DYNAMIC SOUNDS ASSOCIATES

Phono II

USER MANUAL

120/240 VAC Operation

Series 2.16

Naples, Florida

DYNAMIC SOUNDS ASSOCIATES
Phono II
USER MANUAL

WELCOME

Dynamic Sounds Associates welcomes you to our world of the finest possible audio electronic products. We thank you for your purchase and we assure you many years of musical enjoyment. We are always available to answer your questions and we welcome comments regarding our products. Feel free to contact us at any time through our website at www.dynamicsounds-assoc.com or by sending messages directly to info@dynamicsounds-assoc.com. We look forward to your feedback and will gladly respond to all questions and comments.

IMPORTANT INFORMATION

1. All units are set to operate on 120VAC ONLY unless a label is applied to the back panel under the power plug indicating 240VAC operation. Operating a unit set for 120VAC on 240VAC will cause permanent damage and void the warranty.

2. **Dynamic Sounds Associates** reserves the right to make changes or modifications to future units without prior announcement. Any such changes or modifications will be for the purposes of improving the mechanical or sonic performance. Dynamic Sounds Associates, LLC is under no obligation to incorporate any changes or modifications into prior units; however, it may be possible to provide upgrade packages for prior units—if desired—at a cost.

3. Registering your component with us by using the form at the conclusion of this manual, will allow us to contact you with potential product upgrade information. **Information regarding upgrades may also be requested by e-mail to info@dynamicsounds-assoc.com.**

1.0 GETTING STARTED

We know you are eager to get your new Phono II into play. This section will provide preliminary information on the features of the Phono II and familiarize you with the layout of the controls and the connectors. Section 2.0 will guide you through the process of setting up the Phono II and making the proper connections. Section 3.0 will provide additional information on the operation and use of the features of the Phono II. Section 4.0 will provide more detailed information on the overall design and capabilities of the Phono II and can be reviewed at your leisure. Section 5.0 will provide information on how to balance the outputs of the Phono II to maintain its high degree of performance. The Phono II comes pre-balanced and, during normal operation, should not require checking and adjusting the output balance more than once/year.

1.1 Unpacking

The Phono II should be carefully removed from the packaging material that it is wrapped in. The following items should also be found in the Phono II shipping container:

- Shielded power cord
- Four Model 2 VIBRAPOD Isolators
- #00 Philips screwdriver
- XLR female connector with three wires
- Plastic bag containing:
    - 3/32" Hex key wrench
    - ¼ watt 1kOhm resistor

1.2 Installing the VIBRAPOD Isolators

First remove the Phono II from its plastic protective bag then the VIBRAPOD Isolators should be screwed into the four threaded (10-32) comer holes on the bottom of the Phono II. These are provided with thumbscrews so that additional tools are not required. If desired, other feet can be used, provided they have a 10-32 screw so that they can be firmly attached to the bottom plate of the Phono II.

NOTE: VIBRAPOD recommends the use of playing cards, bar coasters, or felt under the isolators to prevent potential blemishes to the surface on which the Phono II is sitting.

1.3 First Look at the Phono II

After unpacking your Phono II, installing the four feet, and ensuring that all of the parts are provided, you should take a few moments to familiarize yourself with the features on the front and back panels. The front panel is shown in **Figure 1**, and the back panel is shown in **Figure 2**.

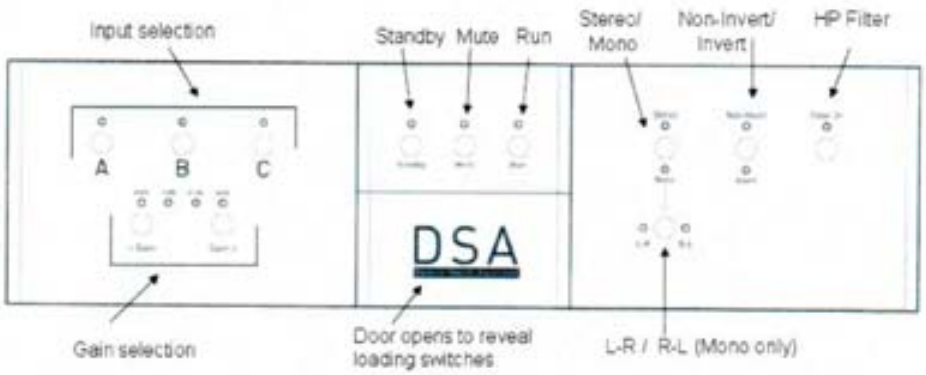

Figure 1 - Front Panel View of Phono II

The front panel is divided into three sections identified as: center, left-of-center, and right-of center. The functions located in each section are:

- Center
  - Standby –amplifier is powered but the output stage is not powered
  - Mute – amplifier and output stages are powered, but output is muted
  - Run – amplifier is fully operational

  The lower portion of the center section is hinged and can be opened to reveal the switches that select the appropriate cartridge loading for each input .

- Left-of-center
  - Input selection
  - Gain selection

  The input selection and gain selection functions are only operational when the unit is in the Standby mode.

- Right-of-center
  - Stereo/Mono selection
  - Non-Inverting/Inverting operation
  - High Pass filter for suppression of excess low frequencies from source material
  - L-R/R-L for azimuth angle adjustment (only operational in mono mode)

Section 3.2 will describe these functions in greater detail

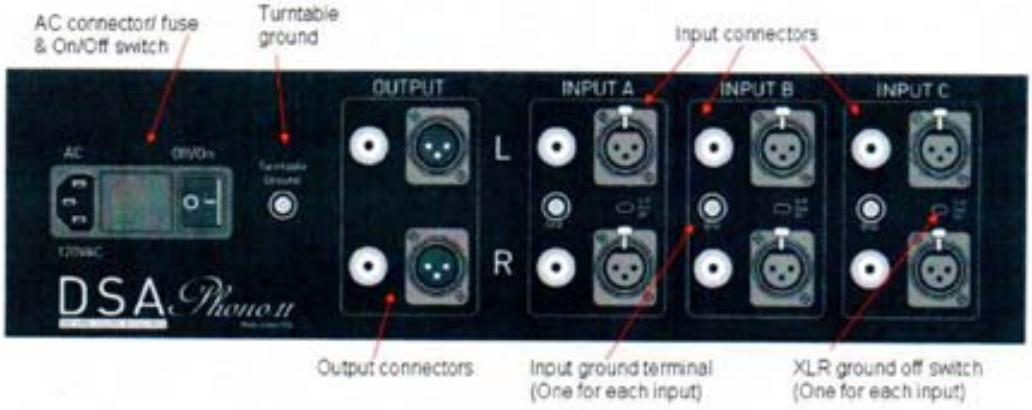

Figure 2 – Back Panel View of Phono II

The back panel contains all of the power and audio connections. The AC power receptacle is on the left, housed in a unit that has an integral AC power switch and fuse holder that is located between the power receptacle and the switch.
NOTE: The fuse holder can only be removed when the power cord is removed from the AC receptacle. Two replacement fuses are contained within the fuse holder (see section 2.2).

