



## Xs Preamp Owner's Manual

## Introduction

There are people who do not know that Wayne Colburn has designed the Pass Labs preamplifier products for the last 20 years. Wayne's modesty has tended to keep him out of the spotlight, and he does not like to write, and so it falls on me to trumpet his latest achievement. It follows in a smooth progression of successful pre-amplifiers and phono stages, each recognized as offering a genuine improvement in sound quality.

When we began development of the Xs power amplifier five years ago, we knew that we would also need a companion piece. Of course, back then we thought we could have this done in a year or so...

Wayne was given carte blanche on the design and an unlimited budget, and as progress on the amplifier was very slow, he had lots of time to acquire and play with many exotic parts and materials. And spend money.

Naturally the comparison will be made with its predecessor, the XP-30 line stage preamp, which achieved incremental performance improvements over the XP-20 and XP-10. The most obvious difference is that the Xs comes in only two chassis, where the XP-30 had at least three chassis, one for supply and control, and one chassis per channel for as many channels as you might reasonably want. The Xs is designed solely for two channel operation, and it fits in two (larger) boxes.

The XP-30 had a few unique features, among them independently adjustable dual output sets for use in bi-amping and the high voltage output swing capable of driving unity gain power amplifiers such as the First Watt F4.

The Xs preamp expands on these features and adds some nice new touches, such as remote control of the absolute phase switching.

The volume controls are improved in performance with 0.5 dB steps, expanded dynamic range and lower noise. The harmonic content of the 0.001% distortion figure of the volume control has been tweaked to favor 2<sup>nd</sup> harmonic over 3<sup>rd</sup>. The buffer stage for the volume control has been eliminated, giving an even simpler gain path. Improved circuit boards layout puts the cherry on top.

The gain stages still use matched complementary Toshiba Jfet inputs, Bipolar cascodes, and Mosfet outputs. Pass Labs has some of the few remaining stocks of these largely unavailable parts. Some changes have been made – the Class A bias has been doubled,

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

accompanied by much larger heat sinks, and the circuit will now drive any reasonable load (I have successfully used it to drive my 16 ohm Lowthers).

The circuits are now completely DC coupled throughout (no capacitors), and the frequency response is flat to 100 KHz.

The XP-30 could swing enough voltage to drive a balanced follower output stage to 80 watts rms. The Xs increases that figure to over 150 watts.

Some of the materials have gotten more exotic – the gain stages are mounted on ceramic circuit boards with gold plating. The channel motherboards are made of Panasonic Megtron with immersion gold, which performs about as well as Teflon or Polyamide but without the adhesion properties. The power supplies use 4 ounce plated-through high temp FR406.

While the two channels share a chassis, they are isolated on separate board systems with distance between them, so the crosstalk figures between channels are as good as the XP-30 separate chassis. Each channel and the digital control circuits have their own isolated supplies, each mounted on it's own board in a separate chassis.

The three separate power supplies use the lowest noise transformers available from Plitron and they incorporate EMI filters on the AC line input, secondary output, fast/soft recovery rectifiers, large storage capacitance and extensive regulation. The active regulation is both series and shunt types, and is followed by passive filtering using polypropylene capacitors.

All this in machined aluminum cases. If like me your eyesight is not what it once was, you will also appreciate the larger display on the control panel.

It does not automatically follow that more money and more exotic parts and such will result in a better sounding product. Indeed, some of things Wayne tried did not work as hoped, although they measured well enough. Fortunately there was lots of time available, and the back-and-forth process between Wayne and the four other listeners assured the finest product we could possibly make.

At this point, I can only say that if you are on a restricted budget you might be wise to avoid borrowing one of these.

Nelson Pass 2013

## WARNING, IMPORTANT SAFETY INSTRUCTIONS

Read these instructions, Keep these instructions  
Heed all warnings, Follow all instructions and precautions

**Water and moisture:** Electrical devices should never 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. Electrical devices should never be left exposed to the weather, dampness, splashing or dripping. Clean this device only with a dry cloth.

**Power Sources:** An electrical device must be connected to a mains power source in strict accordance with the supplied product owners manual and local standards. 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.

**Grounding:** Adequate precautions should be taken so that the grounding provisions built into an electrical product are never defeated. This product is supplied with a polarized and grounding type IEC 320 power cord. An IEC 320 grounding power cord has two blades, which conduct power and a third grounding prong. The grounding prong is essential for personal safety and proper operation of this product. If the grounding prong does not fit your outlet, please consult an electrician and have the obsolete receptacle updated before operating this device.

