Academy Audio Inc.

# discovering the soul of music®

## MCL - LCD Control Board for Hi-End MUSES® Electronic Volume Controls

Ver. 03

# **User Manual**

Rev. 02



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### 1. Introduction

Thank you for purchasing the MCL Control Board for Hi-End MUSES<sup>®</sup> Electronic Volume Control products from Academy Audio Inc.

The MCL Board was designed to provide a quick and efficient way to integrate the Hi-End MUSES<sup>®</sup> Electronic Volume Control board or the MUSES<sup>®</sup> Input Selector and Volume Control board into an existing or a newly built Hi- End audio system.

The MCL Board features a quality back-lit LCD display, a rotary encoder, and a multi-function switch that provide a complete user interface for a stereo preamp or an integrated audio amplifier.

#### 2. What's Inside the Box

The MCL Board package includes the following items:

- MCL Board
- Volume Control 6-pos flat cable
- Input Selector 10-pos flat cable
- Deluxe Remote Control unit

#### 3. Specifications

The following specifications refer to the MCL board connected to a MUSES<sup>®</sup> application board.

| • | Power supply voltage                      | 4.5Vdc – 5.2Vdc                      |
|---|---|--------------------------------------|
| • | Power supply current                      | ≤20mA (MCL Board Alone, On mode)     |
|   |   | ≤2mA (MCL Board Alone, Stby mode)    |
|   |   | ≤50mA (MCL + Vol. Ctrl)              |
|   |   | ≤80mA (MCL + Input Sel. & Vol. Ctrl) |
| • | Max. Number of Inputs                     | 6                                    |
| • | Volume Control Range                      | -120dB to 0dB                        |
| • | Volume Control Step Size                  | 0.5dB                                |
| • | Balance Control Range                     | ±12dB                                |
| • | Balance Control Step Size                 | 0.5dB                                |
| • | Input Gain <sup>1</sup> Control Range     | 0dB to +31.5dB                       |
| • | Input Gain <sup>1</sup> Control Step Size | 0.5dB                                |
|   |   |                                      |

Notes: <sup>1</sup>Input Gain is not an actual gain, but a correction number added to the Volume setting.

### 4. Description

Referring to Figure 1, the MCL board features three parts – a Central part with the LCD display, a Left Switch part, and a Right Switch part. The Central part carries a 2-line 16 character backlit LCD display and all the circuitry including connectors. The Left Switch part carries an On/Off/Mute multifunction pushbutton switch. The Right Switch Part carries a rotary encoder with a push switch function.



Figure 1. MCL Board Front View (top) and Rear View (bottom).

The MCL board may be installed as a single board unit. Alternatively the Left Switch and/or the Right Switch parts may be separated from the Central part along the break-out lines, and installed at a desired

location. In case a side board is separated from the Central board, wire connections between the corresponding 5-pin connector patterns (J1 and J8, and/or J4 and J7) shall be provided.

The back of the Central part features the following useful items:

- A 10-pos flat cable connector J5 for the Input Selector cable.
- A 6-pos flat cable connector J2 for the Volume Control cable.
- An LCD CONTRAST adjustment potentiometer R31.
- A Power-up Mode jumper R32.
- Optional Power Connection Points (GND and +5V).
- An optional MUTE Output (High Mute Off).



#### 5. Mechanical

All dimensions in 0.001".



Refer to Figure 2 for mechanical dimensions and mounting holes location.

#### 6. Power Supply

The MCL board derives power from an application board it is connected to. No separate power supply is needed. The optional power connection points are currently used as test points, and are reserved to connect to a power supply in the future models of the application boards that do not use external +5Vdc power.

**Power Up Options** are controlled by a jumper resistor R32. When the jumper is installed (default), the unit starts working when the power is applied. With the jumper cut-off, when the power is applied, the unit will not turn on without the Power button pressed either on the board or on the remote control. The latter is a useful mode to prevent a sound system from turning on in the middle of the night after a power outage.

### 7. MCL Board Operation

#### **Definitions:**

**Volume Control** adjusts an application board volume setting up or down. After each adjustment the volume setting is stored in a non-volatile memory, and is retained at power down.

**Balance Control** adjusts the balance of the volume control to move a perceivable sound source to the Left or to the Right. After each adjustment the volume setting is stored in a non-volatile memory, and is retained at power down.

**Input Control** selects an active input. After each adjustment the input control setting is stored in a non-volatile memory, and is retained at power down.

**Input Gain Control** adjusts each input sensitivity to align sensitivity of all inputs. No physical gain is applied. The adjustment is provided by adding a constant number to a volume control position.

**Input Type Control** alternates between **AC** (DC blocking capacitor in signal path) and **Direct** (no capacitor in signal path) types.

IMPORTANT: The MCL Board controls an application board to use only the attenuation part of the MUSES Volume Control up to the point when the attenuation is set to 0dB and more gain is still required.

#### **Controls Functionality:**

• Left Button Function: Short click – Mute On/Mute Off; Press and hold for about 2 sec. – On/ Standby.

• Right Encoder Switch Function:

Short click: Volume – Balance – Input Select (for Input Selector enabled boards) – Volume; Press and hold for about 2 Sec. – Advanced Menu: Input Gain control (for currently selected input) Short click while in Advanced Menu mode – Input Type control (for currently selected input) Default – Volume. Returns to default after time-out.

• Turn **Right Encoder** to set a parameter value (Volume, Balance, Input, Input Gain, Input Type).

The **LCD Display** reflects an immediate control parameter value and returns to a default (Volume) position after a time out.

Upon power up and returning from Standby, there is a delay of about 1 second before the Mute relay is energized to prevent any pops and clicks.

IMPORTANT: To avoid clicks and pops, it is a good practice to turn the Mute on while changing the inputs or the input type.

#### 8. Remote Control Unit

A dedicated credit card style IR remote control unit is provided with each IR enabled MCL Board. Due to shipping regulations, the remote control unit is shipped without the battery. Install a CR2025 lithium coin battery before operating the remote control unit.

The remote control unit buttons functionality is illustrated at Figure 3. Unused buttons are reserved for future enhancements.



Figure 3. Deluxe IR Remote Control Unit.

#### 9. Technical Support

For any questions regarding operation of the MCL Control board and for the latest documentation please visit us at <u>www.academyaudio.com</u>.

## Happy listening!

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