There is a grounding terminal labeled "Turntable Ground" that is used ONLY for attaching a grounding lead from your turntable (if supplied) to the Phono II. Do not connect other grounding wires to this terminal or ground loops and AC hum may occur.

The input connectors for both channels are gathered in groups labeled Input A, Input B, or Input C. Each input has both a single RCA female connector and a female XLR input connector for each channel. In addition there is a grounding terminal for each input that can be used for the external ground leads found on some cables. There is also a switch that will disconnect the ground terminal of the XLR input connector if necessary. This is important because unless the interconnecting cables are properly wired for use with the XLR input connector, a ground loop can result causing excessive hum and noise to occur. (See Appendix A for wiring diagrams that show the proper interconnect wiring when using an XLR connector for input.) If hum does occur when connected to the XLR input, moving the switch lever to the right will lift the XLR ground terminal and should eliminate the hum problem.

The output for each channel has both an RCA socket (for unbalanced output) and a male XLR socket (for balanced output). It is possible to use both output connectors, if desired, without damage to the unit.

Notes:

(1) When first turned on it takes approximately 60 sec for the main amplifier power supplies to reach operating voltage and stabilize. During this time the Standby LED will show an orange color and will blink at a 1Hz rate. **(If the Standby LED shows a red or green color only, turn off the unit and contact the manufacturer.)** The Phono II cannot be switched to the Mute or Run mode until after the power supplies have stabilized. This will be indicated when the standby LED stops blinking.

(2) When switching between the Standby and the Mute mode, there is a delay of a few seconds for the Phono II to come out of the Standby mode, and before the Mute LED will illuminate. This is due to a startup delay in the output stage for each channel.

(3) Once in the Mute mode, switching between the Mute and Run modes is instantaneous, as is the response when switching from Run to Mute.

1.4 LED Dimmer

Units having Ser. No. 2.16.101 , and later, have an LED dimmer function. This function is activated using the large red button on the bottom plate. The button is located on the front-to-back center-line and about 2" behind the bottom edge of the front panel. This button can be reached by slightly lifting the front of the Phono II. The dimmer circuit provides four levels of LED intensity and each press of this button will step to the next lower intensity level and then start over as follows:

Max intensity → Reduced intensity → Low intensity → Minimum intensity → Max intensity

On power up the dimmer provides maximum LED intensity. Note that the Standby and Mute LEDs are not controlled by the dimmer function but always remain at full intensity.

2.0 SETUP AND INSTALLATION

The setup of the Phono II consists of three steps:

(1) Connecting the cables to the back panel.
(2) Selecting the desired input and correct gain
(3) Selecting the correct loading parameters for each input being used

These steps will be addressed in the sections that follow.

2.1 Connecting the Cables

The connectors for the Right and Left Channels are grouped separately to prevent confusion and the input and output connectors are individually labeled. The cable from each phono cartridge is connected to the respective RCA or XLR input connector for each channel and input (A, B, or C) to be used. In accordance with convention, the Right Channel uses connectors with a Red band on them and the Left Channel uses connectors with either a White or Black band. Note that each input has an associated ground terminal. This should be used only when using cables that have separate ground leads for the shields. Any ground lead from the turntable should be connected to the ground terminal to the right of the AC power connector.

The choice of output connector depends on whether balanced or unbalanced output cables are to be used. If unbalanced cables are to be used, they are connected to the Left and Right channel RCA connectors, respectively. If balanced output cables are to be used, these are connected to the respective XLR output connectors.

Because the used of a balanced output connection results in a 6dB increase in signal level, it is not recommended that balanced and unbalanced cables be mixed when going to the same amplifier following the Phono II. However, the Phono II can drive separate amplifiers using both the balanced and unbalanced outputs, providing that the combined loading impedance does not result in total output currents exceeding 30mA.

The AC power cord plugs into the connector on the left-hand side of the AC power module on the back panel.[1] This power module also contains the power on-off switch and two line fuses housed in the center section of the module. This module can accommodate either 120VAC or 240VAC supply voltages, however they are not interchangeable without internal changes on the power supply board. Unless indicated otherwise, all Phono II units are set to perform **ONLY** on 120VAC. Connecting them to 240VAC will cause failure of the unit. Those units that are set to operate on 240VAC are so indicated by the application of a label indicating use for 240VAC on the back panel.

The fuses are accessible by removing the power cord and then prying the fuse holder out of the center portion of the AC module using a small flat blade screwdriver (not supplied). There is a slot to be used for this purpose on the edge of the module adjacent to the location of the power plug. Extra fuses are provided, and are located in small compartments that are integral to the fuse holder. These are accessible once the fuse holder is removed. Be certain to only use replacement fuses that are of the 20 mm size, and 1.5 amp capacities such as the Buss Type GMC fuse.

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[1] The supplied power cord is a shielded cord; however, users may prefer to use their own power cord having a standard IEC connector.

2.2 Selecting the Desired Input and Setting the Correct Gain

Inputs (A, B, or C) and gain for each input is selected from the front panel using the buttons in the left-of-center section of the front panel. **These selections can ONLY be made when the unit is in the Standby mode of operation. (Standby is the default mode when the AC power is turned on and can be entered at anytime by pressing the Standby button.)** Pressing the respective button for the desired input will activate that input. (Internal logic will prevent more than one input being selected at the same time.) The gain is selected by using the "Gain up (>)" or the "Gain down (<)" buttons. The gain steps are: 40dB, 50dB, 60dB, and 66dB. Each press of either gain button will cause the gain to increase or decrease by one step. Continuing to press either button will cause the gain to cycle through all of the gain options and then start over.

Table 1 lists the recommended settings for different phono cartridge output voltages—regardless of cartridge type. These settings are recommended to ensure low distortion and wide dynamic range. Settings indicated by "X*" are options if desired for cartridge outputs at the low end of the ranges shown.

