Academy Audio Inc.

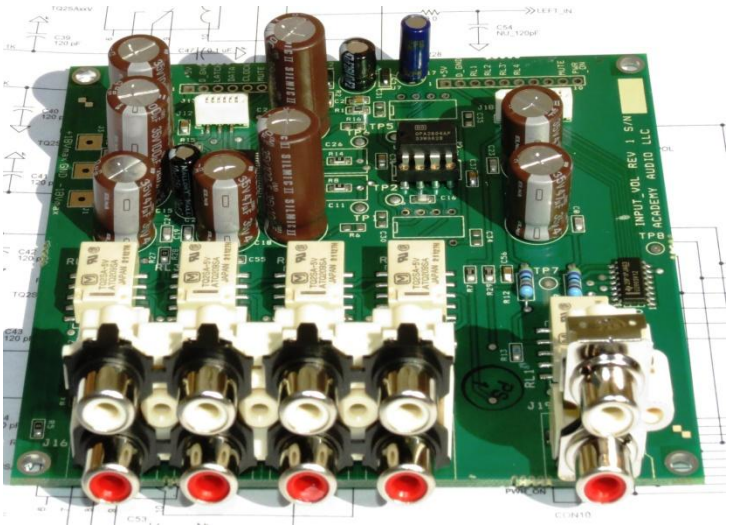
discovering the soul of music®

SVC Hi-End MUSES®
Electronic Volume Control with Input Selector

Ver. 01

User Manual

Rev. 01



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1. Introduction

Thank you for purchasing the SVC Hi-End MUSES® Electronic Volume Control with Input Selector board from Academy Audio Inc.

This four input selector & electronic volume control 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 high quality relays and a unique NJR MUSES®72320 volume control chip. Unlike other electronic volume control chips, this chip does not include any active circuitry, and therefore provides vanishingly low level of noise and distortions.

When used with the MCU Control board and a power supply, the SVC board makes a complete 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 4.00"W x 1.10"H
Power requirements (analog):	+12V ...+18V, 30mA; -12V ...-18V, 30mA
Power requirements (digital):	+ 5V, 50mA
Max. Input Voltage:	10Vrms
Volume Control Range:	0dB to -111.5dB (0.25dB step), MUTE (-120dB), 0dB to +31.5dB (0.5dB step)
Output Noise:	-118dBV (MUSES chip only)
Total Output Noise:	Conforms to characteristics of the opamp.
THD @1kHz , 1Vrms:	0.0005% typ (MUSES chip only)
THD @10kHz , 1Vrms:	0.001% typ (MUSES chip only)
Total THD:	Conforms to characteristics of the opamp.

3. Mechanical Installation

Refer to Figure 1 for mechanical dimensions and mounting holes location. Provide at least 0.200” between the board and the installation surface.

To install multiple SVC boards use at least 1.250” long spacers, and position the boards on top of each other.

