



## WARNING

**Please keep these instructions and heed all warnings.  
Use product only for intended function.**

**For your protection please read the following:**

**Water and moisture:** Electrical devices should not be used near water (as per example, near a bathtub, washbasin, kitchen sink, laundry tub, wet basement or swimming pool.) Care should be taken such that objects do not have the opportunity to fall, and that liquid is never spilled onto or into the device enclosure through openings.

**Power Sources:** An electrical device must be connected to a mains power source in strict accordance with the supplied product owners manual. Please verify that the AC mains voltage specified in the product manual match those requirements indicated on the unit and the AC voltage provided to your location by the power company. Unplug this apparatus during lightening storms or when unused for long periods of time. To completely disconnect this apparatus from mains power, disconnect the power cord from the AC receptacle. The equipment power switch does not provide adequate protection to be considered a service disconnect.

**Grounding:** Adequate precautions should be taken so that the grounding provisions built into an electrical product are never defeated.

**Power Cords:** Pass Labs provides a power supply cord that meets all legislated requirements for the market in which the product was originally sold. If you choose to substitute an after-market product we urge you to choose a polarized cord that is fully safety rated by the necessary local authority. Under no circumstances defeat the safety purpose of any polarized plugs. If the supplied power cord does not fit your power outlet; consult a qualified electrician, never modify the plug.

**Power Cord Protection:** Power supply cords should be routed so that they are not likely to be walked on, abraded, or pinched by items placed on or against them, paying particular attention to cords where they enter plugs or exit from a device. Never under any circumstance insert a cut or damaged power cord into a mains power socket.

**Power and Signal:** Cables should never be connected / disconnected with equipment powered up. Failure to heed this warning may cause injury, damage or destroy equipment.

**Ventilation:** Power-amplifiers run hot, but you should be able to place your hands on them without discomfort. You must allow for this heat in installation, by providing for free air circulation around the product. Electronics should not be subjected to sources of excessive radiant heat. Excessive heat can shorten the life of the product and may cause the electronics to self protect and shut down. Never block any ventilation openings. Allow at least 6 inches of clearance around these products for proper ventilation.

**Crush and Tip Hazard:** When moving or placing these products use caution to avoid injury from tip-over or fall. Make sure that any stand, cart, table, bracket or tripod used to support this product is weight rated sufficient to the task.

**Servicing:** To reduce the risk of fire, electrical shock or other injuries, the user should not attempt to service the device beyond that which is described in the operating instructions. All other servicing must be referred to qualified service personnel.

**For Units With Externally Accessible Fuse Receptacle:** Unplug the device from all sources of power before changing or inspecting any fuse. Replace fuse with one of same physical size, type and rating as that specified by the manufacture for that product.

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## Introduction

Pass Laboratories has long been respected for building some of the finest phono-stages in the audio industry. Since 1999 the venerable Pass Laboratories X-ono has been respected by both consumer and professional user as one of the premiere reference phonostage pre-amplifiers.

As associated equipment in the audio chain has improved we at Pass Labs found ourselves longing for an improved phono-stage with even lower noise, greater resolution and sonic ease than we had enjoyed with the Pass Labs X-ono. The culmination of that investigation resulted in the XP-15, Wayne Colburn's latest phono-stage and successor to the X-ono.

Thank you for purchasing the XP-15, we trust that you will find it easy to set up and a joy to use.

The XP-15 has a very accurate RIAA equalization curve. This curve is accurate to better than 1/10 dB over 10 octaves. The accuracy of this curve does not vary with an adjustment change of gain or cartridge loading.

The XP-15 features gain adjustable from between 46dB and 76dB; a range sufficient to allow successful operation of not only high output moving magnet cartridges, but also the lowest output moving coil cartridges without the use of an auxiliary step-up transformer.

By the early 1980's audiophiles recognized that in general lower output moving coil cartridges were capable of retrieving more fine detail from record grooves than higher output cartridges, in many instances this was simply a case of having lower moving mass to excite in the electrical generator of the cartridge. Moving coils with less than a half dozen turns of the finest wire possible attached to the lightest and stiffest cantilevers were capable of accurately tracking musical passages that a few years before would have seemed impossible.

The cartridge makers had clearly taken a page from the automotive and motorcycle racing engineers who were doing everything in their power to lower "un-sprung mass" in an effort to get tires to stay in intimate contact with rough terrain at high speeds. In both regards the ability to accurately track the impossible is the ultimate goal... less moving mass attached to the suspension is a big part of the answer.