TABLE 1

Cartridge Output at 1kHz	Gain Switch Settings and (LED color)			
	40dB (yellow)	50dB (green)	60dB (blue)	66dB[2] (blue)
< 0.1 mV				X
0.1mV – 0.3mV			X	X*
0.3mV – 1.0mV		X	X*	
1mV – 3mV	X	X*		
> 3mV	X			

2.3 Setting Cartridge Load Impedance

The switches for selecting cartridge type and loading are accessed by opening the lower portion of the Phono II's center section. (This section is hinged at the bottom and will open downward.) After opening the lower front cover, the cartridge selection and load control switches will appear as shown in **Figure 3**.

There are three rows of switches, one for each input and labeled "A, B, C" corresponding to the three inputs. Only one row of switches is active at any time, depending on which input is selected. The switches for each row are arranged in a group of six, labeled #1 – #6, and a seventh switch at the right end of the row which determines the choice of MM (moving magnet) or MC (moving coil) loading. (The seventh switch for the "A" input also has a center position labeled "RX" which will be discussed later.)

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[2] Use of the 66dB gain setting will increase the noise level at the output by 6dB and should be avoided if not necessary. See Section 4.5 for more details.

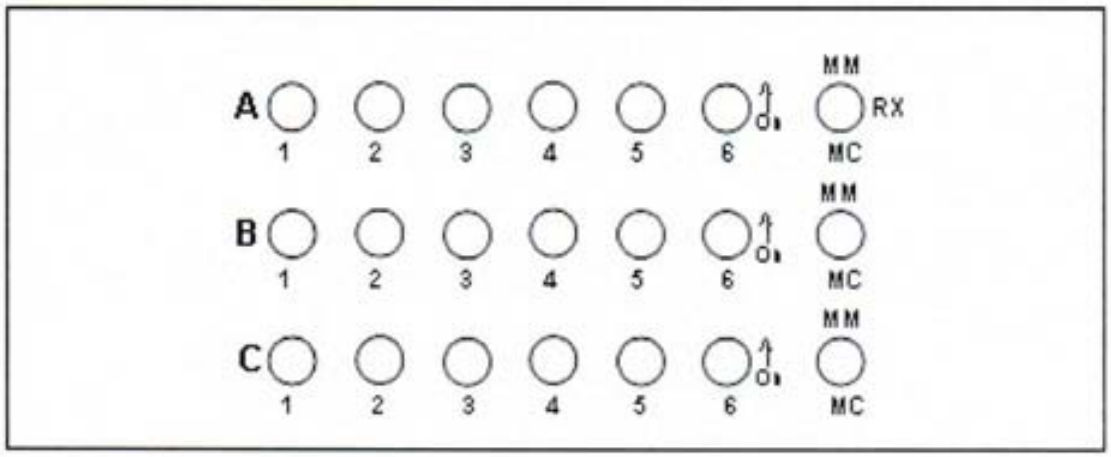

Figure 3 – Load Adjustment Switches

2.3.1 Setting Cartridge Type

The choice of MM or MC for each input should be based on whether the cartridge being used requires resistive (MC) or capacitive (MM) loading.[3] The seventh switch at the right hand end of each row of switches is used to select the type of loading. If using a MC type cartridge (resistive loading) the seventh switch should be "down" and for a MM type cartridge (capacitive loading) it should be in the "up" position.

2.3.2 Setting the Cartridge Loading

2.3.2.1 Moving Coil (Resistive) Loading

For moving coil cartridges, the load values provided by the switches #1 – #6 is listed in the **Table 2** (Ω = ohms). In all cases the values are additive so that the total load is the sum of the individual values selected. Moving the switches #1 – #6 to the "up" position selects the load value controlled by that switch.

TABLE 2

Switch #	1	2	3	4	5	6
Up	25Ω	50Ω	100Ω	200Ω	400Ω	800Ω
Down	0Ω	0Ω	0Ω	0Ω	0Ω	0Ω

Thus, selecting switches #2 & #4 will result in a load resistance of 250 ohms. Resistance values from 25 ohms to 1575 ohms are selectable in 25 ohm steps using these switches and to a precision of > 1%.

[3] The basis for this selection also applies to moving iron and other types of cartridges

Note: If MC is selected, and switches #1 - #6 are all down, the input load for that particular input is a short circuit (0Ω). This will result in no signal to be amplified until a switch is placed in the "up" position

2.3.2.2 Moving Magnet (Capacitive) Loading

If moving magnet is selected, switches #1 – #5 select the "additive" load capacitance in picofarads (pF) as shown in **Table 3**. The selected load is **added** to the intrinsic input capacitance of the Phono II which is 200pF.

TABLE 3

Switch #	1	2	3	4	5	6
Up	25pF	50pF	100pF	200pF	400pF	100k ohms
Down	0pF	0pF	0pF	0pF	0pF	47k ohms
	<---------- +200pF ---------->					

Selecting switches #1 and #3 will result in an **additive** load of 125pF, for a **total** load capacitance of 325pF. Thus, the use of switches #1 - #5 will provide a **total** load capacitance of 200pF to 975pF in 25pF steps to a precision of > 2%.

Switch #6 is used to select either 47kOhms or 100kOhms resistive load in conjunction with the capacitive loading. In the "down" position, 47kOhms resistance is selected and in the "up" position, the selected resistive load is 100kOhms. (The use of "k" implies 1000.) This option is provided for those audiophiles who prefer to use 100kOhms loading for their MM cartridges instead of the typical 47kOhms load.

2.3.2.3 Use of the "RX" Position on Switch #A7

Switch #7 on row "A" has a center position labeled "RX" which is to accommodate cartridges that require either a very low or very high load resistance that is out of the range provided by switches #1 - #6. This feature is ONLY available in input "A", so if the user has a cartridge that requires either very low or very high load resistance, it MUST be connected to input "A". To use the "RX" position, the user should obtain a pair of ¼ watt resistors having the value RX, given by:

$$RX = [RL \bullet 100k] / [100k - RL]$$, ("•" implies multiplication, "k" = 1000)

where RL is the desired resistive load. Thus, if RL = 10 ohms,

$$RX = [10 \bullet 100k] / 99{,}990 = 10 \text{ ohms}.$$

If RL = 10k, then

RX = [10k • 100k] / 90,000 = 11,111 ohms .

Once the proper resistors, RX, are obtained, remove the top cover of the Phono II (only after turning off the unit and unplugging the power cord) using the 3/32" hex key that is provided (if you have difficulty locating the proper resistors, please contact us). **Figure 4** shows the top view of the amplifier boards as seen from the front of the unit. The location of the RX sockets is shown on the left-hand edge of the board. There is a pair of sockets for each amplifier board and a resistor, RX, must be inserted in each pair.

