

**Owner's Manual**  
**Muse Electronics Model Two**  
**Digital to Analogue Converter**

## **INTRODUCTION**

Thank you for choosing this Muse Electronics product. We suggest that you take a few moments to read this owners manual, as you will find the information regarding the operation of your new digital to analogue converter useful. If, after reading the information enclosed you have some questions regarding the use of this product, do not hesitate to call either your Muse dealer or Muse directly.

The Muse Model Two digital to analogue converter is designed to offer you many years of trouble free service. If you encounter any difficulties, you may want to consult the symptoms and solutions table at the end of this manual. As this is a high performance piece of electronics, there are certain items that you should understand in order to ensure the maximum possible enjoyment.

## **DESCRIPTION**

The Model Two digital to analogue converter contains many unique attributes. In the next few pages we will provide a brief description of the technology contained within. All the electronics inside the Model Two are contained on three separate printed circuit boards. These three boards are placed so as to minimize the possibility of interference between the various stages of the converter. We will describe the Receiver-Digital Filter board first.

### **RECEIVER – DIGITAL FILTER BOARD**

Digital signals arrive at the Receiver-Digital Filter board from the rear panel of the converter via a pair of 75 ohm BNC connectors or a 110 ohm XLR connector (with AES/EBU option). Any of these signals can be selected by the front panel input selector switch (labeled either 1or2). The S/PDIF formatted signal is passed onto a specialized receiver via a precision pulse transformer(s). These transformers ensure that the digital signals are both properly terminated and electrically isolated from the internal signals of the converter. The receiver section utilizes a PLL (phase locked loop) to “lock onto” the data stream and separate the various timing and data components from the encoded data stream. The left and right channel audio data is passed along with the necessary timing signals to an advanced application specific digital signal processor used as a digital oversampling and low pass filter. Inside the digital filter the signal is oversampled and reconstructed into a pair of 20 bit words and is then sent via a serial data port to the output DACs. The all important latch enable signal is generated in a unique way by the Model Two. After being re-clocked by the receiver section, a special logic circuit eliminates ant timing related errors (jitter) caused by the digital filter. At this stage, the latch signal is separated into a pair of signals (differential). The nature of these two differential signals prevent any fluctuations in either the ground or power supply stages from adversely affecting the timing accuracy.

All power requirements for the receiver and digital filter section are supplied by an isolated and separate winding of the power supply transformer, which is located on the power supply board. Local regulation, as well as separate passive filtration stages, are provided for each section. A very carefully designed printed circuit board with a full ground plane helps ensure that all signals are isolated from one another. Discrete drivers provide the signal for the front panel indicators.

In the Model Two each digital signal, whether used locally on the Receiver – Digital Filter board or those that are sent to the DAC board, is treated as a high bandwidth transmission line. Careful attention to signal integrity is ensured by the application of correct impedance compensation components, as well as high speed data buffers.

## DAC BOARD

This, the largest of the three boards inside the Model Two, contains dozens of interesting and unique qualities. As many of these technologies are beyond the scope of this text (as well as, the subject of patent applications) hence, we will only cover the basic topology.

All the digital signals arrive from the Receiver – Digital Filter board via separate data paths. The bit clock, left & right channel data along with the differential latch enable signals are routed to the appropriate locations on the DAC board. The differential latch enable signals are handled by a pair of extremely high speed (<1 nS) differential receivers. These receivers are located in a manner so as to eliminate any deterioration to the carefully recovered timing signals. Again, as in the Receiver-Digital Filter board, all digital signals are treated as high bandwidth transmission lines.

A pair of high performance 20 bit DACs operated at 8 times the incoming data rate provide a current output which is proportionate to the amplitude of each digital word. Each DAC is actually comprised of two 19 bit DACs, this configuration ensures that linearity around digital zero is maintained. Conversion from a current to a voltage is accomplished by the simplest possible element. A single resistor elegantly accomplishes this conversion before the signal is reconstructed by a single section passive filter. If required, pre-emphasized signals (as detected by the receiver section) are further filtered to ensure a constant amplitude response.

