB board uses high quality VIMA polypropylene capacitors in the audio signal path circuitry. The -3dB cut-off frequency is about 0.23Hz.

If a true DC operation is desired, move jumpers P1 and P2 to a DC position. That will bypass the capacitors and a high impedance buffer stage. That provides an ultimate sound quality, but makes the system sensitive to the DC applied to any of the inputs. Applying a DC signal to an input may result in clicks associated with the volume control setting changes. The MCL display will show an exclamation mark (!) after the Input name, if a DC presence is detected in the input.

**Provide enough time for break-in before evaluating the results of your experiments.**

## 7. Other Configurations

The standard preamp package uses one ISB, one VCM and one MCL board in a basic configuration. A BOB board added to this package provides a true balanced output. A preamp built with this package will have 3 balanced stereo inputs. Contact Academy Audio for other configurations at [www.academyaudio.com](http://www.academyaudio.com).

## 8. Break-in Period

High-End audio enthusiasts are familiar with the “break-in” phenomenon: the sound gets better with time. In engineering terms that refers to reduced distortions of the audio signal. This distortion reduction may be attributed to priming of the capacitors and all the contacts in the audio path. A noticeable sound improvement is expected after about 100 hours of listening.

## 9. Technical Support

For any questions regarding operation of the ISB board and for the latest documentation please visit us at [www.academyaudio.com](http://www.academyaudio.com).

Happy listening!