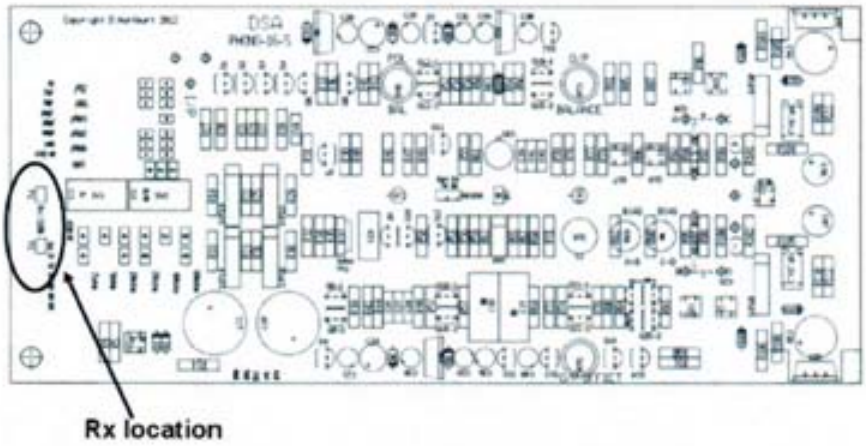

Figure 4 – Location of the RX sockets

The leads on the resistor RX should be bent at right angles and inserted into these sockets on each circuit board. Replace the top cover and reconnect the Phono II as before. Using the "RX" position on switch #A7 will then provide the desired value of RL for the "A" input. Using the "MC" or "MM" position of switch #A7 bypasses the value RX and the switches #1 - #6 operate as described above, even if a resistor "RX" has been inserted.

Note: Using the RX position on #A7, without inserting a resistor RX as described above, will result in a resistive load of 100k ohms.

2.3.2.4 Other Loading Options

There are some MC cartridges that require a 47k ohm load, or the user may prefer to use this as the standard load. This load can be obtained either by using a resistor RX as described in the previous section on input A, or by selecting the MM position on switch #7 and leaving switch #6 in the "down" position. In this case, unless additional load capacitance is desired, switches #1 - #5 should also be" down." This approach can be used on any of the inputs.

3.0 OPERATION OF THE PHONO II

You are now ready to enjoy your DSA Phono II. During operation, the Phono II should be placed on a sturdy shelf that will provide adequate support for the unit and permit access to the back panel for cable connections. Clearance at the ends of the unit should be at least 1 inch, and the top panel clearance should be at least 2 inches to permit adequate air circulation for cooling.

3.1 Turning on the Phono II

After connecting the input and output cables, and inserting the power cord into the AC module, the Phono II can be turned on using the power switch on the AC module on the back panel. When turned on the Standby LED on the front panel will glow with an orange color and will blink at approximately a 1Hz rate. This blinking will continue for about 60 sec during which time the voltages on the internal amplifier cards are ramping up to their operating values. Until this LED has stopped blinking, indicating that the amplifier operating voltages have been reached, selecting either Mute or Run will have no effect.

NOTE: If this LED shows either a red or a green color only, it indicates that one of the power supplies is not active. Turn the unit off and contact the manufacturer for instructions.

After about 60 sec the power supplies will have reached their final values and the Standby LED will stop blinking, then the Mute position can be selected by pressing the Mute button. When first moving from Standby to Mute, there will be a 4-6 second delay while the output stage voltages are applied and before the Mute LED will show a light green color. Also, you may observe that the Standby LED will show either a brief green or red color prior to the Mute LED showing a light green color. This is perfectly normal and does not indicate any problems with the Phono II. In the Mute mode the Phono II is fully powered, but the muting relays on the output are open. This mode represents the mode in which the Phono II can be left operating for long periods of time, if desired, and is the mode in which thermal equilibrium will be obtained most readily.

Switching to the Run mode closes the output muting relays and the Run LED will show a blue color. There is no delay between selecting the Run mode and the Run LED turning blue. Switching back to Mute from Run will turn off the Run LED and illuminate the Mute LED again. Switching back to the Standby mode turns off the output stage voltages but not the amplifier board voltages so the Standby LED will glow but will not blink.

NOTE: If desired, either the Mute or Run button may be pressed during the initial 60 sec period after AC power on. If this is done, then once the Standby LED has stopped blinking the Phono II will advance directly to the operating mode that was selected. However, if "Run" was selected there will still be the initial 4-6 second delay while the output stage is powered up.

Once operational, the Phono II should be left in the Mute or Run mode for about two hours to reach thermal equilibrium. While it can be used and enjoyed during this warm-up period, there is the potential for small DC voltages to appear at the output connectors and some of the switch functions—if activated—may cause unwanted "pops or thumps" in your speaker system. These will be greatly reduced after the Phono II has fully warmed up and thermally stabilized, at which point the top panel should be slightly warm to the touch. For those who wish to listen on a regular basis, it is advised that the Phono II be left running in the Mute mode since this will maintain the thermal equilibrium condition.

3.2 Front Panel Functions

The functions available on the right-hand-side of the front panel are described in detail below.

Stereo/Mono: This button toggles between these two modes. In the Stereo mode, the Phono II is a true stereo preamplifier with > 60db channel separation. In the Mono mode, the left and right channels are summed to provide a true mono mode (the identical signal applied to both channels). The mono mode works best with mono LPs, but can also be used when playing stereo LPs if desired.

Non-Inverting/Inverting: This button selects either normal or inverted absolute polarity of the audio signal. The default condition is non-inverting from the input to either the unbalanced output or the positive side of the balanced output. Pressing the button toggles between non-inverting and inverting operation. This function can be used with the Phono II in either of its operating modes.

High Pass (HP) Filter: This is an "on" or "off" function. The LED is illuminated when the HP filter is "on." This function is used to reduce low frequency rumble or resonance from the turntable, or other undesirable very low frequency content from the source. When turned on, the low frequency –3dB point of the Phono II is changed from 3Hz to 18Hz and the response is approximately -15dB at 9 Hz.

L-R/R-L: This function only operates when in the Mono mode of operation and it differences the left (L) and right (R) channels as indicated. Pressing the button for the first time will select the L-R function. Pressing it again will revert to mono mode only. Pressing a third time will select the R-L function and a fourth press will revert to mono mode only. This cycle will be repeated on subsequent pressings of the button. Going back to Stereo at any time will disable this function.