Unfortunately the active electronics that could extract signal at those low levels typically added noise. Step-up transformers generally

addressed the noise issues, but frequently lost the very fine detail somewhere in the transformers iron core.

The XP-15 gives vinyl playback the gain structure we need and low noise figures we want. The ability to play extremely low output cartridges without a head transformer allows for a clarity with these cartridges that we've personally never experienced.

This extremely low noise / high gain structure of the XP-15 is capable of cleanly and quietly delivering in excess of 0.5V line level signal output with a phono cartridge input of 80 micro-volts. As far as we know these are the best performance figures in the industry for a phono-stage. Performance metrics aside this is beyond question the most user friendly and sonically enjoyable phono-stage that Pass Laboratories has ever offered.

Cartridge loading can be adjusted from a couple ohms to 47k-Ohms, with a parallel capacitance from 100 pF to 750 pF.

## Setup

The XP-15 is a single chassis design with internal power supply which attaches to house power through a standard fused and grounded IEC inlet. A tag affixed to the chassis will indicate voltage and current requirements for the XP-15. Before operation, please verify that the indicated line voltage is consistent with the line voltage where you intend to install this piece of equipment. Line voltage is determined at the time of construction and not user changeable. Line voltage will be 100 Vac, 120 Vac, 220 Vac or 240 Vac.

In addition the rear panel also has a standard IEC 320 inlet socket, which accepts standard detachable power cords for connection to house power and a panel-mount fuse holder for safety. Unit's built at 100 / 120 Vac will be fused for ½ amp; units intended for 220 / 240 Vac will be fused at ¼ amp. In all instances the fuse will be a 3AG single use (type 313) slow blow fuse (1/4" x 1-1/4"). Substitution of another time constant other than slow blow will not harm the amplifier but we would not expect longevity from the fuse element. It is strongly suggested that you not substitute any other type fuse or fuse rating.

We include a power cord with this product that meets all recognized compliance standards for safety. Should you wish to add an aftermarket power cord you are welcome to do so. The product accepts any cordset with an IEC 60320 C13 connector or equivalent. We strongly suggest that you only use cordsets that meet the legal directives of your specific country.

## Adjustment

The single chassis XP-15 comes with two sets of input connections, two sets of output connections, and a single 5-way binding post for turntable grounding. These are located on the rear panel of the pre-amplifier.

On the rear panel you will see two sets of 8 pole DIP switches for each channel, these switches allow you select cartridge type (moving magnet or moving coil), select gain, and adjust cartridge loading. Next to the IEC inlet you will see graphic representation of how the two pairs of switches interact. From the factory the XP-15 ships with a default setting of moving coil at 100 ohms with a gain of 76 dB.

In order to set the XP-15 for your particular cartridge you will need to have some salient information on the cartridge. If you do not have that cartridge information please contact your dealer or the Pass Laboratories factory. We will attempt to help you with that data, but by no means do we have factory data on every cartridge ever built.

Please be aware that the XP-15 is a dual mono design, whatever setting you select for one channel the other channel will need to be set identically.



You will first need to select Moving Magnet (MM) or Moving Coil (MC) as appropriate for your specific cartridge. In all instances the switch-tab for any selection will need to up for “on” and down for “off”. If you have a moving iron cartridge, you will most likely need to select Moving Magnet if the output is greater than 2mV. A moving iron cartridge with an output of less than 1mV will typically

do best with Moving Coil selected. Only one type of input may be selected as “ON”, the alternate input type must be “OFF”. If Moving Magnet is selected as “ON”, all eight (8) resistive loading switches should typically be selected “OFF”.

Once you have selected an input type you will need to attach the RCA connectors from your turntable to the appropriate input on the XP-15 (Moving Magnet or Moving Coil). You will also need to attach the ground connection from your turntable to the single white five way binding post on the XP-15. The XP-15 will function without this connection made up but the background noise level will likely be excessive.

### Moving Magnet

If you have selected Moving Magnet you will also need to select capacitance. It will be impossible to give suggestions for correct capacitance with any given cartridge, due to the huge variation in capacitance on the cables. The optimal value is selected by listening.

There are three capacitive loading switches with values of 330pF, 220pF and 100pF; these are in addition to a fixed value of 100pF. You may select any switch or number of switches, the values are additive. The range of values available is 100pF – 750pF. The correct value is that which gives the best overall tonal balance. Typically if the cartridge sounds too bright more capacitive loading will be required. The typical Moving Magnet cartridge has a fairly predictable output, the XP-15 gain in moving magnet is fixed at 46dB.