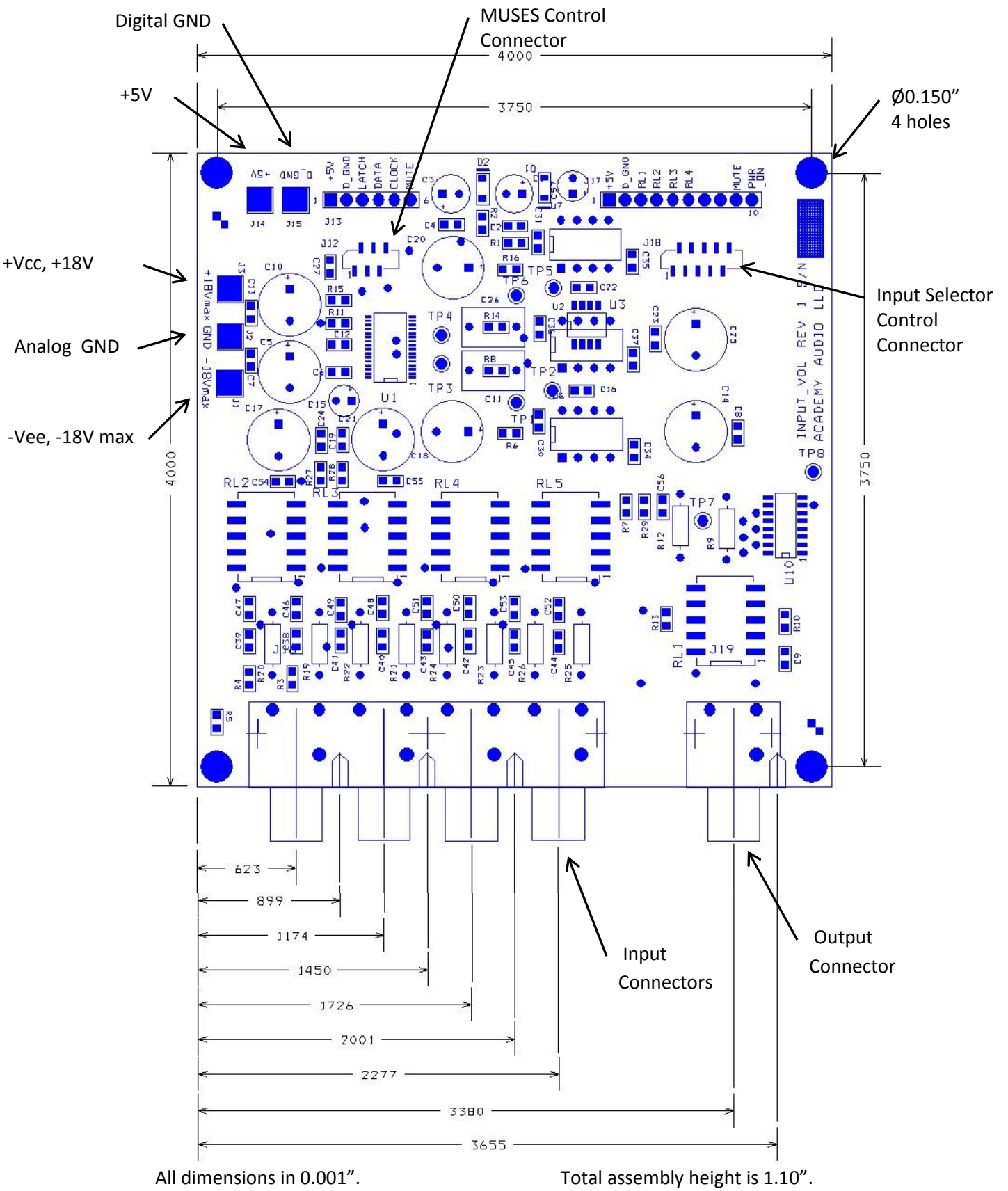

Figure 1 SVC Board Installation.

4. Power Connection

The SVC board requires the following power sources to operate:

1. Digital power source of +5Vdc, 200mA (Including an optional MCU Control Module)
2. Clean analog bi-polar power source of Vcc=+12Vdc to +18Vdc, 30mA and Vee=-12Vdc to -18Vdc, 30mA.

Use J14 and J15 connection points for Digital power. Use J1 – J3 connection points for Analog power.

Please note that the left bottom mounting hole of the board is connected to the digital GND. If this connection is undesirable, remove the resistor R5.

When multiple boards are installed in a stack, use a 20AWG bus wire to connect the power in parallel between the boards using the power pads center holes.

5. Control Signals Connection

The SVC board features a MUSES® control connector J13 with the following connection points:

1. +5V	Digital Power for external controller
2. D_GND	Digital Ground for external controller
3. LATCH	LATCH MUSES Control Signal Input
4. DATA	DATA MUSES Control Signal Input
5. CLOCK	CLOCK MUSES Control Signal Input
6. MUTE	Mute Control Input. Active High – Mute Off

If an optional MCU Control Board is used, all control signals are provided through the connector J12.

The **input selector** section of the SVC board features a control connector J17 with the following connection points:

1. +5V	Digital Power for external controller
2. D_GND	Digital Ground for external controller
3. RL1	Input 1 relay control. Active high.
4. RL2	Input 2 relay control. Active high.
5. RL3	Input 3 relay control. Active high.
6. RL4	Input 4 relay control. Active high.
7. RL5	Not Used
8. RL6	Not Used
9. MUTE	Mute Control Input. Active High – Mute Off
10. PWR_ON	Power Control Input. Active High – TP8 – low.

If an optional MCU Control Board is used, all input selector control signals are provided through the connector J17.

For multiple boards installation the control signals may be paralleled using rigid pins installed in J13 and J17 pads.

6. Audio Signals Connection

Refer to Figure 1 for Audio signals connection. Use a quad stereo phono connector J16 for input connections, and a stereo phono connector J19 for output connection. Make sure the input signals do not exceed 9Vrms at +/-15V analog power.

7. Using the Volume Control and Input Selector

The volume SVC board has a quality dual opamp installed and is ready to use. Use the Volume Control section as a regular dual channel potentiometer based volume control.

To activate one of the four available inputs apply a high logical potential (+2V to +5V) to an appropriate pin of the J17 or J18 connector. **Do not activate more than one input at a time**.

IMPORTANT: When de-energized, the muting relay RL1 disconnects the outputs from the audio output circuitry and connects the board audio outputs to their respective common lines. It is recommended to energize the muting relay after a small delay of about 1 second from the application of power to the board.

Use two boards for balanced operation.

Please refer to the MUSES®72320 volume control chip datasheet for detailed operation description. The Volume Control board has the MUSES®72320 volume control chip hard wired with the chip select address of 000.

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. Advanced Use of the Volume Control

The Volume Control board is designed as a versatile “playground” for advanced users. The unique properties of the MUSES®72320 volume control chip open extensive possibilities for sound quality improvements.

Experimenting with Opamps.

Feel free to experiment with any +/-15V powered standard pinout dual JFET opamp using the provided socket U2. It is also possible to use a SOIC-8 SMT dual opamp using a U3 footprint located under the socket U2, when the socket is removed.

Use U6 and U7 footprints for +/-15V powered standard pinout single JFET opamps. Install 0.1uF 50V 0805 capacitors in C30, C31, C34 and C35 footprints.

To use bipolar input opamps in any of the mentioned above configurations, remove jumper resistors R8 and R14. Install quality polypropylene 1uF capacitors in C11 and C26 footprints, and 470K 0805 SMT

resistors in R6 and R16 positions. The resistor values may require tweaking depending on a type of an opamp used. Do not use resistors below 150K.

For a completely passive volume control solution, remove the opamp from the socket U2 and connect Tp1 to TP2, and TP5 to TP6. Remove resistors R10 and R13. Note that the gain section of the MUSES chip is unavailable in this mode and a high quality buffer should be used in the downstream circuitry.

Experimenting with Capacitors.

It is well-known that capacitors in the audio signal path affect sound quality. The SVC board uses high quality ELNA Silmic II electrolytic capacitors in the audio signal path circuitry.

Feel free to try other capacitor types in place of C14, C17, C18, C20, C21, and C25. Make sure the voltage rating is not lower than 25V. Good results may be obtained using quality bi-polar audio electrolytic capacitors and polypropylene film capacitors.

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

10. Technical Support

For any questions regarding operation of the SVC board and for the latest documentation please visit us at www.academyaudio.com.

Happy listening!