See Section 3.3 for a description of how to adjust the azimuth angle using this function.

NOTE: If the Phono II is operating in the "inverting" mode, the L-R and R-L selections are interchanged. However, the LED indicators will not be interchanged.

3.3 Adjusting Cartridge Azimuth Angle

This function can be used to adjust cartridge azimuth alignment; however mono source material is required for this adjustment. The approach relies on the differencing of the signals from the left and right channels. Azimuth alignment is set when there is zero (or equal but very low) signal in both the L-R and R-L settings.[4] The steps to be followed are as follows:

1. Place a monophonic record on the turntable
2. Switch the Phono II to the mono mode
3. Play the record and listen to the speaker output using the L-R/R-L switch
4. Adjust the azimuth angle of the cartridge to obtain a minimum sound level in each position (L-R and R-L).

4.0 DESIGN PHILOSOPHY AND IMPLEMENTATION

The solitary goal of the Dynamic Sounds Associates (DSA) Phono II is to provide the finest possible reproduction from LP recorded media. To achieve this goal, the Phono II is based on a "no-compromise" dual channel design using best engineering principles and the finest of components. The Phono II does not employ any form of loop feedback to achieve the desired throughput gain or the proper RIAA compensation. Instead, each gain stage of the Phono II has internal feedback to ensure that all forms of distortion are held to very low levels. The RIAA compensation is provided through the use of passive low-pass networks, with the proper time constants, located between the gain stages of the amplifier chain. This approach provides low distortion plus a very high dynamic range. It also eliminates transient inter-modulation distortion, which is a common byproduct of configurations where the throughput gain and RIAA compensation are achieved through the use of intra-stage loop feedback.

Furthermore, because even the finest of coupling capacitors can cause minor, but perceptible, degradations in the reproduction of the audio signal, the Phono II has no coupling capacitors in the audio chain from input to output. Yet, through the use of an innovative design it remains very stable and resistant to DC drifts. Additional advantages of the design approach are the ability to provide easy polarity inversion of the audio signal and a true monophonic capability for the proper reproduction of monophonic LPs. Combining these two capabilities also leads to the L-R and R-L capability in the mono mode.

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[4] There are other methods for adjusting the azimuth angle that rely on minimizing channel cross talk. The use of these approaches may be beyond the capabilities, or resources, of many audiophiles; and, we believe that the approach described in Section 3.3 will prove satisfactory in most instances.

4.1 Amplifier Chain

The block design of the Phono II is shown in **Figure 5**. It consists of four all FET gain stages, two of which can be adjusted to provide the required gain to accommodate virtually any phono cartridge. With the exception of the first stage, all of the gain stages are differential amplifiers. In addition, each gain stage employs its own precision, temperature compensated, constant current source and voltage regulator for the ultimate in stability, signal control, and isolation

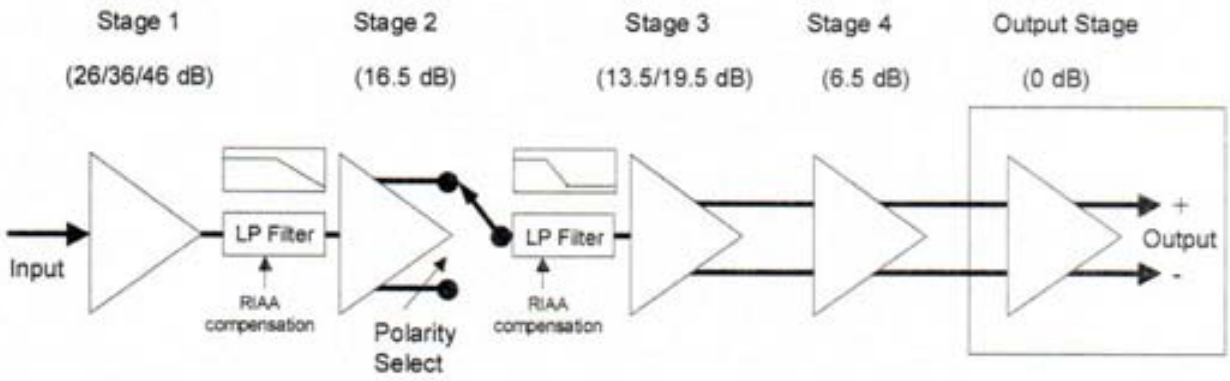


Figure 5 – Block Diagram of Phono II

As can be seen from **Figure 5**, the third and fourth gain stages, and the output stage utilize both differential outputs, thus the Phono II simultaneously provides a balanced output through a standard XLR connector and a single-ended output via a standard RCA type phono jack

4.2 Output Stage

The Phono II uses a separate high bias current Class A output stage for each polarity of the amplified audio signal. The output stage supply voltages are fully regulated and are powered separately from the voltage rails that power the amplifier chain of the Phono II. The output impedance for each polarity at the output connectors is 75 ohms.

Because of the high rail voltages, and the inherent linearity of the Phono II design, it is capable of providing an output drive voltage of >20 volts peak-to-peak without any clipping of the audio signal. The output stages of the Phono II can provide up to 30mA of drive current without distortion, and can drive amplifiers with input impedance as low as 1 kOhm, or long cable runs that have a capacitance of greater than 30nF, without any problems[5].

[5] This is based on a 20kHz signal at 30V p-p. At lower frequencies or drive levels, the Phono II can drive significantly higher values of capacitance without difficulty.

4.3 Power Supply

The Phono II employs a dual, fully regulated power supply, and the individual supplies are isolated from each other. The power supply for each channel provides ± 60V rail voltages for the operation of the amplifier section as well as separate rail voltages of ± 47V for the associated output stage. In addition, it also generates regulated ±12VDC for internal use by the regulator, and +5VDC that is used to control the front panel functions.

To accommodate the fact that the Phono II contains no coupling capacitors within the audio path, and to prevent damage to components that could occur if the rail voltages were applied suddenly, the Phono II power supply is designed with an approximate 60 sec ramp from about ±5VDC at turn-on to the full ±60VDC. As the voltage slowly increases, the value of both positive and negative rails are monitored by comparison circuitry in the power supply. Only when both rails have achieved the proper final values of ±60VDC, and the regulator section has "clamped" indicating that it is in the fully regulated mode, is a turn-on signal generated that permits the output stage to be turned on when the "Mute" or "Run" button is pressed. In a similar manner, the voltage rails for the output stage are monitored to ensure that they are correct before the "Run" function can be enabled. This prevents operation in the event of a failure within the power supply or amplifier board that could result in applying a large DC bias to the output connectors.