Resistive loading for moving magnet is fixed at 47k-ohm. If you require something other than 47k-ohm, please contact the factory. It is suggested that all moving coil loading switches be set to off.

Correct settings for moving magnet gain are shown below.

	<b>MM</b>	<b>MC</b>	<b>G1</b>	<b>G2</b>	<b>G3</b>
<b>46dB</b>	ON	OFF	OFF	OFF	OFF

### Moving Iron

Moving Iron cartridges typically load at 47k-ohm and are not at all sensitive to capacitive loading. It is suggested that you treat them as moving coil cartridges if their output permits.

## Moving Coil

Moving coil cartridges are the typical cartridges of choice for the serious vinylphile and generally the lower output moving coil cartridges are preferred. We have successfully operated the XP-15 with cartridges that output a voltage of 50uv, this pre-amp may be used with even lower output cartridges (without an auxiliary step-up transformer), but we don't know of any.

To operate the Pass Labs XP-15 as a Moving Coil pre-amp, you may need to deselect Moving Magnet (from the factory, the XP-15 ships Moving Coil enabled) and select Moving Coil "On". In addition you will need to attach the turntables phono cartridge to the XP-15's Moving Coil input.

Your next task is going to be to set gain. This will be a very straightforward task. The available gain settings are 56 dB, 66 dB, & 76 dB. Gain is selected by a combination of MM, MC and switches G1, G2 and G3

	<b>MM</b>	<b>MC</b>	<b>G1</b>	<b>G2</b>	<b>G3</b>
<b>56dB</b>	OFF	OFF	ON	OFF	ON
<b>66dB</b>	OFF	OFF	OFF	ON	ON
<b>76dB</b>	OFF	ON	OFF	OFF	OFF

The gain controls attenuate the overall gain of the Moving Coil stage in such a way that as the gain is reduced the noise levels seen at the output of the XP-15 are reduced by a like amount. In this way there is no penalty to selecting one gain setting over another. The exemplary signal vs. THD + noise figures of the XP-15 are never compromised by changing gain settings.

Chose a gain setting that allows your pre-amp volume control to operate within a range similar to what you experience with other source components. If phono is your only source component, then pick a gain setting that allows your pre-amp a fairly advanced gain setting at whatever you consider a comfortable listening level.

The predominate loading effect on Moving Coil cartridges will be resistive loading, however like Moving Magnet adding capacitance will selectively reduce perceived output at higher frequencies.

Resistively the XP-15 has a fixed moving coil input value of 47k-ohms and user selectable values of 10, 25, 50, 100, 250, 500, 825 and 1k-ohm. Selecting "On" for any of these values places that value in parallel with the 47k-ohm or any other value selected. From a purely mathematical perspective this gives a possible 2^8 resistive loading selections according to Ohm's law for parallel resistors. We're very

grateful to Georg Simon Ohm for sharing his discovery with us, but leave the math of all the 256 perturbations to those so inclined. From a practical standpoint the 9 values indicated are likely sufficient to cover the needs of all but the most obscure cartridge.

After you have selected a resistive cartridge loading that gives the best overall spectral balance and the most dynamic presentation you may choose to add or subtract capacitive loading to slightly trim the high-end response.

Please understand the loading of a moving coil cartridge is a very inexact science at best, specific recommendations should be taken (and offered) very lightly. I encourage you to think separately from the cartridge manufacturer and choose your resistive loading values accordingly. The cartridge maker may have for example anticipated a transformer being used as the initial stage of gain, the XP-15 with its active elements is a very different proposition. As an added complexity part of the cartridge loading is provided by the lead-in wiring, the resistance, and reactance of that wire must be accounted for in choosing loading values in the XP-15. As long as you derive your final setting empirically you may ignore these effects, your moving coil cartridge will not.

An improperly loaded cartridge will suffer every unwanted sonic anomaly, ranging from lack of definition and bass to a very strident and screechy high end. Making the mistake of not loading channels identically adds additional confusion. Please verify that loading for one channel is duplicated in the other accurately.

Cartridge loading is a compromise between what works best for the cartridge and what sounds best for the listener. Specifically we are looking for a compromise loading which sounds best across the whole audio spectrum.