From this stage, until arriving at the output terminals, all signals are now analogue. Here, the experience we have gained in high performance analogue design is fully exercised. The small voltage created by the current to voltage resistor is amplified by a unique current feedback amplifier. This single, high performance gain block is configured in a *uni-block differential* arrangement which provides both balanced and unbalanced output signals. These signals are configured so as to provide a low and constant impedance at the analogue jacks on the rear of the Model Two.

All power required by the various stages of the DAC board are supplied by individual constant current (class A) sources and shunt regulation. This method of power supply regulation, though more expensive to implement, has the advantage of low noise and low impedance well into the RF region. Much of the sonic excellence of the Model Two can be directly traced to this power supply approach (remember, you saw it here first!). All power required for each channel is supplied from a separate winding on the power supply by a separate filtered and isolated path. Again, as in the Receiver-Digital Filter board, a carefully designed printed circuit board (complete with a full ground plane) isolates each stage.

## POWER SUPPLY

This outwardly simple board is responsible for supplying all power requirements of the Model Two. At the heart of this board lies a carefully designed transformer. This multiple secondary transformer provides electrical isolation between each section by the use of internal shields. Each of the five different voltages are rectified and filtered before being sent onto the subsequent stages of the Model Two. A DPDT switch located on the power supply board selects the appropriate mains voltage (either 120 or 220 – 240 VAC 50 or 60 Hz). Protection from over voltage is provided by MOVs on each primary winding. Over current protection is accomplished by a fuse connected in series with the transformer primaries. The Model Two is supplied with a high quality shielded mains cord which is connected to the power supply board via an IEC connector. Absent, is a mains power switch. At all times when the Model Two is connected to an AC source, the unit remains active. This ensures that the lengthy time necessary for proper warm-up is eliminated. **Additionally, since power is always present inside the Model Two, extreme care must be exercised when replacing the mains fuse. ALWAYS remove the power cord from the IEC connector before attempting to replace the mains fuse.**

## INSTALLATION – LOCATION

In order to select a proper location for your Model Two, you should consider several points. First, the Model Two should be located so that minimum length cables are necessary to make the connections to both

your preamplifier and your digital signal source(s). If your system also contains phonograph playback capability, you may want to locate any digital component (Model Two, CD transport, DAT, etc) a reasonable distance from either the turntable or any step-up device. This will help eliminate any unwanted RFI entering the sensitive phonograph stages. When routing the power supply cord for the Model Two, avoid any signal cables; including digital data ones. If you are unable to route all the various cords separately, then make sure that the AC power cable does not run parallel with any other cables. All cables should cross only at right angles.

## **INSTALLATION – CABLING**

The rear panel of your Model Two provides several connection points for attachment of the various cables. Located on the right hand side (facing the rear) are the connections for the AC mains cord and the digital inputs. Your Model Two has two S/PDIF formatted BNC inputs and possibly an XLR AES/EBU (if purchased with this option). The S/PDIF inputs are labeled “1” and “2”, these may be connected to any digital audio output from any number of different types of sources (CD, DAT, Laser Disc, etc). Each of these input connections is made via a BNC coaxial connector. An adapter has been provided with the Model Two, which will allow use of RCA style cables. As the BNC style connector is superior to all others, please avoid the use of the adapter when possible. Should your Model Two be equipped with the optional AES/EBU input, then this input should be used for your highest priority signal.

The left hand side of the rear panel (as viewed from the rear) contains the audio output signals. There are both unbalanced (RCA) and balanced (XLR) connectors. Though it is possible to use both outputs simultaneously, we recommend that only one type of output be used at a time. If your preamplifier will accommodate the use of balanced signal (XLR), then these should be used with the Model Two. If your system allows only unbalanced (RCA) signals, then use the unbalanced outputs of the Model Two. As the standard output of the Model Two is 1 volt RMS at full scale (0 dB), normal or *un-attenuated* inputs are the best choice. It should be noted that an optional 2 volt RMS output is the higher performance configuration. Therefore, please contact either your Muse dealer or Muse directly should you wish to consider this modification.

## **OPERATION**

The front panel of the Model Two provides both input selection capability and status indicators. The switch labeled “1” and “2” selects between either of the two BNC inputs (or “ST” optical). The Model Two has the ability to capture signals with sampling rates between 32K and 48K. Any signal between these extremes will be decoded with equal fidelity (excepting the basic difference in the quality of the original signal). If your Model Two has the AES/EBU input option, then a third switch position between the inputs labeled “1” and “2” selects the AES/EBU input. If possible, always use the AES/EBU input for your most important listening.