4.4 RIAA Compensation

The RIAA compensation is divided into two parts. The high frequency (HF) (>1kHz) compensation is located between Stages 1 and 2, and the compensation for frequencies <1kHz is located between Stages 2 and 3. The RIAA compensation is designed in this manner to ensure that HF signals from the cartridge which enter the preamplifier at levels greater than those at lower frequencies are correctly attenuated before passing to the other gain stages of the Phono II. This approach ensures high dynamic range over the full frequency spectrum as well as significantly reducing the output noise power. The RIAA compensation curve of the Phono II uses precision matched components and is individually trimmed to an accuracy of ± 0.2 dB from 20Hz to 20kHz.

4.5 Noise Levels

The Phono II uses two matched shielded toroidal transformers, whose primaries are driven out of phase from each other. These transformers are also encased in a separate magnetically shielded housing to provide virtually total cancellation of residual AC fields within the Phono II chassis. In addition, the Phono II uses an internal RFI filter on the AC power line to eliminate residual power line interference that might enter via that pathway.

Figure 6 shows a typical un-weighted noise voltage spectral density for the Phono II, when set for 40dB gain and 60dB at 1 kHz, as measured at the single ended output and with the input shorted. Both curves are for the right channel, with identical results for the left

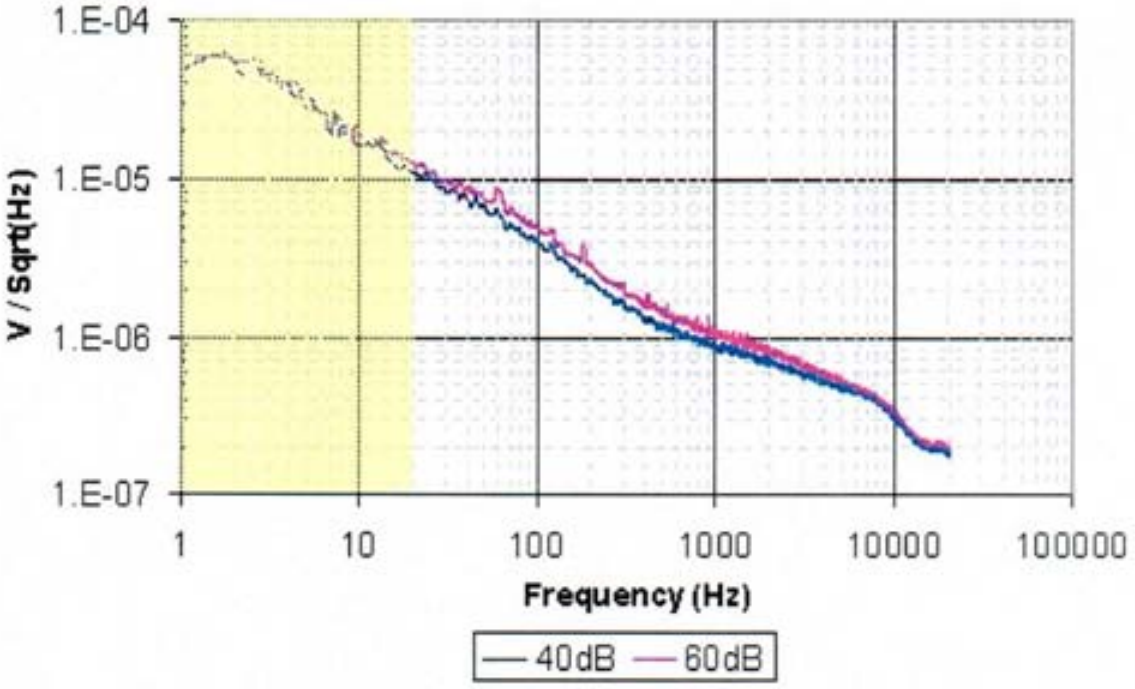


Figure 6 – Phono II Noise Level from 1Hz – 20kHz

channel. It will be observed from **Figure 6** that, unlike most preamplifiers, the output noise level is virtually independent of gain within the 40dB to 60dB range. This is due to the fact that the majority of the noise is generated in the second amplifier stage and not the first stage, as is the usual case. However, if the +6dB gain setting is selected, the noise level will increase by 6dB because the additional 6dB of gain is implemented in the third amplifier stage and thus it amplifies noise generated in prior stages.

A complete analysis of the total noise power indicated in these two curves is used to specify the total noise level of the Phono II given in the specifications at the end of this manual. Analysis shows that the noise power in the shaded region between 1Hz and 20Hz represents about 1/3 of the total noise power at the output of the Phono II. Thus, much of the noise that is generated is very low frequency and difficult to detect on even the best systems.

5.0 BALANCING AND OTHER ADJUSTMENTS

The Phono II comes from the vendor fully "broken in" and balanced under normal thermal operating conditions. Testing has shown that the circuitry of the Phono II is stable for over a year and that additional balancing is generally not required. However, through long periods of use, or use in extreme thermal environments, some rebalancing may be required. The need for such adjustment will become apparent when use of the polarity function, or connecting the Phono II output to a line amplifier, results in an excessive "thump." (A

small "thump" may occur and is a normal occurrence when selecting the Phono II output and does not indicate a problem.)

The location of the balance adjustments is shown in **Figure 7**. These adjustments should be made with the top cover in place because removing the cover will change the thermal equilibrium conditions.

NOTE: Making these adjustments can be facilitated by turning on the High Pass filter function (far right button on the front panel) because it will eliminate any infrasonic noise that may interfere with a good voltage reading.

The adjustments described below should be made with the Phono II on and fully operational. To ensure thermal stability, it should be left in "Mute" mode for several hours prior to making these adjustments. If, for any reason you do not wish to make these adjustments yourself, the unit may be returned to DSA for these adjustments.