**I suggest you start with the following:**

Always, ALWAYS mute or turn the volume of you pre-amp to a minimal setting (better yet, turn your power-amp off) before making any adjustments to the XP-15. Changes made to the XP-15 loading have the possibility of sending pulses to your pre-amplifier that could damage speakers if the volume of the pre-amplifier is set sufficiently high.

Once the volume setting is reduced and the power amp turned off set the loading to 100 ohms (switch position 4 “on” and positions

1-3, 5-8 “off”. Give the XP-15 a couple minutes to settle in electronically and turn the power-amps back on. Listen to the system critically for some time (10 minutes to an hour) using various musical selections that you are familiar with.

Now turn the volume down and the power amps off again, set the loading switches to the next lowest resistive value (50 ohms). Once again give the XP-15 a couple minutes to settle in, turn the power amps back on and listen to the same musical selections as before. If your test selections sound better with the new loading you can be assured that the loading change was in the correct (lower resistance in this example) direction.

If the change in loading resulted in a more pleasant presentation of your chosen musical selections, once again turn down the volume on the preamp and the power supply off. Select the next lowest resistive loading (25 ohms) and listen to the same selections again. At some point you will find a value where the sound deteriorates, move back to the last value that sounded excellent. Once this has done you have reached the optimal resistive loading.

If going below 100 ohm resulted in degraded sound, then obviously the correct change would have been to have gone upward next highest level above 100 and repeat the listening. I am sure you get the idea, its not complicated but it can be time consuming.

The eight values available should cover any cartridge needs nicely. However should you wish to get very creative resistors can be selected in parallel for almost limitless experimentation. Some examples of additional loading values follow on page 12. Should you wish any combination of switches may be selected “ON”. The resultant values will follow Ohm’s law for resistors in parallel. Once again this shouldn’t be necessary, but it is available should you wish to calculate the myriad of permutations possible.

Again I would like to stress that you are listening for a musical balance in the selections that you play. Some loading selections will offer better bass but poor high-end resolution, some will have better high-end and definition but with a flat sound stage. You are seeking an optimal balance of correct spectral balance in conjunction with correct spatial information. Finding the best compromise will take time.

Do not make the mistake of setting the pre-amp so that it enhances one recording only, listen to a variety of material and adjust accordingly.

## Design Comments

Capacitive loading will not affect moving coil cartridges to the same extent that capacitive loading affects moving magnet cartridges but there may be some small benefit to adjusting this parameter once the resistive loading is optimal.

Once you have found the optimal setting, take the time to record those settings so that should the need ever arrive, you can replicate your personal settings with little effort. Of course when you change either cartridge or wires between the cartridge and pre-amp you may need to revisit your selected settings.

For a very long time there has been faith in the technical community that eventually some objective analysis would reconcile critical listeners subjective experience with a repeatable laboratory measurement protocol. Perhaps this will occur, but in the meantime audiophiles largely reject bench specifications as an indicator of audio quality. This is appropriate; the appreciation of audio is a completely subjective human experience. We should not more let the numbers define audio quality than we would let chemical analysis be the ultimate arbiter of fine wines. Measurements are certainly critical, they can and do provide a measure of insight, but are no substitute for human judgment of that which is pleasant.

As in art, classic audio components are the results of individual and collective efforts that reflect a coherent underlying goal and philosophy. If successful, they make both a subjective and objective statement of quality, which is meant to illicit appreciation in the final product. It is essential that that the circuitry of an audio component reflects a philosophy which addresses the subjective nature of its performance first and foremost.

Lacking the ability to completely characterize performance in an objective manner, we should take a step back from the resulting waveform and take into account the process by which it has been achieved. The history of what has been done to the music is important and must be considered a part of the result. Everything that has been done to the signal is embedded in that signal, however subtly.

Experience correlating what sounds good to knowledge of component design yields some general guidelines as to what will sound good and what will not sound good in real life.

1) Simplicity and a minimum number of components is a key element, and is well reflected in the quality of better tube designs. The fewer pieces in series with the signal path, the better.

This is often true even if adding just one more gain stage will improve the measured performance.

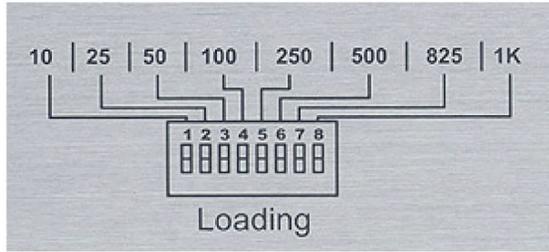
2) The characteristic of gain devices and their specific use is important. Individual variations in performance between like devices is important, as are differences in topological usage. All signal bearing devices contribute to the degradation, but there are some different characteristics that are worth attention. Low order nonlinearities are largely additive in quality, bringing false warmth and coloration, while abrupt high order nonlinearities add harshness.