The two indicators labeled *locked* and *emphasis* will tell you at a glance the status of the Model Two. The blue indicator “*locked*” illuminates whenever the PLL is locked to a valid digital signal. Any excessive errors of any will cause this indicator to be extinguished. Should the Model Two detect that a digital signal contains a pre-emphasized component, then the indicator labeled “*emphasis*” will illuminate red and the appropriate decoding circuitry will be activated. If your Model Two was ordered with the optional HDCD® filter, then the “*emphasis*” light will also serve as an HDCD detection indicator. In the case where an HDCD® encoded signal is detected, then the lower indicator will illuminate green and the appropriate HDCD® filter will be utilized.

## **MAINTENANCE**

Apart from the highly unlikely blown fuse, no part of the Model Two is user serviceable. Should you find it necessary to replace the fuse, **disconnect the power cord before removing the fuse cap**. Make certain that you use a fuse of the same type and rating as the one specified for your region. General cleaning of the front panel and chassis can be accomplished with either a dry cloth or a mild household multipurpose spray cleaner. As with all electrical appliances, do not attempt to clean the Model Two with the power supply

main cord connected. Do not use harsh solvents as they might harm the front panel nomenclature or the chassis finish. Under no circumstances should you allow your Muse Model Two to become immersed in any form of liquid. The various connectors on the Model Two should require no cleaning during normal usage.

Should you have any questions or concerns not covered in this manual, please contact either your Muse dealer or Muse Electronics. Muse Electronics may be reached by telephone at (714) 554-8200 between the hours of 9 AM and 5 PM PST or by writing us at P.O. Box 2198 – Garden Grove, CA 92842-2198.

<b>Symptom</b>	<b>Remedy</b>
No audio output from Model Two	Is “locked” indicator illuminated? Is correct digital input being selected? Are cables properly attached?
Hum or noise in system when playing LPs	Relocate any digital product away from turntable, step-up device or phono cables.
No sound from DAC, neither “locked” or “emphasis” LED illuminated	Is DAC power cable properly attached? Is fuse intact? (see maintenance section for information on fuse)
Emphasis LED on, but locked LED not	The PLL in the Model Two is out of range. Try selecting a different input, then return to prior selection.
Chattering sound from the DAC, emphasis LED on or blinking	The PLL in the Model Two is attempting to lock to the digital source selected. Try selecting a different digital input, then return to prior selecting. If necessary, temporarily unplug, then reattach the power cable for the DAC.

### ***LIMITED WARRANTY***

All Muse products are covered by a limited 90 day parts and labor warranty, effective from the date of purchase. If you are the original purchaser and your purchase was made within the United States, this warranty can be extended to a period of three years by filling out the enclosed Warranty Registration Form and within 10 days of the date of purchase, returning it to Muse Electronics along with a copy of the bill of sale. If your purchase was made outside of the United States, your warranty will be handled by the specific importer for your area. As the details and restriction of your warranty may differ, you may wish to speak with your Muse dealer for specific information. Upon receipt of the completed form, we will validate the following nontransferable warranty for a period of three years:

Muse Electronics, Incorporated warrants its products to perform according to their specifications. Any failure, due to a manufacturing defect, will be corrected by Muse Electronics, Incorporated.

Under no circumstances would the following be included as warranty coverage:

Any product which has been operated in a manner not in accordance with the instructions in this manual.

Any product which has been repaired or modified by any person(s) not specifically authorized by Muse Electronics, Incorporated.

Any product which, in our judgement, has been subjected to abuse.

This warranty gives you specific legal rights. You may also have other rights depending on the laws of the state in which you reside.

Should your Muse product fail, pack it in its original box and take it, along with your bill of sale, to your Muse dealer. In the event repairs are necessary, the unit should be shipped freight prepaid to the factory. Muse Electronics will prepay the freight for the return trip.

In the case of a Muse product whose consumer purchase was made outside the United States, the importing distributor in the country where the purchase was made will provide the warranty. The warranty may be different than the one stated above, so be sure to check with your dealer for details.

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