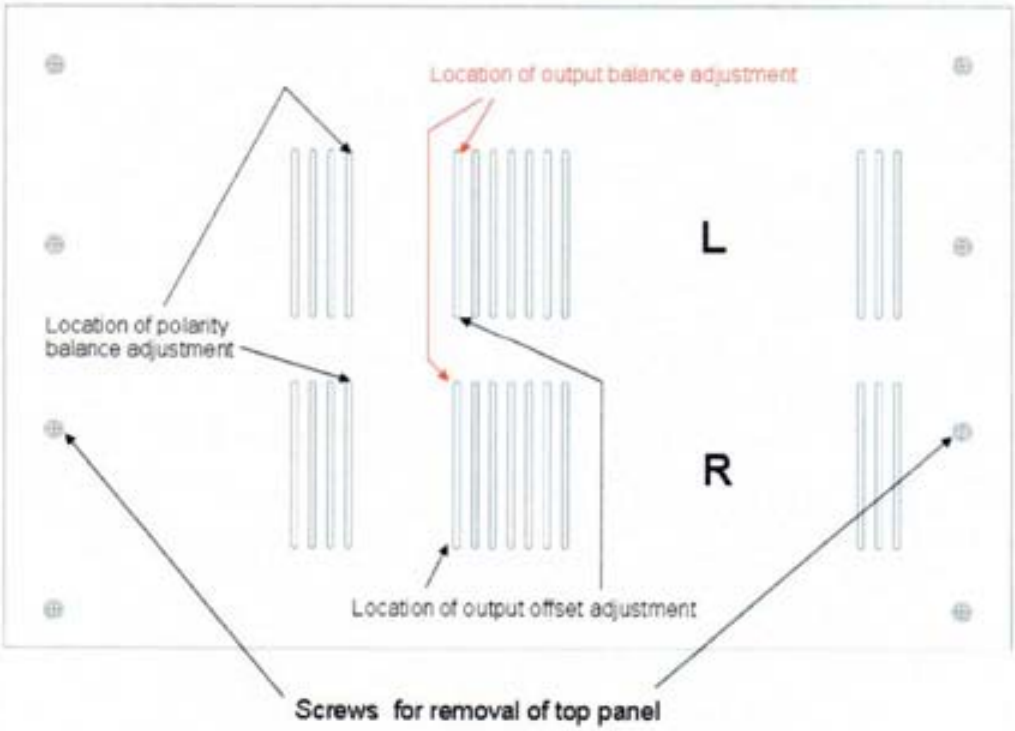


Figure 7 - Location of Balancing Adjustments on Top Panel

5.1 Excessive "Pop Noise" When Selecting the Phono II Output

This situation implies that the DC balance, and/or offset, at the outputs have drifted out of the factory specification. This adjustment uses the #00 Philips head screwdriver and female XLR plug with three wires that are provided with the unit. Also, a DC voltmeter is required, but this is not provided.

After a period of warm-up to ensure thermal equilibriium, insert the female XLR plug into the left channel XLR output socket. Using the DC voltmeter, measure the voltage between the red and blue wires; the voltage should be less than ±10mV. If it is greater than this, insert the screwdriver through the top panel slot where indicated for the left channel output balance adjustment. The screwdriver will engage a small adjustment potentiometer that is below the indicated location (a small flashlight may be needed to see the control below). Once engaged, rotate the screwdriver very slightly to obtain "0 volts" (typically ± 10mV) between the two wires.

Once this balance has been achieved, connect the voltmeter between the black wire and the red wire. Insert the screwdriver in the bottom of the same slot where the output offset adjustment potentiometer is located. Using the screwdriver, adjust the control in a similar manner to obtain a reading of "0 volts" (typically ± 10mV) on the voltmeter. You have now balanced the output of the left channel.

Repeat the above process for the right channel, first moving the female XLR plug to the right channel output socket.

5.2 Excessive "Pop Noise" When Changing Polarity

This adjustment is rarely required; however, if it is the polarization balance function is activitated using the small toggle switch on the back panel located between the two sets of output connectors, as shown in **Figure 8**. Moving this switch to the right, toward the "Pol Bal" text will enable the polarization balance to be performed. (In the normal mode of operation this switch should be to the left, which disables the polarization balance function.)

Figure 8 – Location of switch and holes for polarization balance

To the right of this switch are two small holes labeled "L" and "R". There is a socket located behind these holes and the provided 1kOhm resistor will plug into the socket. (When the lead goes into the socket there will be some slight resistance and then the lead will slide in.)

First plug in the XRL female connector used in section 5.1 into the right channel XLR output socket. Then, find the 1 kOhm resistor provided with the unit and insert the short end into the upper ("L") of the two holes shown in **Figure 8**. (When properly engaged in the socket, the outer end of the body of the 1kOhm resistor will be almost flush with the outside surface of the back panel.)

After a sufficient period of warm-up, connect a DC voltmeter between the protruding resistor lead and the black lead on the female XLR plug. Measure the voltage and then press the front panel button to invert the polarity, and measure the voltage again. The two readings should be within ±10mV of each other. If not, insert the provided screwdriver through the top panel slot in the location indicated in Figure 7 for the left channel polarity balance adjustment.

As in section 5.1, adjust the polarity balance potentiometer such that the voltages in the non-inverted and inverted polarity positions are within ±10mV. Then remove the resistor and place it in the lower ("R") hole, again engaging the socket behind the hole. Repeat the voltage measurement between the protruding resistor lead and the black wire on the female XLR plug and adjust the polarity balance potentiometer for the right channel as before.

When these adjustments are completed, remove the resistor and the XLR connector and return the polarity balance switch to the "off" position (to the left). This completes the balancing adjustments that may be required occasionally.

6.0 SPECIFICATIONS

Design Topology:	
Gain stages:	**DC coupled, balanced-differential**
Output Stage:	**Class-A, balanced-differential, push-pull**
RIAA Compensation:	**Passive, 2-stage LP filter**
AC Voltage:	**120 VAC (240VAC option)**
Fuse Type and Rating:	**2 x Buss GMC (20 mm) 1.5 A**
Dimensions:	**17" (W) x 11-1/2" (D) x 4-1/2" (H)**
Weight:	**22 lbs**
Moving Magnet Input Impedance:	
Load Resistance	**Selectable: 47Kohms or 100Kohms**
Load Capacitance	**Selectable: 200pF to 975pF in 25 pF steps**
Moving Coil Input Impedance:	**- Selectable from 25 ohms to 1525 ohms in 25ohm steps** **- Or user value Rx (Input A only)**
Gain:	**User selectable: 40dB, 50dB, 60dB, 66dB**
Channel Separation:	**≥ 60 dB**
RIAA Accuracy:	**± 0.2dB from 20 Hz – 20KHz**
Max Output Voltage:	**20 volts peak-to-peak (7VRMS)**
Output Impedance (balanced or unbalanced):	**75 ohms**
Output Current:	**Max. 30 mA (for Class A operation)**
RMS Noise power (Shorted input to unbalanced output):	
40 dB gain	
1Hz – 20kHz	**- 66dB relative to 3mV input at 1kHz**
20Hz – 20kHz	**- 70dB relative to 3 mV input at 1kHz**
60 dB gain	
1Hz – 20kHz	**-65dB relative to 0.3mV input at 1kHz**
20Hz – 20kHz	**-69dB relative to 0.3mV input at 1kHz**