**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 one that is fully safety rated by the necessary local authority.

The mains cord is intended to function as the safety disconnect for this product and must remain readily accessible for this purpose at all times.

**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, or where they intersect traffic paths. Never walk on a power cord. 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. Unplug mains cable before attaching or removing signal or speaker cables Failure to heed this warning may damage or destroy equipment and result in personal injury.

**Ventilation:** Electronic devices frequently 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.

The Xs Preamp is not expected to generate much heat; A 10 degree C rise above ambient would be typical of the control chassis and the power supply is expected to have a negligible temperature rise above ambient.

A minimum of 5 cm (2 inches) should be allowed for both side-to-side and vertical clearance.

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. Under no circumstances may the ventilation openings be blocked with items such as newspapers, cloths or drapes. No naked sources of flame, such as candles may be placed on or near this product.

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.

Servicing by a qualified technician is mandatory when the apparatus has been damaged in any way; such as when a power cord is damaged, when the device has been exposed to moisture or liquids, been dropped or does not operate normally in any way.

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

There is no power switch on the Xs Preamp, the unit is presumed to operate continuously.

Safety disconnect for this product is the detachable power cord by design. There are no internally mounted user serviceable fuses or other components within this product. Any service issues must be referred to a qualified electronics service technician

Installation: It is presumed that the two Xs Preamp chassis will be stand mounted. If installed on a cart or stand, the cart or stand must be rated by the manufacturer to support beyond the product weight. Extreme caution must be exercised if moving the product while installed in stand or cart to avoid tipping and possible physical injury.

Ambient Temperatures: Normal temperature rise of this device in extended operation is 10 degrees C. Do not operate this device in an environment greater than 45 degrees Celsius.

## Physical Setup

You can place this pre-amplifier anywhere you wish but it is suggested that you choose its placement in such a way that input cables can be short, neatly dressed and away from AC power lines.

You may stack the Xs Preamp power supply and control chassis, however performance of this product will be enhanced if some distance separates power supply chassis and control chassis. Alternately the two chassis may be arranged in a side-by-side configuration, separated by no less than 15 cm roughly 6 inches for lowest noise and best performance.

As previously indicated each Xs Preamp consists of two independent chassis connected to each other by twin umbilical cable terminated at both ends with a powerCON connector. The connector should never be attached or removed from either chassis with the power supply chassis attached to mains power.



## Electrical setup

Once the Xs Preamp chassis are placed in their physical location you may start making input and output connections, you may wish to reference the following section Physical Description and Operation.

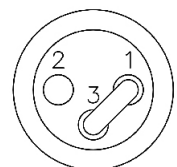
The signal connection may be either single ended (RCA) or balanced (XLR), choose one or the other.

If running single ended please verify that a jumper is installed between pins 1 and 3 of the XLR. Proper placement is shown on silkscreen on the back of the Xs-preamp control chassis.

Pin 1 XLR - Signal Ground

Pin 2 XLR - Plus signal

Pin 3 XLR - Minus signal (Inverted)





## Physical Description and Operation

If you have lost the jumpers, please contact either your dealer or the factory for replacements. A single ended input without the XLR jumper will result in diminished performance.

You may now connect the power supply to it's control chassis stages. Other than being line voltage specific the power supplies are universal to the Xs Preamps. Both right and left channel powerCON connections must be properly made up before AC power is applied.

**powerCON cable end connectors insert into their respective chassis connectors and then lock with a 1/8 turn clockwise. Insert the cable connector into the chassis receptacle; turn to lock until they click and latch. Verify that they latch and lock before proceeding.**

Last cable to be attached is the mains cable. Please make connection with the power supply IEC 320 socket first, house mains last.

Failure to follow this sequence can damage speakers and in some instances result in increased likelihood of electrical shock. As with all electrical devices the power cord (when used) is always the first to be removed and the last to be connected, no exceptions.

At this point you should be ready to play music.

The powersupply chassis connects to the electrical mains by a standard IEC 320 detachable power cord and to the control chassis by two 1.5 m powerCON umbilicals. On the rear of the power supply chassis is a single IEC 320 power inlet for connection to the mains, below a single 3AG fuse holder rated for AC mains duty. To the left and right side two locking powerCON connectors, which will accept the supplied, interconnecting powerCON umbilicals.