3) Maximum intrinsic linearity is desired. This is the performance of the gain stages before feedback is applied. Experience suggests that feedback is a subtractive process; it removes information from the signal. In many older designs, poor intrinsic linearity has been corrected out by large application of feedback, resulting in loss of warmth, space and detail.

We give these precepts a great deal of thought in the design and voicing of product. You only need to address the cartridge loading till it sounds good to you.

#### Some Suggested Resistive Loading Values

in	1	2	3	4	5	6	7	8
ohms	10	25	50	100	250	500	825	1K
10	ON	OFF						
17	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
25	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
33	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
50	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
83	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF
91	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
100	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
166	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF
200	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
250	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
311	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF
333	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
452	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
500	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
825	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
1000	OFF	ON						
47000	OFF							



10 Ohm

17 Ohm

25 Ohm

33 Ohm

50 Ohm

83 Ohm

91 Ohm

100 Ohm

166 Ohm

200 Ohm

250 Ohm

311 Ohm

333 Ohm

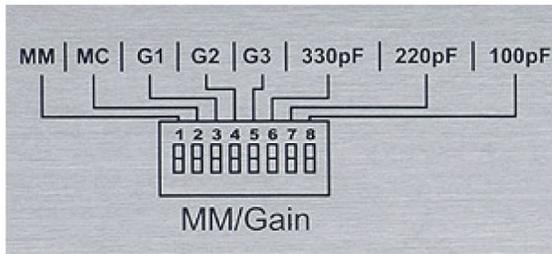
452 Ohm

500 Ohm

825 Ohm

1 000 Ohm

47 000 Ohm



<p>MC</p>	<p><b>MC - 76 dB</b></p>	<p><b>100 pF</b></p>	
	<p><b>MC - 66 dB</b></p>		<p><b>200 pF</b></p>
	<p><b>MC - 56 dB</b></p>		<p><b>320 pF</b></p>
<p>MM</p>	<p><b>MM - 46 dB 47 kOhm</b></p>	<p><b>420 pF</b></p>	
	<p><b>MM - 46 dB 1 kOhm</b></p>	<p><b>430 pF</b></p>	
		<p><b>530 pF</b></p>	
		<p><b>650 pF</b></p>	
		<p><b>750 pF</b></p>	



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## Warranty Information

Please note: Conditions of warranty service and customer rights for product purchased outside the United States may vary depending upon the distributor and local laws. Please check with your local distributor for specific rights and details.

All Pass Laboratories products purchased new from an authorized Pass Laboratories dealer in North America are covered by a transferable, limited 3-year warranty. This warranty includes all parts and labor charges incurred at the factory or factory specified repair facility, exclusive of any subsequent or consequential damages. Damage due to physical abuse is specifically excluded under this warranty.

For this warranty to apply the customer is responsible for returning the product unmodified to the factory within the specified warranty period. The customer assumes all responsibility for shipping and insurance to and from the factory or a factory specified repair facility. The conditions and stipulations of this Pass Laboratories warranty only applies to units originally sold new through an authorized dealer. Warranty on factory repair is 60 days and covers only the scope of the original repair.

Non-North America customers should consult with their original Pass Labs dealer or distributor for warranty repair instruction prior to contacting the factory or shipping product to the factory for repair. Non-North American product must be returned to the country of origin for warranty service. Foreign distributors are only required to offer warranty service on Pass Laboratories product that they have imported, verifiable by serial number.

Any modifications to Pass Laboratories products that have not received written factory approval nullify all claims and void all provisions of the warranty and liability by the maker or authorized distributor. Should a modified product be returned to the factory for repair the owner will be required to pay all necessary charges for the repair in addition to those charges required to return the product to its original configuration.

In the case of safety issues, no product shall be returned to the customer without those safety issues being corrected to the most recent accepted standards.

Removal or alteration of original Pass Labs serial numbers voids the factory warranty. Product with altered or missing serial numbers will be suspect as counterfeit or stolen product.

Pass Laboratories will not repair or in any way indemnify any counterfeit or cloned product. Pass Laboratories does not offer products in voltages intended for international markets either to authorized Pass Labs dealers or to third parties located in the United States or Canada.

For more information please contact: Pass Laboratories Inc.  
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