WARRANTY

All DSA products carry a three (3) year warranty against defects in material, components, and workmanship. This warranty also includes the balance adjustments described in Section 5.0, if required, during the first year of service. This warranty becomes effective on the date of purchase, or the date of shipping, which ever is later. To ensure proper registration of the product, and to validate the warranty, it is necessary to return the warranty registration card below. (This card may be scanned and e-mailed to info@dynamicsounds-assoc.com if preferred.) Under the terms of the warranty, repairs and/or adjustments will be made at manufacturer's cost, including return shipping to the user during the warranty period. The user is responsible for shipping costs to the manufacturer for warranty repairs. Charges for unauthorized service and shipping are not covered under this warranty. This warranty is null and void where it is apparent that misuse, accident, neglect, and tampering with or modifications by other than DSA have damaged the product. The warrantor assumes no liability for property damage or any other incidental or consequential damage whatsoever which may result from a failure or misuse of this product.

Prior to returning any product for warranty repairs, or adjustments, it is necessary to obtain a return authorization number (RAN). Products returned without a RAN will be returned without repair, or adjustment. You must obtain an RAN by sending an e-mail to support@dynamicsounds-assoc.com. Identify the product, the serial number and provide a brief description of the problem with the product. You will receive an RAN by return e-mail message.

DETACH THIS PORTION AND SEND TO DSA TO COMPLETE REGISTRATION

Dynamic Sounds Associates, LLC.
1754 Persimmon Ct.
Naples, FL 34109

MODEL_____ SERIAL No. _____

PURCHASE/SHIPPING DATE _____

NAME OF OWNER _____

ADDRESS _____

CITY, STATE, COUNTRY, ZIP _____

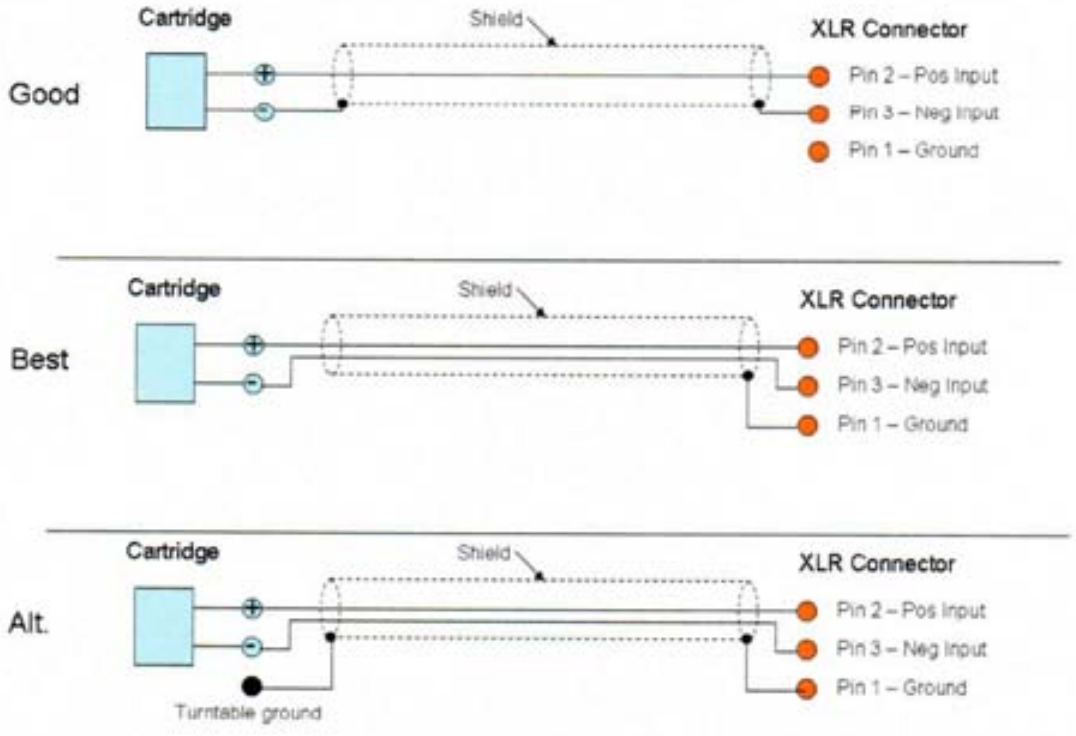
TELEPHONE No. _____

E-MAIL _____

APPENDIX A

This Appendix addresses the proper ways to connect a phono cartridge to the input of the Phono II when using the XLR input connectors. It should be realized that the XLR, or "balanced", connector is designed to properly support a "balanced" signal. This implies that the signal voltage is measured between two wires and a third reference wire—or ground. The voltages on the two signal wires of a "balanced" signal are of equal amplitude but of opposite phase relative to the reference. Thus, when they are added—as in a differential input—they will be summed giving a signal that is twice the value of either one. (By the same token, "common mode" or in-phase signals appearing on both signal wires will be subtracted when fed into a differential input. This is the reason balanced cables are often used for long cable runs, or in areas of high interference, because any interfering signal is "common mode" and largely rejected at a balanced amplifier input.)

Phono cartridges, by the nature of their design are "single-ended" or "unbalanced" since they only have a signal wire and a reference (ground) wire for output. (A "balanced" phono cartridge would have three pins for each channel output.) Thus, it is very important that the wiring between the "unbalanced" phono cartridge and the "balanced" XLR input be done properly, or excessive hum resulting from ground loops can result. Below are three diagrams on how this wiring should be implemented to avoid excessive hum problems when using an XLR (balanced) input. The wiring diagrams labeled "Good" and "Best" are preferred. The "Alt." wiring diagram is only to be used if there is no other means of grounding the turntable.



If hum still remains after using either of the above cable configurations, the user can use the switch on the back panel at the input that is labeled "XLR ground off." This lifts the ground pin on the input XLR connector and may eliminate the hum problem. If hum persists, the user should check to see if the "-"or ground pins of the cartridge being used are connected to the turntable ground through internal turntable wiring. If this is the case, remove the turntable grounding wire to the Phono II and see if the hum is eliminated.