Safety disconnect is provided only by the detachable AC power cord. Under normal operation access to the AC power cord must be maintained in the event of electrical failure. The AC power cord should be removed from the mains and then the power supply when the unit is left unused or during atmospheric electrical events (lightening storms). Under normal circumstances and for best sonic performance the unit is left powered up continuously.

The control chassis is a true dual mono design: Right and left channels receive power independently via independent dedicated powerCON umbilical cables. In all instances of power and signal

the upper bank represents left channel, the lower bank represents the right channel.



Viewing the control chassis from the front.

Extreme right hand side is the rotary volume control opto encoder. The knob of the opto encoder lets you manually raise or lower the volume in 0.5 dB steps from  $-89.5\text{dB}$  to  $+9.5\text{dB}$  (100 discrete steps).

Left of center on the front panel is the vacuum florescent which shows all operational characteristics of the preamp.

Underneath the vacuum florescent display, four small push buttons and window for the IR receiver (remote control function)

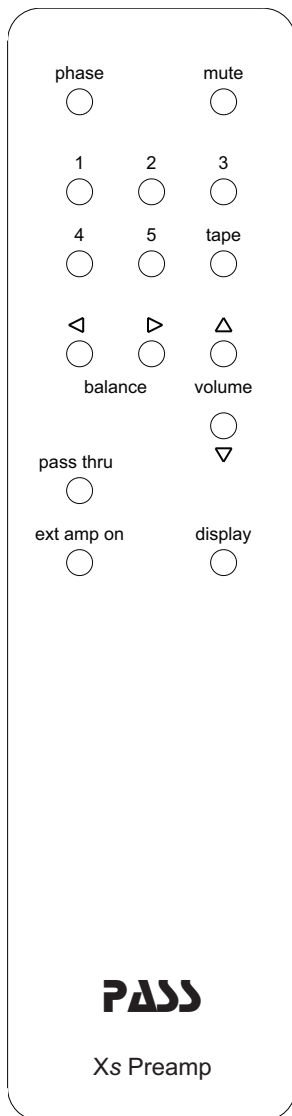
Buttons are labeled “Mute, Mode, Input < and >”

**MUTE:** Pressing the mute button once, quiets the output of the Xs-Preamp. Pressing the button a second time restores normal output.

**MODE:** Pressing the mode button, brings up the status of the slave (auxillary) output. The relative level of the Slave (Aux) output can then be set by the INPUT < and > buttons on the Xs-Pre front panel. This function is only available on the front panel. A second pressing of the mode button reverts the display back to normal status and returns the INPUT< and > to their normal function of manual input selection.

**INPUT < and >:** A single press on either of these buttons increments the input selection for rear panel inputs (XLR or RCA) selecting inputs 1-5 in the “normal” mode. In the “AUX” mode





as previously indicated these buttons allow for the relative offset (displayed in 0.5dB steps) of the slave (auxiliary) outputs in relation to the master (main) outputs.

The buttons on the hand remote duplicate most but not all of the functions on the Xs Preamp front panel. Level setting for the slave (auxiliary) output is not available from the hand remote.

From the hand remote you can direct access the following functions:

**Phase:** flips the absolute phase of the output. A “-” will appear on the preamp display to indicate the phase.

**Mute:** Mutes the output.

**inputs 1-5:** duplicating the manual Input < and Input > buttons on the front panel.

**Tape button,** selects and deselects the tape input (virtual input #7). Tape output is always live.

**Balance < and Balance > buttons** set the relative levels between right and left channel.

**Volume ^** increases the output level in 0.5 dB steps to a maximum of +9.5dB

**Volume v** decreases the output level in 0.5 dB steps to a minimum of -89.5 dB.

**Pass Thru** is a multi step software operation that selects the “pass-thru” input (virtual input #6) and slowly ramps the gain up to 0 dB. At any time during the “ramp-up” period, a second button push will cancel the “Pass-Thru” command and operation. Pass thru is intended to be used with a multi-channel processor. This feature allows the multi-channel processor total control over the analog signal chain.

**Ext amp on (External Amp On)** This button toggles a voltage between +12 Volts DC and 0 Volts DC. This switched DC signal is available at both right and left channels of the Xs-pre control chassis and is intended to control the turn on circuits of the associated power amplifiers. The power amplifiers if so enabled can be connected to the red and white binding posts on the rear panel of the Xs-Preamp control which are marked “ext amp on”.

**Display:** The display button controls the luminosity of the vacuum

fluorescent display on the front panel of the Xs-Preamp control chassis. The default setting is “bright”. One push on the button and the display re-sets to “dim”. A second push on the button and the display extinguishes. A third push and the blank display reverts to the default setting of “bright”.

With the display extinguished any command function, such as a volume change will illuminate the display in the “dim” mode for approximately 5 seconds and then return to a blank, extinguished state.



Viewing the gain channels from the rear... right to left.

There are 6 inputs of XLR and RCA, these inputs are labeled 1-5 and pass-thru. At any input you may choose either RCA or XLR. To properly input RCA one of the supplied gold jumpers must be placed between pins 1 & 3 of the associated XLR. You may use a mix of RCA and XLR, not however on the same channel. RCA inputs will function without the jumper but gain will be low by 6dB and noise will be up by a like amount.

The Pass Thru input deserves special mention. Pass Thru is identical to all other inputs with one exception. Pass Thru is associated with a software sequence that sets the gain of that input to 0 dB specific for use with a surround sound processor. However there is no requirement that the Pass Thru be used at the 0 dB default. The user is free to set Pass Thru manually to any level they wish after the initial ramp up.

Immediately to the left of the normal inputs is a side loop named conventionally as Tape In and Tape out. The selected input always appears at the Tape out without benefit of the volume control. One could use this loop for a conventional analog recording system or just as easily an analog signal processor. We do not anticipate a large number of users will have need of this feature, it is however

available. More frequently users will simply wish to use Tape In as the 7<sup>th</sup> input.

That pretty much covers the gamut of available inputs, next we have the three outputs which also are available both single ended and balanced. Two are considered “Master” (main) and one “Slave” (auxiliary). Any or all outputs may be utilized at the same time in so much as each one has it’s own output buffer and is fully independent of all other outputs .

The Master (main) outputs track the volume control directly in 0.5 dB steps (-89.5 dB though +9.5 dB) as indicated on the main display as true gain figures.

The Slave (auxiliary) outputs may be set equal to or less than the levels of the Master (main) outputs. Once set from the front panel of the control chassis the Slave (auxiliary) outputs will accurately track the Master (main) from either the front panel volume control or the hand remote.

Immediately to the left of the outputs a pair of five way binding posts which supply a 12 volt DC signal to control “on/off” functions on a number of power amps.

Next to that pair of binding posts and at the extreme left hand side of the rear panel as single locking powerCON connector.



## Power requirements

Lets talk about AC power requirements. The Xs Preamp draws 80 watts of current continuously.

The voltage and current rating are indicated on the rear panel of the power supply chassis. The power supply will be rated for either 100 Vac, 120 Vac or 240 Vac. Voltages are fixed at the time of build and are not changeable in the field.

The frequency rating of the AC line source will be 50Hz to 60Hz nominal in all cases. Please verify that the power supply voltage and current rating are consistent with the local mains power before connecting this product to the electrical mains.

The Pass Laboratories Xs Preamp power supply is provided with a conventional IEC power cord rated at 15 amps. The safety ground is provided by this power cord and attached at the chassis in the conventional approved manner.

The AC power input to the power supply runs through an RF filter, which reduces high frequency noise coming into and going out of the amplifier power supply. This filter and the safety ground both depend upon a quality earth ground from the ground pin on the power cord.

Under no circumstance should you defeat the ground connection of the power cord. Safety ground is isolated from signal ground to reduce the incidence of ground loop noise. The presence of safety ground will not degrade the audio signal chain.

You may substitute an aftermarket detachable IEC 320 style power cord of your choosing provided it is rated for at least 15 amps and meets all legal requirements and has been approved by the appropriate local testing authority.

“Pass”, “**PASS**”, “Pass Labs”, “Pass Laboratories”, Supersymmetry”, “Aleph”, and “Zen” and are all registered trademarks of Pass Laboratories, Inc., and all rights thereto are protected by law.

**PASS**®

Pass Laboratories Inc.  
13395 New Airport Rd., Suite G, Auburn, CA 95602  
voice: 530.878-5350 - fax: 530-878-5358 - web: [passlabs.com](http://passlabs.com)

## Pass Labs Warranty

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.

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.

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 it's 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.